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Chances of survival in isolation in the case of Polish military pilots – a comparative analysis of the research from 1998 and 2018

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Manuscript Preparation
E Funds Collection

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Abstract

Background and Study aim: Survival school and SERE (Survival, Evasion, Resistance, Escape) have been gaining more and more importance in Polish military aviation for over 20 years. The aim of this research was to answer the question whether in the period of 20 years there was a change in the awareness, knowledge and skills pertaining to survival of Polish military pilots.

Material and Methods: In 1997, fifty military pilots at the age of 23-41 were surveyed, while in 2018, ninety military pilots at the age of 26-52. An anonymous questionnaire was used to conduct the research.

Results: The research conducted in 2018 showed that at least 74% of the Polish military pilots had a sufficient level of "survival awareness". A sufficient level of "knowledge of survival" was found among 40% of the respondents, whereas 43% had "survival skills". In comparison to the results obtained 20 years ago, there was only a significant difference in "survival awareness". Fulfilling the criteria of isolation, was only true for 22% of the Polish military pilots, whereas in 2018 the proportion amounted to 23%.

Conclusions: It was demonstrated on the conducted research that just like 20 years ago, only every fifth Polish military pilot is prepared to operate in isolation at least to a sufficient degree. Education and training activities in the Air Force over the past 20 years have only contributed to the increase in "survival awareness" of the military pilots.

Key words: knowledge of survival • SERE • soldiers • survival awareness • survival skill

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Survival school of soldiers – psychomotor competence necessary to manage forced isolation in an environmental occupied by the enemy.

Survival awareness – contractually defined factors related to survival school, both of an internal nature (i.e. directly related to the respondent's attitudes, activities, interests) and, in a certain sense, external (e.g. possession of specific equipment by the respondent).

Survival knowledge – basic knowledge of ecosystems to facilitate survival in a variety of geo-climatic conditions and isolation.

Survival skills – a set of skills taught on survival school and SERE courses that enable survival in diverse geoclimatic conditions and isolation.

SERE – Survival, Evasion, Resistance, Escape.

INTRODUCTION

Shooting at the American military pilot O`Grady over Bosnia in 1995, and events related to that, are believed to be a breakthrough moment because they changed the approach to the survival school training (now SERE) provided for Polish Armed Forces. Following the aircraft shooting, the pilot landed among the enemy population, and during next 6 days he successfully hid in the Bosnian forests so as not to be found by the Serbian troops. Once he managed to get in touch with his army, he was rescued by the United States Marine Corps Special Operations Command. O`Grady admitted that he survived merely thanks to the SERE training sessions that he had undertaken. This event prompted an immense interest in the "survival" topic both in a practical sense and in a theoretical domain of the Polish environment concerned with the aviation training. Within a short period of time, a few significant pieces of work were published. The majority of the authors come from the Military Institute of Aviation Medicine [1-4]. The issues pertaining to preparing military pilots to perform operations in isolation have also become the topic of some doctoral dissertations [5, 6].

The research approach was comprehensive. The topic was touched upon by specialists from the fields of study such as aviation medicine, physical culture, psychology and defense. A plethora of scientific conferences and research results were devoted to the discussion on the need to train Polish pilots in survival school. One of such conferences in 1999 presented the concept of survival school, whose co-author was the commander of the Air Force Academy (now the Aviation Military Academy) [7]. Gradually, training sessions were introduced in the Military Fitness Training Center, and within a few years they were adjusted to the NATO standards.

At that time soldiers' survival school was defined. It was understood as knowledge and psychomotor capabilities related to the ability to deal with situations of forced isolation on the land overtaken or controlled by forces of the enemy. In contrast to the term "survival" in the common understanding, the term in question was limited to the issues concerned with both maintaining one's life in the conditions of isolation and not being able to rely on own strength, other individuals or groups (1st category of tasks in "soldiers' survival school) and undertaking a fight for survival with the forces that aim at defeating a solider (2nd category of tasks in "soldiers" survival school). The skills that belong to the 1st category revolve around recognizing the location, obtaining food, hiding (masking) and providing premedical first aid. The 2nd category of tasks involves activities that occur in case of a life-threatening situation in a direct contact with an enemy (using weapons, close combat) [4].

In order to diagnose general preparations and the approach to the issues related to survival school, the surveys among military pilots and then aviation cadets as well as students of the School of Aviation were conducted in 1998. The results proved that at that time only 22% of pilots had a sufficient level of strength to survive in the described conditions [8]. Likewise, the same situation was affirmed among aviation cadets and students of the School of Aviation. It was demonstrated that only a half of the surveyed pilots expressed the need to participate in the survival training (SERE).

The objective of this research was to answer the question whether in the period of 20 years there was a change in the awareness, knowledge and skills pertaining to survival of Polish military pilots.

