

## Investigation Effect of Biorhythm on Work-Related Accidents in The Metal Industry (A Short Report)

Ehsanollah Habibi<sup>1</sup>, Zahra Mohammadi<sup>1</sup>, Ayoub Ghanbary Sartang<sup>\*2</sup>, Mohammad Zeinodini<sup>1</sup>

1) Department of Occupational Health, School of health, Isfahan University of Medical Science, Isfahan, Iran.

2) Occupational Health, Isfahan University of medical sciences, Isfahan , Iran.

\*Author for Correspondence: aioobghanbary@gmail.com

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### ABSTRACT

Biorhythm is one of the newest subjects in the field of cognition of mental ergonomics which can be very effective in reduction of work-related accidents or mistakes with no apparent reason. With evaluating Biorhythm individuals can intervention action to reduce job accidents carried out. Thus, the aim of this study was to determine the relationship Biorhythm and work-related accidents in the metal industry. This research is a cross-sectional and analytical-descriptive in the metal industrial Isfahan city of 120 work-related accidents during 2015. The required information was collected from available documents in HSE unit of the company biorhythm charts were drawn based on a date of accidents and participants birthdays, using natural Biorhythm Software V3.02 Conduct. Finally the data were analyzed using spss version 20 and descriptive statistics. This study showed that the frequency of accidents in critical days and negative section of physical cycle was more than expected. Also the frequency of accidents in critical days and negative section of emotional and intellectual cycles was less than expected. Most type of injury, including cuts to 35.8 percent and the lowest type of injury was torsion with 5 percent. Most limb injury, hands and fingers with 51.7 percent and the lowest limb injury were back at 2.5 percent. Accidents outbreak in physical cycles was 38.3 percent. These 120 accidents in additionally were causing 120 loss of working days in effect accident. Most percent of loss of working days were for 20 to 30 days with of 39.2 percent. Most percent of loss of working days were for 20 to 30 days with of 39.2 percent. Due to the physical nature of the work activities in the metal industry can be stated that the study showed that in physical work activities, frequency of accidents in critical days and negative section of physical cycle in which the person is not physically ready to do the job was more than expected. Therefore, by training and increasing the knowledge of workers regarding biological cycle and its effects on mental, emotional and physical status, each person effects can make some changes to their work plans during days that they do not feel well, physically or mentally, in order to prevent the likely accidents.

**Keywords:** Biorhythm, Work-Related Accidents, Metal Industry

### INTRODUCTION

Biorhythm is one of the newest subjects in the field of cognition of mental ergonomics which can be very effective in reduction of work-related accidents or mistakes with no apparent reason. Biorhythm theory suggests that people's behavior is affected by three biological cycles that start at birth and is continued through life. Biorhythm cycles are believed to originate from the day of birth and a base line begin their cyclical variation with an initial upward swing. These cycles have been termed: (1) the physical cycle which lasts 23 days includes strength, energy, endurance, resistance to disease; (2) the emotional cycle which lasts 28 days includes periods of elation, sadness, moodiness, creativity; and (3) the intellectual cycle which lasts 33 days includes alertness, memory, reasoning ability (Fig. 1) [1] any

change in the level of chemicals or function of the body, called biorhythm. Biorhythm theory for the first time in 1890 by two German doctors (Latman and Garriott) was introduced and gradually expanded [2] Science of "Biorhythm" is the science of predicting human performance by means of understanding biological rhythms. Biorhythm theory suggests that people's behavior is affected by three biological cycles that start at birth and continue through life. Biorhythm theory and practice in the field of physical, emotional and intellectual properly on different days or inappropriate explain [3] So that individual if the days specified for each cycle of physical, emotional and intellectual in good condition could be different things according to the physical, emotional and intellectual do, but in the days that for cycle physically, emotionally and intellectually

