**Medical Science**

# The impact of extreme sports on mental health: Is "No Risk No Fun" a healthy approach?

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## ABSTRACT

*Introduction:* This research explores the various aspects of extreme sports, especially their effect on human mental health. *Results and discussion:* Extreme sports play an essential role in the lives of many people, affecting both their mental and physical health. Not all extreme sports enthusiasts are alike, and they often get into these pursuits for reasons aside from the thrill and adrenaline. Some may want to find creativity, balance themselves emotionally, or achieve self-realization, while others seek ways to venture and learn. Extreme sports improve feelings, reduce tension, and increase emotional toughness. They also provide a means to develop bonds through activity. They promote healthy habits. However, extreme sports also carry the risk of negative consequences, such as injuries, adrenaline addiction, emotional burnout, and cognitive problems, including depression and social isolation. *Conclusion:* Extreme sports have significant effects on mental health. They can provide various benefits, such as improving mood, reducing stress, and developing personality. People can benefit from them by improving their mood, reducing stress, and developing their personalities. Conscious risk management and social support are key to minimizing adverse effects and fully utilizing the therapeutic potential of extreme sports.

**Keywords:** Extreme Sports, Mental Health, Adrenaline, Risk, Self-Awareness

## 1. INTRODUCTION

As a form of physical activity, sports can significantly impact mental and social health, improving well-being, reducing depression, and better social functioning. Studies have long shown that running and football improve aerobic capacity and circulatory system function at rest, while football helps reduce obesity (Oja et al., 2015). Regular physical activity reduces cardiovascular risk and improves body

composition (Oja et al., 2024; Patnode et al., 2017). There are indications of health benefits even for physical activity, such as regular walking on sunny days (Kelly et al., 2018).

Studies have shown that the secretion of endocannabinoids in the brain produces analgesic and euphoric effects in response to high-intensity activities (Table 1) (Matei et al., 2023). But what about the impact of extreme sports on human health? Extreme sports play an increasingly important role in many people's lives, both as a form of physical activity and a way to achieve inner balance and self-fulfillment (Monasterio et al., 2018). Unlike traditional sports focused on competition, extreme sports attract participants with the possibility of exploration, pushing boundaries, and experiencing intense emotions. Very different motivations drive participants.

Some want to experience the adrenaline and overcome fear; others wish to develop internally. These sports can be associated with injuries, but can also bring many benefits. Preliminary studies also suggest that specific personality traits and adaptive mechanisms play a key role in coping with the challenges of extreme sports. Doctors will need to learn how to prevent and treat injuries specific to extreme sports (Bouchat et al., 2022). This study aims to present the effect extreme sports have on the mental health of participants. We will include both positive and negative aspects.

