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HEALTH, BEHAVIOR, AND PERFORMANCE IMPLICATIONS OF NON-PRESCRIPTION DRUG USE IN ATHLETIC POPULATIONS: AN INTERDISCIPLINARY PERSPECTIVE

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ABSTRACT

The use of non-prescription or over-the-counter (OTC) medications has become increasingly common among athletes due to the physical demands of intensive training and competitive sports. These medications are frequently used to manage pain, inflammation, fatigue, and minor illnesses, often without direct medical supervision. This study investigates the patterns, health implications, and performance-related effects of OTC drug use in athletic populations. A quantitative research design was employed using a dataset consisting of 600 athletes representing multiple sports disciplines. The analysis examined variables related to medication use, health outcomes, behavioral influences, and athletic performance indicators. Descriptive statistics, correlation analysis, and regression techniques were used to evaluate the relationships between OTC drug consumption, injury occurrence, and performance measures. The results indicate that analgesics and stimulant-based substances are the most frequently used medications among athletes. A moderate association was observed between injury frequency and medication use, suggesting that athletes experiencing injuries are more likely to rely on OTC drugs for pain management and recovery. Additionally, several athletes reported mild physiological side effects associated with medication consumption. The findings highlight the potential health risks and behavioral drivers associated with self-medication practices in sports environments. The study emphasizes the importance of medical guidance, education, and improved medication management strategies to promote safer drug use among athletes.

KEYWORDS: Non-prescription drugs, OTC medication, athletes, sports pharmacology, self-medication, athletic performance, injury management, athlete health

1. INTRODUCTION

Self-medication patterns are also on the rise among sportsmen, as sporting activities impose a lot of physical and psychological stresses on the players. Athletes often have injuries, tiredness, swelling, and minor diseases in the course of intense training and competitions. In order to cope with such conditions fast and be able to perform, most athletes use over-the-counter (OTC) drugs, which are readily available, without a medical prescription. Although these medications are typically deemed to be safe when taken in proper form, there is a concern about the possible health risk and behavioral consequences associated with the use of these medications in the sporting environment. Figure 1 shown that self-medication tactics are commonly used by athletes as a part of regular performance management in the context where the retention of training and the ability to remain competitive are to the highest priority (Bursik et al., 2025).



Figure 1: Medications and Supplements Used in Sports

Image by Qimono (2018), Pixabay. <https://pixabay.com/users/qimono-1962238/>

The figure represents commonly used over-the-counter medications and supplements, including analgesics and stimulant-based products frequently consumed by athletes for pain management, inflammation control, and performance enhancement. Excessive or unsupervised use may lead to gastrointestinal, renal, and cardiovascular health risks.

The most prevalent OTC drugs in sporting activities are the non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and naproxen, which are commonly used to treat pain and inflammation caused by high levels of physical exercise. Research has demonstrated that these medications are at times taken by athletes and even prior to competitions or training to prevent injury or to treat it (Leyk et al., 2023). Nevertheless, regular or large doses of NSAIDs can cause some negative health effects, including gastrointestinal dysfunction,

renal distress, and heart problems (Brennan et al., 2021). Besides analgesics, caffeine-based supplements are also widely adopted by athletes to improve their alertness, stamina and overall performance. Although these are viewed as advantageous, inaccurate labeling and the presence of adulterants in sports supplements have also been expressed as being harmful due to potential exposure of athletes to unintended pharmacological effects (Finan, 2023).

Antihistamines and cold medications are also widely used by athletes in order to treat allergies, respiratory infections and other minor illnesses that can interfere with training schedules. These substances could affect the physiological processes like thermoregulation and cardiovascular activity during physical exercise (Newhouse, 2024). Even though OTC drugs are not prohibited and are quite common and accessible, their use in the sports setting is not properly tracked. In contrast to performance-enhancing substances, which are prohibited and have a high degree of control due to the anti-doping systems, non-prescription drugs are comparatively less taken care of by the sports organizations and the regulatory bodies (Abbasi Barazi, 2025). As a result, athletes can turn to self-medication without proper medical advice, and the likelihood of unwanted health outcomes and even concealment of underlying injuries becomes high (Ferry et al., 2020).