determined to be in the inappropriate mode is prone to accidents caused by human error [4] It should be noted that this cycle naturally in all humans from birth until death started and continues throughout life [5] Each of these cycles has a fixed period of time and has three stage are charges (positive), crisis (transition) and discharge (negative) (Fig. 2). Based on biorhythm theory the performance of the functional status of the biological cycles situation and combined, with another cycle[6] the days when are the positive region, most successful days are and unlike the days of passive curve (negative half curve) low-energy days are tedious. The most dangerous and the most critical these days when the biorhythm curves close to the zero line in the transition from the active phase on stage is off phase [7]Various studies have thus far claimed that a person’s biorhythms cycles are considered as one of the causes of unsafe behaviors and occupational accidents [8,9] Foutkak and Talor et al in a 15 month investigation showed that the critical days biorhythm has been of cause of work-related accidents [10,11] due to the physical nature of the work activities in the metal industry, thus the aim of this study was to investigation effect of biorhythm on work-related accidents in the metal industry Isfahan city.

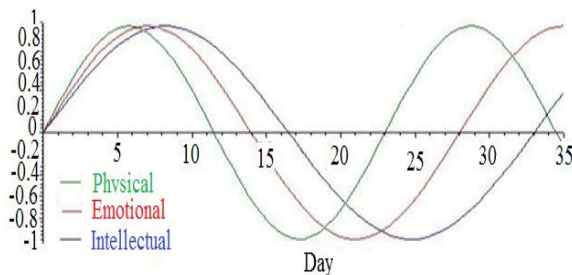


Fig. 1. Biorhythm Cycles

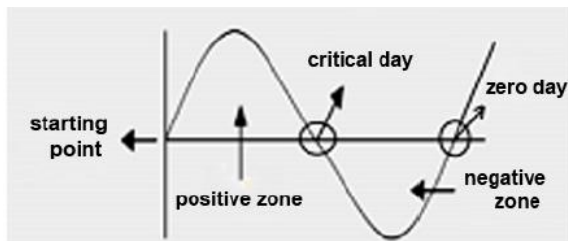


Fig. 2. Difference period of time Biorhythm Cycles

**MATERIALS AND METHODS**

This research is a cross-sectional and analytical-descriptive in the metal industrial Isfahan city of 120

work-related accidents during 2015. The required information was collected from available documents in HSE unit of the company biorhythm charts were drawn based on a date of accidents and participants birthdays, using natural Biorhythm Software V3.02 Conduct. Accidents were chosen for study that the people at the incidence accidents have an impact. For Biorhythm investigation and the impact on the accident extract were data date of birth date accident incidence the time of the incident type injury organ injury and the number of working days lost due to accident. Each of these accidents led to the loss of working days has been of variable number of days lost were collected in three groups include 1 to 10 days 10 to 20 day and 20 to 30 day were classified. Using date convertor date became change from solar to Milady and enters in software Easy Biorhythm Calculator. After receiving information by software, for any accident, recorded positive or negative and critical days in each of physical, emotional and mental cycle. An inclusion criterion was people at the incidence accidents have an impact [12]. Also an exclusion criterion was an unwillingness to cooperate in study [13]. Data analysis was performed with SPSS (version 20) and descriptive statistics and chi-square test. Also the value of  $P \leq 0.05$  was considered statistically significant. This study was performed after getting permission from the Ethic Committee in Medicine.

**RESULTS**

In this study, the information 120 accident was collected from available documents in HSE unit with person's average age (SD) 38 (2.7). The frequency of accidents by the type of injury and limb injury showed that most type of injury, including cuts to 35.8 percent and lowest type of injury was torsion with 5 percent of the number of accidents. Most limb injury, hands and fingers with 51.7 percent and the lowest limb injury was back with 2.5 percent.

According to Table 1 accidents outbreak in physical cycles was 38.3 percent. Physical cycle on the accidents outbreak is more than impact other emotional and intellectual cycle. Also in the negative section of each three cycle of more accident occurred than positive section and shows that a negative section each a biorhythm cycle impact of the accidents.