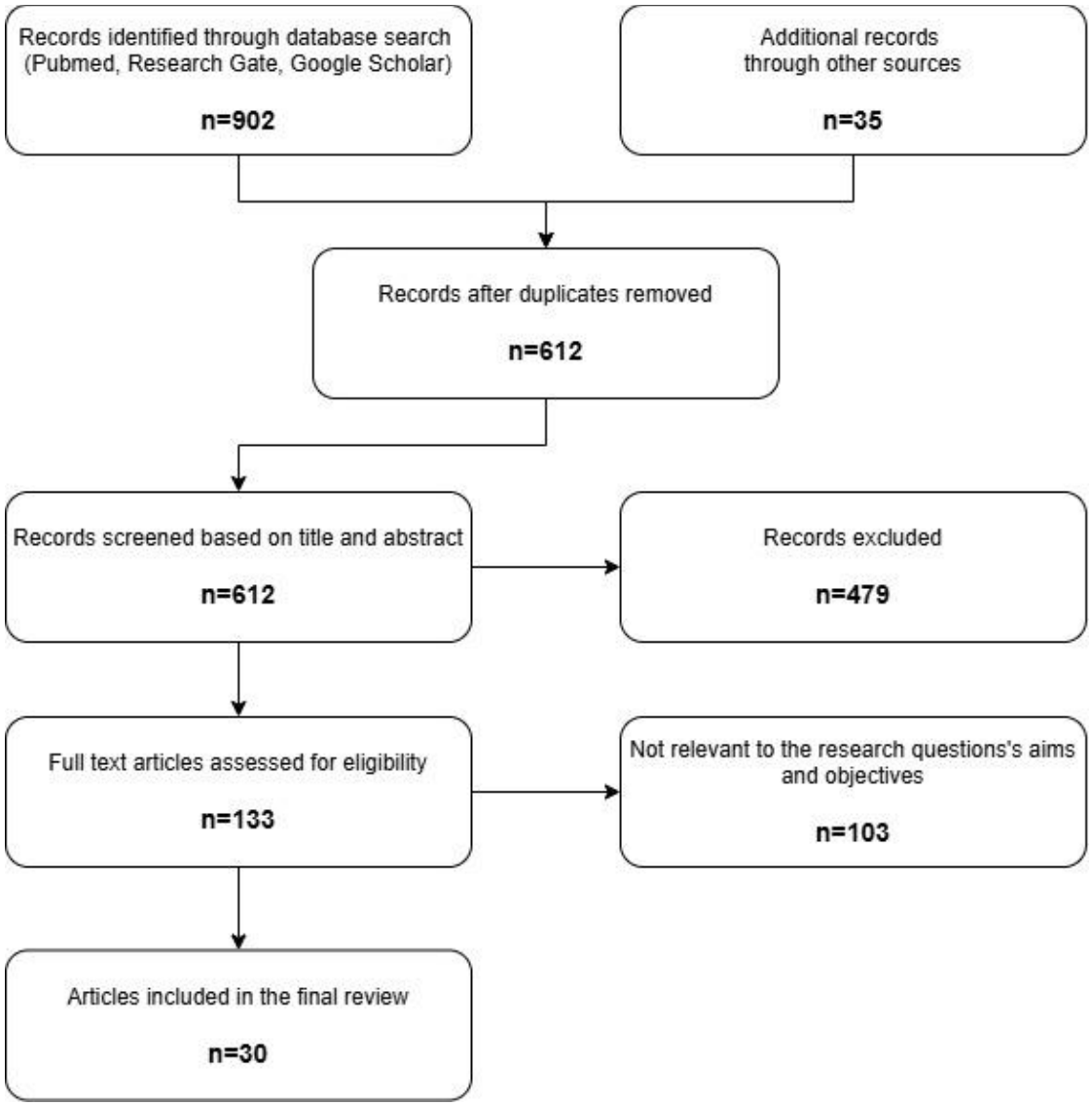


**Figure 1** Consort chart

## 2. METHODOLOGY

This literature review used databases such as PubMed, PubMed Central, ResearchGate, and Google Scholar, along with the keywords: Extreme sports, Mental health, Emotional resilience, Adrenaline, Self-realization, Risk, Motivations of athletes, Self-awareness, Adrenaline addiction, Stress reduction, Adaptive mechanisms, Risk psychology, Emotional benefits. We found nine hundred thirty-seven articles published between January 2010 and September 2024 (Figure 1). Finally, we selected 30 titles describing the impact of extreme sports on human mental health.

*Inclusion Criteria*: Clinical research, systematic reviews, and meta-analyses about the impact of extreme sports on mental health, published in English.

*Exclusion Criteria*: Studies with weak methodologies and publications written in languages other than English.

## 3. RESULTS AND DISCUSSION

Extreme sports are becoming more and more popular. Participants in these activities are not a homogeneous group, and their motivations go beyond risk and adrenaline to include creativity, learning, and self-fulfillment. In extreme sports, the emphasis is on exploration and discovery instead of the competition typical of essential sports. Extreme sports can support physical and mental health, develop emotional resilience, and promote pro-ecological behavior (Brymer et al., 2020). This experience is associated with intense fear, but the participant in an extreme sport does not allow fear to control him. He is aware that control over the future is not always possible (Brymer and Schweitzer, 2013).

Research shows that participation in extreme sports is not just a desire to take risks. It is a complex desire of many factors overshadowed by the danger involved (Brymer, 2010). Studies show that the personality of an athlete has a significant impact on their relationship with extreme sports. People with a strong need for connection with others, who feel that they have fulfilled this need, are likelier to experience positive emotions and are less likely to become addicted to exercise than those with weaker social motivation (Schüler et al., 2014). One group of people who practice extreme sports are mountain climbers. Studies have shown that mountain climbers have unique personality traits that distinguish them from the average population.

They show a greater tendency to seek novelty, perseverance, self-discipline, and the ability to cope with complex conditions. At the same time, the study indicates that there is no single defined personality profile of a climber because participants differ significantly in these traits (Monasterio et al., 2014). Outdoor activities such as climbing affect the mental health and well-being of participants. Studies emphasize benefits such as improved mood, reduced stress, and increased self-awareness. The personality traits of these athletes can be different or similar. Mountaineers and base jumpers are courageous and open-minded, disciplined and well-organized. Mountain climbing can be therapeutic if the user has the right preparation (Monasterio and Cloninger, 2019).

