Proceeding Paper

SQoF-WEAR Project. The Use of Wearable Devices to Identify the Impact of Stress on Workers' Quality of Life [†]

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Abstract: (1) Background: Stress is a major public health problem due to its relevant health, social and economic repercussions. Moreover, stress can be associated with work; when stress increases over time, burnout can occur, an occupational phenomenon recognized by the WHO in 2019. There is interest in the use of wearable devices to monitor and control stressors and their influence on the condition of workers. This study aims to identify the level of job stress and its influence on the quality of life of workers. (2) Methods:This longitudinal study was carried out between the end of May and mid-July 2021. Three assessment tools along with a daily and a weekly questionnaire were computerized through the RedCap platform. The participants had to fill out the diary and weekly questionnaires and wear a Xiaomi Mi Band 5 during the project. (3) Results and discussion: Thirty-six workers from the University of Coruña and from the University of Porto participated in the project. This study promotes the awareness of workers regarding their work stress and the influence of this factor on their quality of life using physiological (e.g., activity, sleep, and heart rate) and psychological indicators (self-report questionnaires in different moments).

Keywords: Xiaomi Mi Smart Band 5; burnout; occupational balance; occupational therapy; participatory health; wearable technology; work stress; sleep

1. Introduction

Work and working conditions can influence health status and quality of life. Work can be influenced by different factors such as work overload, lack of support, etc. The increase in these factors can cause work stress in the worker. When work stress is prolonged and worsened over time, it can lead to burnout situations. Burnout is an occupational phenomenon was recognized by the World Health Organization (WHO) in 2019.

Occupational stress has become one of the most frequent health problems in workers. It is estimated that approximately 3 million workers suffer from occupational stress and that it's 50–60% of the cases of absenteeism and presenteeism. In addition, it is estimated that burnout affects 10% of workers. In the last year, these data have been increased because of the current pandemic situation. Since working conditions have been significantly damaged due to the new forms of work organization and sociolabor relations.

Epidemiological studies report that workers with high levels of stress suffer from anxiety or fatigue, and in several situations, may develop depression. Some studies also consider occupational stress as a triggering factor for cardiovascular and respiratory diseases and physical or cognitive fatigue. Some studies refer to the importance and care of the components' workers' lives, with sleep being one of the most important factors for

workers' life. Likewise, the balance between the activities of daily life and work is relevant to obtain the workers' satisfaction and well-being.

Due to the aforementioned, institutions associated with occupational health and work, must promote the workers' quality of life, which gained priority during the pandemic situation, considering the news work demands and the situation of the workers. Thus, the development of studies that provide us with information on the situation of workers in order to create strategies and plans for detecting and monitoring stress and associated factors with the aim of promoting their quality of life and occupational performance. Nowadays, wearable devices are becoming more and more popular in society, being devices used in some researches due to the data they provide on some physiological parameters such as sleep, activity and heart rate. The information of this wearable can be used to know a person's stress and helps to raise awareness of stress and quality at work. In this study, the levels of of work stress and its influence on sleep, daily activity, and quality of life were evaluated. For this purpose, the Xiaomi Mi Band 5 and specific scales and questionnaires were used to measure the different aspects that influence the quality of life of workers.

2. Materials and Methods

2.1. Design of the Study

A cross-sectional study was conducted among workers belonging to the University of Coruña (Spain) and the University of Porto (Portugal), between the end of May and mid-July 2021. Prior to starting the study, all participants gave their informed consent for participating. Also, the study protocol was approved by the A Coruña-Ferrol Research Ethics Committee (code: 2019/249) and by the Ethics Committee of the Faculty of Psychology and Education Science of the University of Porto (code: 2021/06-03). In addition, the study was conducted following the Helsinki Statement for human research ethics. The researchers maintained the confidentiality of all data collected and the anonymity of each participant. Thus, the project respected the Spanish 2016/679 and European Organic 95/46/E.C. Law on the protection of personal data at all times.

2.2. Data Collection and Analysis

In this study, the Xiaomi Mi Band 5 wearable device and different computerized scales were used. To obtain biometric data, participants wore the Xiaomi Mi Band 5 for one month. This device collected minute-by-minute activity and heart rate data, and daily sleep data. In addition, the Research Electronic Data Capture Consortium (REDCap) program was used to computerize the different assessment tools used in the project. Participants had to complete a sociodemographic questionnaire at the beginning of the study; three assessment tools associated with quality of life, sleep quality, and stress perception at the beginning and end of the study; and a daily and weekly questionnaire with questions associated with sleep, stress, physical activity, and occupational balance.

2.3. Statistical Analysis

The project data are obtained in raw form using .csv files, so it is necessary to clean, organize, describe and process them to perform statistical analysis. For the statistical analysis, the IBM SPSS Statistic version 22 program was used. The different numerical variables (age, sex, etc.) will be expressed as mean, standard deviation, taking into account the maximum and minimum ranges. Pearson and Spearman's Rho tests will be used for the association between the variables.

3. Results

36 workers participated in the study. A total of 58.3% belonged to the University of A Coruña, were women (53.8%), and were under 30 years of age (30.8%). Most of the participants (61.9%) had moderate work-related stress and considered that their stress level had increased somewhat to quite a lot due to the COVID-19 situation.

In daily questionnaires, most of the participants came to work in person (67.9%), and felt somewhat frustrated (27.6%) and exhausted (22.4%). In the weekly questionnaires, 39.1% considered that they had been overloaded with tasks during the week.

Averages scores of PSQI and daily questionnaires show that participants had slight difficulties falling asleep and low sleep quality (39.9%). By contrast, wearable reported that participants attained optimal sleep habits. Data from wearable Xiaomi Mi Band 5 show that participants walked on average 5780 steps. Regarding sleep, participants slept 60 min of deep sleep and 233 min light sleep.

4. Discussion and Conclusions

This project contributes to know the influence of occupational stress on the quality of life in university workers, using physiological (e.g., activity, sleep, and heart rate) and psychological indicators (self-report questionnaires in different moments). The increasing use of wearable devices encourages to obtain real-time biomedical data available for people, promoting participatory medicine and knowledge of people's health status. Thus, in this project, workers have been able to have an insight and be aware of their stress level, different stressors, and other parameters related to their activity, sleep, and heart rate. This data can help the worker to improve in their routines and habits and add strategies to reduce their stress level and improve their quality of life [1].

Reference

1. Concheiro-Moscoso, P.; Groba, B.; Martínez-Martínez, F.J.; Miranda-Duro, M.d.C.; Nieto-Riveiro, L.; Pousada, T.; Queirós, C.; Pereira, J. Study for the Design of a Protocol to Assess the Impact of Stress in the Quality of Life of Workers. *Int. J. Environ. Res. Public Health* **2021**, *18*, 1413. [CrossRef]