**Table 1:** Frequency outbreak work-related Accidents in each biorhythm cycle

Cycle type	Frequency	Percent
physical cycle	46	38.3
emotional cycle	20	16.17
intellectual cycle	12	10

The chi-square test showed that the cycle of physical and emotional more than impact on the accident outbreak in the critical day's than to intellectual cycle ( $P \leq 0.05$ ).

These 120 accidents in additionally were causing 120 loss of working days in effect accident. According to Table 3, the most percent of loss of working days was for 20 to 30 days with of 39.2 percent and the lowest percent of loss of working days was with 30 percent for 1 to 10 loss of working days. The frequency distribution loss of working days is shown in Table 2.

**Table 2:** The frequency loss of working days

Number loss of working days	Frequency	Percent
1-10 day	36	30
10-20 day	37	30.8
20-30 day	47	39.2

## DISCUSSION

Aim of this study was to determine the relationship Biorhythm and work-related accidents in the metal industry. The results of the present study confirm the effect of biorhythm on the outbreak of the accidents. Due to the nature often work activities metal industry can be said that the frequency of outbreak accident is more than in the negative and critical physical cycle than other biological cycle. Also between the outbreak accident and the critical days of the in a cycle of emotional and intellectual cycles, than the physical cycle, there was no significant relationship. The findings this study confirms the findings of the study by Carvey and Sharma [14,15]. Garriott and Latman in study on vehicle drivers the concluded to that the frequency of outbreak accident in the negative section and critical physical cycle is more than other cycles, which confirms the findings of the present study [2]. Soutar and et al to investigation critical analysis of biorhythms and their effect on industrial accidents in agra casting manufacturing units, concluded to that the frequency of outbreak accident in the critical days and physical cycle of were more than emotional and intellectual cycles, which confirms the findings of the present study [16] Mohammad Fam and et al in a study that investigated to biorhythms effect on the incidence of lost time accidents and their severity in manufacturing industry concluded to that Physical cycles most impact on outbreak accident and lost days caused the accident, which confirms the findings of the present study[8] Bordbar and Bafghi that investigated to biorhythms effect on the accident at the mine concluded to that biorhythm cycles and physical cycle and the critical days most impact has been on the severity of the accident and outbreak accident, which confirms the findings of the present study [17] Arab and *et al.* that check out of the effect of biorhythm on work-related

accidents the results showed critical days of individuals biorhythms cycle influence the outbreak of accidents. Also 60 percent of accidents have been occurred in critical days of biorhythm cycle, which confirms the findings of the present study [18] Zakerian *et al.* that check out, ergonomic study of biorhythm effect on the 62 occurrence of human errors and accidents in automobile manufacturing industry results showed that the frequency of accidents in critical days and negative section of physical cycle was more than expected. Also the frequency of accidents in critical days and negative section of emotional and intellectual cycles was less than expected [19] The results findings of Fabiano et al. confirmed that biorhythm cycles are effective in accidents and biorhythm cycles are effective in accident frequency index and accidents by severity for workers in metal industrial [20]

## CONCLUSION

Due to the fact that one of the main causes of accidents are human error, Administrators can use the biorhythm theory and the study of aspects of intellectual, physical and emotional personnel in the use of engineering controls and management in the workplace, in reducing work-related accidents and their consequences are very effective. Findings of this research showed that bad and critical days of individuals' biorhythms cycle influence the outbreak of accidents. Therefore, by training and increasing the knowledge of workers regarding biological cycle and its effects on intellectual, emotional and physical status, each person effects can make some changes to their work plans during days that they do not feel well, physically, in order to prevent the likely accidents.

For to ensure the validity of biorhythm theory can be further studies will do on the working environment and conditions difference of physical, emotional and intellectual with high population.

## ETHICAL ISSUES

Ethical issues such as plagiarism have been observed by the authors.

## COMPETING INTERESTS

Authors declare that there is not any competing interest.

## AUTHORS' CONTRIBUTIONS

Professor Habibi, Mohammadi and zeinodini designer, conducted the study and advisor the study. Ghanbary Sartang was Corresponding author.

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