Ryn divided the studied climbers into two personality profiles. The most common was schizoid-psychasthenic, characterized by interpersonal withdrawal, lack of need to maintain contact with others, mysteriousness, and unconventionality. The second personality profile discovered was the asthenic-neurotic type. People with this personality avoid social contact despite the need to establish relationships. It comes with a fear of being hurt and high emotional sensitivity. These people are shy, exhibit neurotic behavior, and may experience neurotic symptoms, such as depressive episodes, phobias, or psychosomatic problems, especially in situations of assessment.

At the same time, they try to compensate for this with high aspirations and the need to confirm their value (Sołtysik et al., 2019). In the general opinion of the population, BASE jumping is considered one of the most extreme activities. We can classify people practicing this sport into groups: wingsuit users and other BASE jumpers. The former shows the most outstanding willingness to take risks. A scientific study hypothesized that wingsuit users would be characterized by a higher level of mental resilience and a lower level of harm avoidance. Researchers conducted the test on 183 BASE jumpers. Researchers rejected the hypothesis, finding no significant differences in psychological characteristics between wingsuit users and other BASE jumpers (Bouchat et al., 2022).

BASE jumpers have high mental resilience, independence, perseverance, and risk-taking tendencies. However, this is a heterogeneous group in terms of motives and reactivity to stress in the hypothalamic-pituitary-adrenal (HPA) system (cortisol reactivity) and the sympathetic arousal system (alpha-amylase reactivity). This personality profile, characterized by high resilience, influences decision-making and pursuing benefits despite the risk of injury or trauma. This trait, known as The Right Stuff, is a

common characteristic of all BASE jumpers (Monasterio et al., 2016). Studies also highlight the role of substance abuse in overcoming fear when practicing extreme sports.

That is why the role of a psychiatrist in supporting athletes is so important (Tofler et al., 2018). The role of family or friends of athletes is also essential. However, their actions are insufficient to significantly modify the practice of extreme sports or even to stop them. Friends who practice similar sports are often the only people who support such practices in their friends (Vande and Inglés, 2021). Experiencing risk together builds strong interpersonal bonds, which has a positive effect on mental health (Musumeci, 2021). Additionally, emotional support and motivation are essential in improving sports results (Peris-Delcampo et al., 2024). Studies have also shown impulsivity and bipolar traits in people practicing high-risk sports.

Researchers studied a group of 480 athletes. They found that participants scored higher on impulsivity and bipolarity than those in the control group. These results suggest that impulsivity and bipolar traits may be associated with undertaking high-risk activities (Dudek et al., 2016). Another study was conducted on 363 people from Poland, practicing extreme sports (ES) and high-risk sports (HRS) for at least 2 years. The study utilized tools such as the Eysenck Personality Questionnaire (EPQ-R), the Inventory of Physical Activity Objectives (IPAO), and the Satisfaction with Life Scale (SWLS). Men scored higher on the psychoticism scale, and women on neuroticism. ES athletes were more extroverted than HRS.

The most critical motives were physical fitness and health, regardless of gender. Women more often indicated motives related to self-confidence and physical attractiveness. People practicing HRS reported higher levels of satisfaction than those in ES. Extraversion and experience were positively associated with life satisfaction. Addiction tendencies reduced satisfaction, especially in men practicing ES. The conclusion is that there are apparent differences between ES and HRS in the context of personality traits, motivations, and impact on quality of life. Motivations related to extreme experiences (adrenaline) affected satisfaction in men practicing ES (Krokosz and Lipowski, 2022).

Women practicing extreme sports exhibit personality characteristics associated with masculine or androgynous gender identity (Table 1) (Cazenave et al., 2007). Winter swimming is an activity that requires high resistance to stress, the ability to adapt to extreme conditions, perseverance, and openness to new experiences. Regular winter swimming brings benefits such as improved mood, antidepressant effect, and better general mental condition. However, gradual preparation and supervision are necessary to benefit fully (Knechtle et al., 2020). Ultra-endurance running brings together people with a tendency towards perfectionism, ambition, and the need to overcome their limitations.

This sport requires participants to have significant mental resilience and the ability to adapt to difficult conditions (Scheer et al., 2022). An important concept is the fear felt by such people. It turned out that it is integrated and experienced as a potentially constructive event (Brymer and Schweitzer, 2013). Extreme sports such as skydiving, climbing, or surfing provide intense emotions and a sense of freedom that attracts people. Participants experience an adrenaline rush that improves blood flow, relaxes muscles, and increases energy availability. This effect becomes addictive. The feeling of danger strengthens survival mechanisms, which some people experience as pleasant.

