

Evaluation of the role of individual and external background factors in traumatization and in everyday life

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Abstract. The scientific article considers the importance of background factors in emergence of off-the-job injuries, which factors if present increase the probability, and if absent reduce the risk level of traumatization. During the problem study, we categorized the background factors. It was found out that there is a direct correlation between individual background factors and emergence of off-the-job injuries ($p < 0.001$). Reverse, statistically weak, and doubtful correlation between external factors and the number of off-the-job injuries was revealed. At the same time, preventive work should also consider existence of external predisposing factors.

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Problem urgency

Traumatism is one of the most important medical and social problems of the modern times not only in Kazakhstan, but also in the whole world. Currently, traumas in economically developed countries hold the third place among the population death causes; at that, traumas mostly kill people of young and active working age [1, 2, 3, 4]. As for the structure of traumatism, in 2012, the leaders were off-the-job and outdoorsy traumas, the share of which was equal to 84.3% of all types of injuries. Due to the complexity and diversity of the causes and conditions resulting in home injuries, we find it reasonable to talk of not the causes but the background (predisposing) factors of off-the-job traumatism. As sleet, for example, does not cause a trauma, but only contributes to it. Consequently, the existence of background factors increases the probability of off-the-job injuries, and, vice versa, their absence decreases the traumatism risk degree [5, 6, 7]. Emergence of background factors takes place at immediate influence of the starting factors. The latter are inadequate actions of a human and conditions, at which the off-the-job injuries take place.

Materials and methods

Based on the current observation, 1,071 cases of off-the-job injuries were studied. Differentiation of off-the-job injuries was carried out in accordance with the previously suggested criteria [8, 9, 10]. In order to process the obtained results, the correlation analysis and analysis of variance was used.

We categorized the background factors of

off-the-job traumatism as external and individual.

The 1st group included: 1) malfunction of household utensils; 2) lack of light on an entryway, an apartment, pavement, yard territory, etc.; 3) sleet and excessive snow; 4) excessive garbage at the work place; 5) lack of care after the yard; 6) bad design of home appliances; 7) low level of home amenities; 8) bad quality of the floor in the house (apartment); 9) defects in the electrical wiring insulation.

The 2nd group included: 1) vision deficiency; 2) lack of care; 3) lack of sleep, fatigue; 4) helio-meteodependence; 5) age; 6) mental and somatic diseases, anatomic (physical) deficiencies; 7) previous events; 8) medicines taking and tonic beverages drinking; 9) relations in the family.

Research results

Individual background factors were identified in 64.52+1.48% of cases. The group of individual factors included the cases of off-the-job injuries, which were not accompanied with external factors. With at least one external factor existing as well as in case of simultaneous combination of the latter and an individual one, the background factors were categorized as external factors.

The approximate estimation of the power of correlation between background factors and the number of emerged off-the-job injuries based on the Spearman's correlation coefficient (Table 1) shows that there is a strong direct correlation between individual factors and emergence of off-the-job injuries ($p < 0.001$). And weak reverse correlation with the external factors was stated ($p > 0.05$).

At calculation of the Pearson correlation

coefficients, the similar results were obtained (refer to Table 1). We noticed a strong direct correlation between individual background factors and the number of off-the-job injuries ($p < 0.001$) and reverse, statistically weak, and doubtful correlation between external factors and the number of off-the-job injuries ($p > 0.05$).

Table 1. Correlation between the background factors and the number of emerged off-the-job injuries

Background factors	Spearman's correlation coefficient	t	Pearson correlation coefficient	p
Individual	+0.731	5.25	0.837	7.47
External	-0.118	0.58	-0.097	0.48

The ratio of determination describing the influence of individual factors is equal to 0.701. Consequently, the share of the influence of individual factors in the probability of off-the-job injuries is equal to 70.1%. The most frequent individual factor is lack of sleep. Cases of sleep duration less than 8 hours per day were included in this category. The sleep was considered optimal if the duration of sleep was 8 and more hours per day. The duration of sleep less than 8 hours was typical of $66.25 \pm 2.16\%$ of injured persons. Lack of sleep of injured people varied between 3 and 7 hours; at that, the maximum relative share belongs to the sleep duration equal to 7 hours ($41.51 \pm 2.76\%$) and 6 hours ($36.16 \pm 2.69\%$). In order to identify the extent of influence of sleep duration (the organized factor) on the quantity of off-the-job injuries (the resulting attribute), we used the analysis of variance. The calculations proved that the influence of the sleep duration on the number of off-the-job injuries was rather considerable and equaled to 71.0%. The trusted margins of the power of influence of sleep duration at the level of confidence $p = 0.05$ (F table = 4.96) are equal to 0.710 ± 0.144 . Just 29.0% is the share of all other influences unaccounted within this research.

However, lack of sleep does not only result in the greater number of off-the-job injuries, but also increases their relative share. For example, the injured persons who slept less than normal two times more often suffered fractures ($p < 0.001$) and contusions ($p < 0.001$). Considerable relative share of various wounds was also typical of them.

The correlation between other individual factors and emergence of off-the-job injuries is shown in Table 2.

Vision deficiency, the share of which equaled to $52.12 \pm 1.5\%$ of the injured people, held the second place among the individual factors. We determined a strong direct correlation with it. The largest share among the abnormalities of various types of refraction has moderate hypermetropia. Its

share in the entire refraction pathology is equal to $39.85 \pm 3.00\%$. Other refraction disorders were positioned in the following sequence: low grade hypermetropia ($30.45 \pm 2.82\%$), low grade myopia ($21.43 \pm 2.52\%$), moderate myopia ($3.76 \pm 1.17\%$) high hypermetropia ($3.01 \pm 1.05\%$), and high myopia ($1.50 \pm 0.74\%$). Perfect vision was reported by $47.88 \pm 1.55\%$ of the injured persons.