Although there is an increasing trend in the use of OTC medications by athletes, previous studies have mainly been done on doping drugs as opposed to legal drugs that are used in sports. In addition, a significant amount of the literature focuses on the use of medication in a strictly medical context, and little has been done to incorporate behavioral and sociological aspects that drive the decision of athletes to use drugs. This gap indicates that interdisciplinary studies with a focus on the intricate connections between health in athletes, medication habits, behavioral pressures, and performance outcomes are necessary (Brennan et al., 2021; Leyk et al., 2023).

1.1. Research Objectives

1. To identify patterns of non-prescription (OTC) drug use among athletes
2. To assess the health risks associated with OTC medication use in athletic populations
3. To examine the relationship between OTC drug use and athletic performance outcomes

2. LITERATURE REVIEW

2.1. Non-Prescription Drug Use in Sports

The self-prescription or even self-non-prescription drugs have gained popularity in the sporting

settings. Often, athletes have pain, inflammation, fatigue and minor illnesses because of the high physical loads of the training and competition. Consequently, most athletes have opted to use self-medication strategies to cope with such conditions and sustain performance rates. Among the young adult groups and the university population, self-medication and self-medication behavior have been extensively reported, which means that people usually use readily available drugs without a doctor-patient relationship (Al Kubaisi, 2020; Bawin et al., 2021). In sporting environments, such behaviors are usually affected by the necessity to recover quickly and to perform. Studies indicate that the use of non-steroidal anti-inflammatory drugs (NSAIDs) is one of the most widespread drugs used in sports. Popular NSAIDs that are used by collegiate athletes to alleviate pain and inflammation during training and competitions include ibuprofen and naproxen (O'Connor et al., 2019). Moreover, all kinds of stimulants including caffeine are popular because of the perceived effects on endurance, alertness, and reaction time during physical activities (Jakubowski et al., 2018).

2.2. Pharmacological Effects of OTC Drugs

The OTC medicines, which are utilized in sports, may be broadly divided into analgesics, stimulants, and antihistamines. NSAIDs are popular analgesics, with the help of which musculoskeletal pain and inflammation caused by strenuous exercise are relieved. Even though these drugs can be used as a short-term relief, their moderate or long-term use can disrupt natural recovery processes and physiological responses to training (Howatson & Lundberg, 2025). Athletes are often taking stimulants, in particular caffeine-containing supplements, in order to stimulate their energy and improve their thinking process. Nevertheless, with the overuse of stimulants, it can cause a number of negative physiological effects like the heightened heart rate and high blood pressure (Jakubowski et al., 2018). Athletes also take antihistamines and cold drugs to treat allergies and respiratory diseases that could interfere with training programs. Although such medications could reduce the symptoms, they also could change the thermoregulation and cardiovascular reactions during exercise.

2.3. Health Risks in Athletic Contexts

OTC drugs can be dangerous to health in cases where they are taken regularly or in absence of guidance. Among the most frequent complications that are frequently reported is a gastrointestinal disturbance with a long-term use of NSAIDs. Vigorous exercise is already likely to overload the

gastrointestinal system, and exercising with medications will potentially risk adding to gastrointestinal drops or damage (Costa et al., 2022). There is also the issue of cardiovascular stress and this is especially a problem with athletes who take substances that are made of stimulants. Exercise greatly enhances the cardiovascular workload, and stimulants might further augment the heart rate and blood pressure, which could lead to the development of adverse cardiovascular events (Franklin et al., 2021; Segreti et al., 2024). Moreover, frequent intake of some medicines can have an adverse impact on kidney functioning, particularly in endurance athletes who are prone to being dehydrated or generally under physiological stress during a competition (Kulbacka et al., 2025; Ascher et al., 2022).