People who practice extreme sports have a sensation-seeking personality, which often requiring more potent emotional stimuli. Research indicates a possible connection between a preference for risk and a genetic mutation that affects dopamine receptors, which may explain the intense search for emotions. There is a risk of injury. Constantly pursuing the experience of strong emotions can cause addiction. The result is increasingly serious challenges. That's why we should approach extreme sports with caution. In this way, we will avoid threatening mechanisms (Musumeci, 2021). Participants often experience constant stress. It can lead to the development of perfectionism and a sense of competition (Hornby et al., 2024).

Phenomena such as somatic and cognitive stress response are common in these sports (Martinho et al., 2024). Some studies indicate the possibility of symptoms similar to behavioral addictions, such as the need to constantly participate in the sport, difficulty in stopping the activity, and withdrawal symptoms, such as anhedonia or an intense desire to return to the sport (Hornby et al., 2024). Adrenaline addiction and the search for increasingly dangerous challenges can lead to an increased risk of injury as a result of making rash decisions (Martinho et al., 2024). Participants may gain a sense of greater control and self-confidence over time, leading to lower perceived risk and taking on increasingly risky challenges.

Although extreme sports can strengthen a sense of belonging to a community, discontinuing participation can lead to feelings of isolation and alienation (Hornby et al., 2024; Martinho et al., 2024). Long-term exposure to difficult conditions, such as extreme altitudes, low temperatures, or high overloads, can lead to health problems, including respiratory, cardiovascular, and nervous system

damage. In difficult moments, such as injuries or failures, a lack of emotional support can lead to depression, burnout, or emotional problems (Martinho et al., 2024). In the group of people practicing competitive sports, negative personality traits or emotions such as anxiety, frustration, depression, mental exhaustion, increased sensitivity to crisis, increased occupational stress, and decreased quality of life were more frequently observed (Table 1) (Aleshicheva, 2016).

Practicing extreme sports is a hobby that is not for everyone. Fortunately, deciding whether we want to do them is up to us. It is crucial to adapt the entertainment to our character so that it brings more benefits than losses. Extreme sports are available at different levels of adrenaline saturation and risking life. Some will need a more significant stimulus and a lack of any safeguards. Others need a bit of adrenaline to get excited, but an enormous amount harms them (Table 1). With too high a dose, we block ourselves, and the sympathetic nervous system takes control of our body. We have to find the perfect balance for ourselves. Therefore, the choice is quite broad. The only limitation is our mind.

**Table 1** Summary of the impact of extreme sports on mental health

| **Crucial points** | **Explication** |
|---|---|
| Role of extreme sports | Extreme sports affect health on various levels, both mental and physical. |
| Psychological benefits | Mood improvement<br>Mental strength<br>Calming down<br>A sense of belonging |
| Personality traits of the participants | Impulsiveness<br>Perfectionism<br>Risk-taking tendencies |
| Social aspects | People who practice extreme sports often belong to different sports groups in which they build strong bonds. However, there is a risk of exclusion if they stop practicing in these sports. |
| Risks and negative effects | Adrenaline addiction<br>Physical injuries<br>Emotional burnout,<br>Cognitive problems<br>Withdrawal effects |
| Biological and neurological effects | Strong experiences release endocannabinoids, which cause euphoria and relaxation. There can be genetic predispositions, which lead an athlete to more risky sports. |
| Influence of gender | Women who practice extreme sports often exhibit characteristics typical of men. |
| Mental health considerations | Increased anxiety<br>Frustration<br>Mental exhaustion<br>Drug addiction to manage fear |
| Future recommendations | To prevent adverse effects, it is necessary to provide education and psychological support to athletes. |

## 4. CONCLUSION

We have proven that extreme sports have a significant effect on human health. Analysis of the literature allowed us to take a closer look at this phenomenon. It turned out that the athlete experienced many positive emotions. Participants in these activities feel more self-fulfilled. At the same time, extreme sports carry the risk of adrenaline addiction, physical injuries, and emotional problems. Risk factors include perfectionism and impulsivity. That is why a cautious approach is important. The key is balancing passion with responsibility

for your and others' health. Future efforts should focus on preparing participants. Psychiatrists should also develop therapies to support people struggling with the issues mentioned in this article.

**Author's contribution**

Conceptualization: Karolina Kalinowska
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Resources: Michał Orzechowski
Data curation: Joanna Orzechowska
Writing-rough preparation: Karolina Kalinowska
Writing-review and editing: Jan Karczmarz
Supervision: Karolina Kalinowska
Project administration: Karolina Kalinowska, Paulina Fijałek
All authors have read and agreed with the published version of the manuscript.

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**Informed consent**

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**Conflict of interest**

The authors declare that there is no conflict of interests.

**Data and materials availability**

All data sets collected during this study are available upon reasonable request from the corresponding author.

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