There is direct moderate correlation between the quality of sleep and the number of traumas. Poor quality of sleep, which manifests itself in difficulty in falling asleep and multiple awakening during the night before the trauma, was reported by $25.21 \pm 1.98\%$ of the injured persons. $74.79 \pm 1.98\%$ had no problems with the sleep.

On the day the persons were injured, $36.25 \pm 2.19\%$ of them said they felt sick due to various symptoms. However, the correlation between pathological symptoms and the number of off-the-job injuries is statistically weak. Most complaints included general weakness, headache, and restraint. Much less often, the injured persons complained of heart rate, drowsiness, faintness, pain in joints, and torpidity.

To manage the pain, $13.75 \pm 1.07\%$ of the injured persons took respective medications several hours before the trauma. Most often, they took hypotensive ($18.88 \pm 3.27\%$) and sedative ($18.18 \pm 3.22\%$) medicines. In $15.38 \pm 3.02\%$ of cases, they took coronaractive medicines, in $12.59 \pm 2.77\%$ – analgesics, and in $4.19 \pm 1.67\%$ – antispasmodics. The "others" group equals to $30.77 \pm 3.86\%$. There is a statistically significant correlation between the taking of medicines and the number of injuries.

Table 2. Correlation between individual background factors and the number of off-the-job injuries

Individual background factors	Pearson correlation coefficient	t	p
Vision deficiency	+0.874	5.95	<0.001
Poor sleep	+0.620	2.62	<0.05
Medicines taking	+0.578	2.35	<0.05
Pathological symptoms	+0.520	2.02	>0.05
Hearing disorder	+0.375	1.34	>0.05
Hand tremor	+0.033	0.11	>0.05

Lesser incidence of the pathology was noticed with respect to the hearing organs. Diminished hearing was noticed with just $17.21 \pm 1.17\%$ and very poor hearing was noticed with $0.48 \pm 0.21\%$ of the questioned people. And the majority ($82.31 \pm 1.18\%$) of the injured people had normal hearing. Disorders of the vestibular apparatus

measured by hand tremor at rest, are rare ($4.23 \pm 0.62\%$).

The overwhelming majority ($95.77 \pm 0.62\%$) did not have any of such disorders. Analysis of the subjective assessment of workability before the injury shows that the majority of injured persons ($63.36 \pm 1.49\%$) rated their workability as "normal", $29.23 \pm 1.41\%$ reported "a little tired", $5.58 \pm 0.71\%$ described it as "unworkable, very tired", and only $1.83 \pm 0.41\%$ indicated "very good workability".

At studying the scale describing the mood before the trauma, $74.23 \pm 1.36\%$ reported they were in "good" mood. $15.58 \pm 1.12\%$ of the injured people estimated it as "not very good". $8.65 \pm 0.87\%$ said they were in "very good" mood. And insignificant number ($1.54 \pm 0.38\%$) reported "very bad" mood.

The analysis of the scale of estimating the events, which could influence the overall condition of the injured person, evidences their absence in $87.02 \pm 1.04\%$ of the cases. The events (12.98%), which happened on the day of trauma, had the following percentage: "minor troubles" — $5.86 \pm 0.73\%$, "joyful events" — $5.00 \pm 0.67\%$, "major troubles" — $1.54 \pm 0.38\%$, "tragic events" — $0.29 \pm 0.17\%$, "very joyful events" — $0.29 \pm 0.17\%$.

As it has been noticed before, external background factors contributed to emergence of off-the-job injuries in $35.48 \pm 1.48\%$ cases. Generally, the external background factors had the following incidence: lack of light — $40.5 \pm 2.6\%$; sleet — $22.25 \pm 2.43\%$; excessive garbage and wet surface at the work place and in residential premises — $14.80 \pm 1.25\%$; malfunction of household utensils — $12.63 \pm 1.84\%$; lack of care after the yard, foot-walks — $8.05 \pm 0.94\%$; bad design of home appliances — $0.78 \pm 0.05\%$, low level of home amenities; bad quality of the floor in the house (apartment) — $0.38 \pm 0.03\%$, defects in the electrical wiring insulation — $0.46 \pm 0.03\%$.

The power of correlation between individual external factors and emergence of off-the-job injuries is shown in Table 3.

To sum up the carried out study of the background factors of off-the-job traumatism, it is to be noted that in the current context, the leading role in the emergence of off-the-job injuries belongs to the group of individual factors, which strongly mediate the influence of background factors.

We find that this point is of principal importance in terms of prevention and reduction of the degree of off-the-job traumatism. At the same time, the preventive work must be also accomplished with the purpose of decreasing the trauma risk of the environment and complete removal of external background factors of off-the-job traumatism.

Table 3. Correlation between the external background factors and the number of off-the-job injuries

External factors	Pearson correlation coefficient	t	p
Lack of care after the yard and foot-walks	+0.548	3.20	<0.01
Malfunction of household utensils	+0.388	2.06	<0.05
Excessive garbage at the work place and inside residential premises	+0.326	1.69	>0.05
Bad design of home appliances	-0.088	0.43	>0.05
Sleet	-0.086	0.42	>0.05
Lack of light	+0.054	0.26	>0.05
Other factors	+0.118	0.58	>0.05

Summary

Evaluation of the extent of correlation based on the Spearman's correlation coefficient showed that there is a strong direct correlation between individual factors and emergence of off-the-job injuries ($p < 0.001$), and reverse weak correlation with external factors ($p > 0.05$). At the same time, the preventive work must be also accomplished with the purpose of decreasing the external background factors of off-the-job traumatism.

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