2.4. Behavioral Drivers of Drug Use

Physiological needs are not the only factors that influence the use of medication among athletes, the behavioral and social factors also play a role. The high-performance expectations and competition are some of the reasons why athletes can be encouraged to train even when they are injured or in pain. At that, drugs can be considered as convenient means of coping with pain and continuing functioning (McDuff et al., 2019). The culture and coaching of the team also have significant effects in the development of medication behaviors. The acceptance of playing in pain in certain sporting settings can influence, and even promote athletes to use medications instead of managing the problem (Kegelaers et al., 2018).

2.5. Theoretical Framework

A number of the behavioral theories can be used to explain the use of medications among athletes. According to the Health Belief Model, people adopt health related behaviors according to their perceived advantages and dangers. Sportspeople can thus take the OTC drugs in situations where they perceive the advantages of pain relief or performance improvement to surpass the possible health effects (Green et al., 2020). In the same way, the Theory of Planned Behavior emphasizes the influence of attitudes, social norms, and perceived behavioral control on behavioral intentions regarding the use of medication (Ajzen, 2020). These theoretical insights can be used to explain the behavioral determinants of OTC drug use among athletic groups.

3. METHODOLOGY

3.1. Research Design

The research design used in this study is the quantitative cross-sectional research design, which aims at investigating the relationship between non-

prescription drug use, health outcomes, behavioral influences and performance indicators in athletes. The quantitative method is suitable as it allows conducting a systematic study of measurable variables and identifying patterns and relationships in the data. The study incorporates the views of sports medicine, pharmacology, and behavioral science to give a holistic explanation of the use of medications among athletic groups.

3.2. Data Source

The study is based on a structured body of information that holds information on 600 athletes in different sports. The variables that are discussed in the dataset include the demographics of athletes, training, tendencies of using medications, type of pharmacological drugs, and the indicators of performances. The data was put into three categories such as athlete medication records, sport performance measures and drug pharmacological characteristics. These factors were included in order to examine the association between medication practices and health and performance related outcomes of athletes.

3.3. Sample and Variables

The sample will be divided into 600 athletes who will be of various sport types and training intensities. The most important variables to be considered in this study are type of OTC drug taken, frequency of taking the drug, behavioral pressure index, performance measures as well as health risk measures. The types of drugs are divided into

analgesics, stimulants, and antihistamines, which are the most common non-prescription drugs in the sporting setting. Age, gender, type of sport, and the number of hours per week of training were used as the control variables, to provide an opportunity to consider the demographic and training-related variations in athletes.

3.4. Data Analysis

The statistical methods to analyze the data were used. To summarize the characteristics and patterns of drug use among athletes, descriptive statistics were applied to first summarize their characteristics. Second, correlation analysis was used to discover the associations between medication use, behavioral pressures and health indicators. Lastly, the multiple regression analysis was used to assess the effect of non-prescription drugs use on the performance outcomes and the health risk scores of athletes in a controlled setting, considering the effects of demographic and training-related variables.

3.5. Ethical Considerations

The research process was carried out with ethical standards that were adhered to. No information on the research was considered to be confidential and was analyzed as aggregate numbers to ensure privacy and anonymity. The study followed the ethics of research, hence ensured transparency in data management, analysis and findings. Reasons The research was scholarly, and it adhered to the overall principles of sports science research (Figure 2)