MATERIAL AND METHODS

Chances of survival in isolation in the case of Polish military pilots were examined in an indirect manner by means of filling in an anonymous questionnaire. Three spheres were analysed in an indirect manner: "survival awareness", "knowledge of survival" and "survival skills". The theoretical basis for this classification was derived from the criteria that was put forward by RM Kalina in1997 year [2]. It was assumed that a sufficient level of the factors in question (that is the spheres, particular skills and areas of knowledge) was testified by the majority rate. For instance, five questions were used to diagnose knowledge of the ways to keep physical fitness. The expectations were met if at least three answers were correct. Regardless of the general principle, the presence of the three features (assigned to concrete spheres) was sought based on the rule of zero-one variable. This goal was achieved by posing questions of the "can you" type (*…give an intramuscular injection*, etc.). Whereas, the three questions were structured in such a way that it was possible to verify the respondent's credibility. The survey consisted of 14 questions.

Given the methodological constraints in diagnosing awareness as such, it was acknowledged, in simplified terms, that there are certain factors that prove the presence of "survival awareness", which are both of internal nature (reference to behaviour, activities and interests of a respondent) and to some degree of external nature (possession of certain objects). In both cases, the factors are closely connected to survival. The internal factors include "preferable forms of physical activities in times of one's youth that could prepare for survival in isolation" and "readiness to stay in extreme conditions for a temporary period". The external factors mean that someone "is in the possession of equipment that facilitates survival". It was arbitrarily established that the highest chance of survival in isolation, following shooting or forced landing, occurs in the case of a pilot that meets the criteria at a sufficient level for each of the three main factors (that is spheres): survival awareness, knowledge of survival and survival skills.

Participants

In 1997, fifty military pilots at the age of 23-41 were surveyed, while in 2018, ninety military pilots at the age of 26-52.

Statistical analysis

In the statistical analysis of the test results, the structure indicator expressed in percentage was used, and the significance of differences between the studied groups was determined using the Student's t-test.

RESULTS

The research conducted in 2018 showed that at least 74% of the Polish military pilots had a sufficient level of "survival awareness". A sufficient level of "knowledge of survival" was found among 40% of the respondents, whereas 43% had "survival skills". In comparison to the results obtained 20 years ago, there was a significant difference in "survival awareness" (Table 1). Fulfilling the criteria in all three researched spheres, that is a sufficient level of readiness to deal with the conditions of isolation, was only true for 22% of the Polish military pilots, whereas in 2018 the number amounted to 23%. Considering that – in accordance with the research criteria – all three criteria must be met to achieve a sufficient level of chances to survive in isolation (survival awareness, knowledge of survival and survival skills), it was stated that there are no significant statistical differences between the two groups of the surveyed pilots.

In the sphere of survival awareness, it was shown that the substantial difference refers to the possession of equipment that facilitates survival. These days, a much larger number of the surveyed military pilots declares the possession of equipment, which is conventionally classified as "survival equipment". In 1998 such a declaration was made by 46% of the respondents, whereas in 2018 this number reached 77%. As regards the criteria – readiness to stay in extreme conditions for a temporary period and acceptance of survival forms in the times of one's youth – it was demonstrated that there was a decreasing tendency (Table 2).

When it comes to declared knowledge of survival, there was no considerable difference in particular variables, except for knowledge of ways to keep physical fitness (Table 3). The military pilots surveyed in 2018 manifested a much higher (60%) familiarity with issues related to keeping physical fitness than the military pilots surveyed in 1998 (28%). The data from the research allow for the statement that the Polish military pilots are most acquainted with survival aspects connected to fauna and flora of basic ecosystems – it is proven by the fact

Table 1. Proportion [in %] of Polish military pilots indirectly revealing at least a sufficient level of awareness, knowledge, skills of survival.

Variable	Year	
	1998	2018
Survival awareness	58	74*
Knowledge of survival	42	40
Survival skills	52	43

*p<0.05

Table 2. Indirectly manifested "awareness of survival" by Polish military pilots [in %].

Variable	Year	
	1998	2018
Readiness to stay in extreme conditions for a temporary period	30	22
Accepting survival forms in your youth	50	45
Possession of survival equipment	46	77*
The habit of spending free time in a physically active way	70	74
Readiness to persuade relatives to physical activity	74	84

*p<0.05

Table 3. Percentage of Polish military pilots indirectly revealing elements of basic "knowledge about survival" [in %].

Variable	Year	
	1998	2018
Fauna and flora of basic ecosystems	60	48
Methods and forms of self-help	46	50
Culinary issues	36	20
Ways to maintain physical fitness	28	60*
Habits of individual species of animals and fish	20	20

*p<0.05

that 60% of the declarations in 1998 and 48% in 2018. Only every other military pilot – both in 1998 and 2018 – declared that they were not oblivious to methods and forms of self-defense. However, knowledge of habits typical for particular species of animals and fish still remains low (20% in both years).

