FEATURES OF THE DERMATOGLYPHIC FOOT PATTERN IN SUICIDAL MEN
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Abstract. Since suicide is one of the most common types of violent death among people of working age (including military personnel) and children, it is necessary to conduct in-depth studies of the structure of skin patterns in a group of people with completed suicide in order to develop methods of active suicide prevention. In order to determine the propensity to commit suicide, the dermatoglyphs of the distal phalanges and metacarpal pads of the toes of 138 male subjects aged 18 to 59 years who committed suicide and 100 control subjects aged 18 to 59 years were studied. The type of pattern (arc, tibial or fibular loop, curl, complex pattern), delta and comb counts were determined. It was found that the suicide group differs from the control group mainly in a higher number of interruptions (ending X) of the main plantar lines A, B and C; an increase in the frequency of arc patterns on most toes of both feet with a degree of reliability; a decrease in the frequency of curls on the third toe of the left foot to 44.5±11.2 (p<0.001) and an increase in the frequency of this pattern on the second toes of both feet; an increase in the value of the comb count in the area of the tibial edge of the foot, with a decrease in the values near the fibular edge of the foot.

Key words: phenotype, dermatoglyphic status, deviant behaviour, suicide, psychotype.

Statement of the problem and analysis of the latest research. In Ukraine, at least 5,914 people took their own lives in 2021. At the same time, 87% of the registered suicides were committed by men, 13% by women, according to the Ministry of Health. According to the World Health Organisation, one person in the world takes his or her life every 40 seconds, so the interest of researchers in this cause of death is not accidental [1]. Suicide is one of the main causes of death among Ukrainian soldiers, accounting for 18 to 50 per cent of all fatalities. The reasons for this are difficulties in adapting to the harsh army living conditions and excessive stress. A study of parasuicides conducted by several organisations under the supervision of the WHO found the following: the average age of suicides was 19.9 years; 65 per cent of attempts required further hospitalisation. Suicide was mainly committed by hanging (54.5 per cent), cutting wounds with damage to large vessels (27.3 per cent), jumping from high-rise buildings (9.1 per cent), and poisoning (9.1 per cent).

It should be noted that suicide mortality rates are general characteristics of territories that do not take into account the factors that influence its changes. Meanwhile, according to some authors [3], it is necessary to take into account age, gender and territorial gradations of the population, which cause significant differences in the level, dynamics and trends of suicide rates in each region. It is important to consider the relationship between suicide and ethnicity and genetic factors [4]. In addition, the level of mortality from suicide may be influenced by the profession, the presence of severe somatic pathology and mental disorders [5]. There is no doubt that some preventive work is needed to reduce the suicide rate.

Material and methods
The object of the study was the internal and external relationships between anthroposcopic, anthropometric and dermatoglyphic distal phalanges of the toes and metatarsal pads of the feet obtained from 138 male subjects aged 18 to 59 years who committed suicide and 100 control subjects. In determining whether a person belonged to one group or another, the following factors were taken into account: committing one of the suicidal acts, consent of the investigator in charge of the criminal case; absence of genetic pathology, endocrine system and musculoskeletal system pathology; age over 18 and under 59 years [6,7].

In the research of foot dermatoglyphs, the type of pattern (arc, tibial or fibular loop, curl, complex pattern) on the distal phalanges and metatarsal pads, delta and comb counts were determined (Fig. 1).

In addition to the type of pattern, its height, width, and the type of line flow, the following relative indicators were calculated on the toes: delta count and scallop count (the number of skin combs between the centre and the edge of the pattern).

To study dermatoglyphic features, we used the method of photographing foot dermatoglyphs (Fig. 2) with subsequent image processing using special graphic editors, in particular, the Fingerprint identification algorithm (FIA)
The main task of this software is to convert a raster image into a vector image. When converting a raster image to a vector image, errors can often be made due to incorrect interpretation of the pixel matrix data. In this case, the choice of an algorithm (or software tool) that is suitable for processing images obtained from papillary drawings is extremely important, which minimises the likelihood of errors when processing dermatoglyph images.

Various methods of univariate and multivariate statistical analysis were used to assess the relationships between variables. All data obtained directly in the course of the study were recorded and structured in digital format using Microsoft Excel spreadsheets based on the Windows operating system. Statistical calculations were carried out using the software package STATISTICA 12 for Windows (licence number ZZS999000099100363DEMO-L).

**Results and discussion**

The study of foot dermatoglyphs in male suicides revealed a significant difference from the control group. In particular, the main plantar line A on both feet in suicidal men was blindly interrupted in 30.0% of cases, while in the control group - only in 10% (p<0.001). Similarly, the main plantar line B on the left foot in the study group was significantly more likely than in the control group (25% and 9%, respectively) to have an X ending.

The main plantar line C had peculiarities of endings only on the left foot. Here, the number of line interruptions (ending X) was increased with a significance level of p<0.001. The main plantar line E differed from the control only by a significant increase to 6.0% in the frequency of interruptions on the left foot (X-type endings) at p<0.001.

As for the pattern of distal phalanges, in the suicide group, a simplification of the patterns was found - an increase in the frequency of arc patterns on most of the toes of both feet with a degree of reliability of up to p<0.001. There were no clear patterns in the distribution of scroll patterns in our material. There was only a significant decrease in the frequency of curls on the third toe of the left foot to 44.5±11.2 (p<0.001) and an increase in the frequency of this pattern on the second toes of both feet (left to 18.0±6.0%, right to 30.0±10.0%) at p<0.001 (Fig. 5).

In the distribution of interdigital comb counts, a fairly clear pattern was found - in the group of suicidal individuals, there was an increase in comb counts in the area of...
the tibial edge of the foot, with a decrease in values near the fibular edge of the foot. However, most of these differences were observed at the level of trends. Significant differences were only in the values of the comb count on the left foot - 52.45±5.41 in suicidal patients and 33.32±4.01 in the control group (p<0.05).

Conclusions
Thus, in the course of the study, we found that there are certain statistically significant differences in the dermatoglyphs of the feet in the group of suicides, which indicates the existence of a genetic basis for this phenomenon. It is considered necessary to conduct in-depth studies of the structure of skin patterns in a group of people with completed suicide in order to develop methods of active suicide prevention.

Financial Disclosure. The author declared no financial support.

Conflict of Interests. The author declare that no conflict of interests exist.

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