Declared "survival skills" do not distinctly differentiate compared groups of the military pilots. 13 variables of "survival skills" indicated the difference at a significant statistical level of how shelters would be constructed (declared skills decreased from 86% in 1998 to 40% in 2018) and how meals would be prepared (declared skills decreased from 74% in 1998 to 27% in 2018). Similarly to 1998, less than a half of the military pilots declared skills in using knots, filleting fish, performing relaxation exercises, distinguishing animal tracks and climbing rocks. More than a half of the current military soldiers declare skills in making simple tools (74%), crossing water reservoirs (65%), finding their way without a map (60%) and providing self-help in case of injuries (53%). All in all, the research results related to "survival skills" show that those skills used to be more common in the past (Table 4).

In terms of skills in the field of survival medicine, it was demonstrated that there are differences in only two variables at a significant statistical level. It applies to skills such as stopping haemorrhage (increase in the declared number of people by 7%) and dealing with viper bites (reducing the number of people by 9%). The smallest difference between the surveyed pilot communities (in the absence of statistically significant differences) concern the issue of intramuscular injection (42% in 1998 and 39% in 2018), poisoning procedures (40% and 36%, respectively), fracture procedures (respectively: 74% and 78%) and frostbite treatment (50% and 44%, respectively) (Table 5).

DISCUSSION

The terms "survival awareness", "knowledge of survival" or "survival skills" used in the work are highly arbitrary and indirect. While addressing the issue of more or less conscious involvement of military pilots in physical activity focused on survival school, the term "consciousness" was employed in the common sense of the word. The primary goal was to observe that "awareness of survival" is a compilation of many factors that determine the ability to observe

Table 4. Proportion [in %] of Polish military pilots revealing indirectly "survival skills" in 1998 and 2018.

Variable	Year	
	1998	2018
Constructed shelters	86	40*
Making simple tools from hand-held raw materials	80	74
Crossing water reservoirs	78	65
Preparation of meals	74	27*
Crossing a mountain river	56	48
Orientation in the field without a map	55	60
Self-help in the event of injuries	54	53
Mushroom discrimination	50	52
Handling nodes	48	41
Fish filleting	22	31
The use of relaxation exercises	18	20
Differentiating animal tracks	18	23
Climbing the rocks	14	20

*p<0.05

important factors for the pilot to survive in the conditions of isolation, when a person cannot rely on anyone else. Similarly, "knowledge of survival" and "survival skills" were evaluated indirectly. However, this method seems reasonable if one takes into account the lack of reliable data on the possibilities to perform operations by Polish military pilots in various isolation conditions. The obtained research results allow to answer the question whether educational and training activities resulted in a positive change in the indicated factors.

The results of the research manifested that over a 20-year period, despite undertaking the survival training (SERE), the percentage of Polish military pilots with a sufficient level of preparation for survival did not increase. Over the past 20 years, many organizational and training activities were initiated in order to increase the chances of survival of military pilots after shooting of the aircraft or emergency landing within the enemy area. It is noteworthy that in the earlier period, to some extent, trainings that aimed at preparing soldiers to survive in isolation also took place. For example, there was a military instruction issued in 1982 by the Air Force Command [9]. Following the conference in 1999, during which the concept of the survival school was presented [7], at the Military Training Centre in Zakopane, it was only in 2003 when the training session of survival

Table 5. The structure of skills in the field of survival medicine [in %].

Variable	Year	
	1998	2018
Stopping bleeding	74	81*
Procedure of limb fractures	74	78
Procedure of viper bites	52	41*
Dealing with frostbite	50	44
Intramuscular injection	42	39
Procedure in case of poisoning	40	36

*p<0.05

school was introduced. Initially, 3 hours of classes were provided as part of basic fitness camps [10]. Then, from 2012 there has been as a separate training in the field of SERE, in accordance with NATO procedures [11].

After the period of 20 years, out of the three basic criteria (awareness, knowledge and survival skills), only "survival awareness" presented a greater percentage of pilots meeting this criterion (74%). Greater awareness of the pilots about the possibility to participate in the armed conflict had a potential impact on the results. There is a likelihood of shooting down a military pilot while performing a combat task over the enemy land. From time to time it is reported by the media. It can be assumed that due to professional secrecy, public opinion is not informed about many of such cases. It is a pity that the conviction of the surveyed military pilots about the need for good preparation for operations in conditions of isolation does not equal the quality of training sessions. SERE trainings at level A are carried out only on the theoretical basis and they last 9 hours. Thus, such a training session cannot contribute to the improvement of survival skills. One can only believe that knowledge and awareness of survival will increase thanks to the influence of this training. Certainly, participation in the military pilot training has an impact on the acquisition of knowledge and skills related to survival.

A positive aspect is the occurrence of a significant increase in knowledge of how to maintain physical fitness. On the one hand, it probably results from a generally greater interest in physical fitness (as part of a healthy lifestyle nowadays), on the other hand, from a more serious approach of military pilots to physical preparation, which is perceived as an important factor in this profession. It is also their understanding of the relationship between physical preparation and defensive preparation. Moreover, it is the responsibility of military pilots for their equipment and the performance of a combat task that influences safety. This important change should be carefully used by means of incorporating appropriate physical education measures. Physical education methods and methods that are used in the case of military pilots are of major importance [12]. Irrespective of the fact that physical targeted preparation and special physical preparation of military pilots varies depending on whether it is preparation for operations in the air or on the land, there is a common point in at least one aspect. It is the ability to maintain body balance. Besides, it is also one of elements of the qualification procedure for candidates for military pilots [13]. The ability to maintain body balance is also important during operations performed by soldiers on the ground (land).

In the past, the Polish Army devoted time to observe changes in body balance distribution tolerance skills (BBDTS) during training courses of survival school for aviation soldiers [14, 15]. As a research tool, a rotational test (RT - non apparatus version) was employed. This tool can be used in all field conditions and, more importantly, it is subject to the validation procedure [16]. Surveys conducted in the conditions of survival school training were carried out on the example of a group of experienced military pilots (with around 17 years of military service) [14] and on the example of a group of Air Force Academy cadets specializing in jet aircraft pilot [15]. A comparative analysis of the research results demonstrated that BBDTS deteriorated among both military pilots and aviation cadets; respectively: from 5.8 points up to 6.9 points and 3.2 points up to 6.7 points. It is interesting to notice in this comparison that candidates for military pilots (younger people) have a much better BBDTS level than experienced military pilots. This may indicate that flight training and long-standing military pilot profession do not contribute to the increase (or it even they do not preserve) the ability to maintain balance. It implies that the deterioration of BBDTS correlates with the age of respondents. Even though an elite of military specialists was selected, the number of people that were surveyed is too small to clearly draw such a conclusion. Another health-promoting aspect of BBDTS perceived in the long-term is the possibility to be used as a preventive effect on health protection against harmful effects of falls [16, 17]. Empirical studies determining the susceptibility test to the body injuries during the fall (STBIDF) among women and men were presented by R. Bąk [18] in his paper, in which he justified the use of Rotational Test in health education. It seems that it would also be advisable to include that in physical education not only for military pilots, but also for other soldiers. Current physical education classes for professional soldiers are focused on general physical fitness, with an indication of running endurance and muscular strength. There are not enough pro-health elements. Therefore, using the potential of soldiers in the form of their interest in methods and

forms of improving physical fitness (which is confirmed by the results of the research conducted in 2018), requires a rapid action of personnel responsible for physical aspect in the army. Undoubtedly, the military technique is changing, but there is also the need for changes in the physical preparation of a soldier with the use of the latest scientific research results. In 2003, Z. Drozdowski [19] referred to this topic in his article about the relationships between "physical culture and war". The author in the study looked at the issue from the anthropologist's point of view to notice changes in modern armed conflicts. He spoke about the need for a different approach to physical preparation of soldiers. He pointed out that nowadays there are different motor skills, which decide about the "usefulness" of a combat soldier and reduce the role of endurance and muscular strength in favour of coordination motor skills. Z. Drozdowski also mentioned the need to introduce soldiers to physical training such as diving, climbing, survival and a greater range of combat sports. A. Chodała [20] conducted a noteworthy experiment connected to the realization of hand fight classes, which were described in his doctoral thesis. The author proved that cadets whose psychophysical included the intensification of exercises related to direct combat were better prepared for intervention activities than cadets trained according to the traditional program. B. Wolska et al. [21] also indicated the favourable impact of practicing martial arts as preparation for service in uniformed formations by conducting research among military class students.

It appears that military decision makers do not often take into account the results of scientific research, which indicates the necessity to introduce changes in the training of soldiers. One can get the impression that most frequently it is a subjective assessment of the instructors rather than reliable information of the researcher that matters. Should it be the case in such an important issue as the defence and psychophysical preparation of a soldier? There is only one answer to this question, that is definitely not. The psychophysical preparation of a soldier (officer of the uniformed services) should be based on rational psychomotor tests (multi battles) [22, 23].

CONCLUSIONS

It was demonstrated on the conducted research that just like 20 years ago, only every fifth Polish military pilot is prepared to operate in isolation at least to a sufficient degree.

Education and training activities in the Air Force over the past 20 years have only contributed to the increase in "survival awareness" of the military pilots that participated in the survey.

It is advisable to introduce adequate psychomotor tests in order to evaluate preparation for activities in confinement conditions, at the end of training for soldiers attending SERE sessions.

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