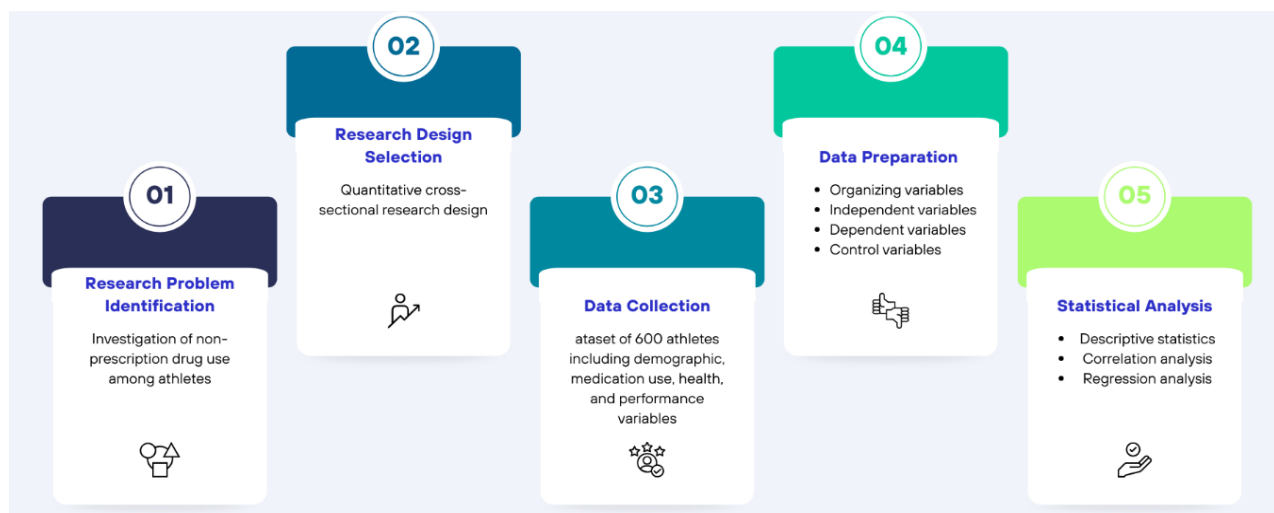


Figure 2: Methodological Framework of the Study

The figure illustrates the methodological workflow of the study, outlining key stages from research problem identification to statistical analysis. It highlights the structured process involving

research design, data collection from 600 athletes, variable preparation, and quantitative analysis.

4. RESULTS

4.1. Descriptive Statistics

It consisted of 600 athletes of different sport disciplines and different training levels. Descriptive statistics were calculated as an effort to familiarize with the distribution of vital variables of medication use, training exposure and performance indicators. The findings demonstrate that the mean use of OTCs was 5.65 times a month, which reflected moderate

consumption of the drug by the athletes. The VO₂ max had a mean of 54.2 ml/kg/min which was somewhat high representing the aerobic capacity of trained athletes. Moreover, one in four athletes experienced at least one adverse effect with drugs indicating that the use of medication could have visible effects on physiological aspects. Table 1 contains the descriptive statistics of the variables that play a key role in the study.

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Age (years)	24.7	4.8	18	36
Training hours per week	12.3	4.1	5	25
Drug use frequency (monthly)	5.65	3.42	0	12
VO ₂ Max	54.2	7.6	38	72
Injury frequency (12 months)	1.8	1.2	0	6

4.2. Patterns of Non-Prescription Drug Use

Medication categories were analyzed and it was revealed that some OTC drugs were frequently used by athletes. The most common drug category that was reported was the analgesics, which was then succeeded by stimulant-based supplements. The most common use of NSAIDs like ibuprofen and topical anti-inflammatory medications were employed to treat musculoskeletal pain that is related to training and competition.

The most common medication used as includes ibuprofen (101 athletes), caffeine supplements (80

athletes), and acetaminophen (57 athletes) as shown in Table 2. One hundred and seventy-seven athletes denied taking drugs, which means that the sample has a mixed drug practice (Figure 3).

Table 2: Frequency of OTC Drug Use

Drug Type	Number of Athletes	Percentage (%)
Ibuprofen	101	16.8
Caffeine supplements	80	13.3
Acetaminophen	57	9.5
Diclofenac gel	55	9.2
Antihistamines	45	7.5
Cold medications	32	5.3
No drug use	117	19.5

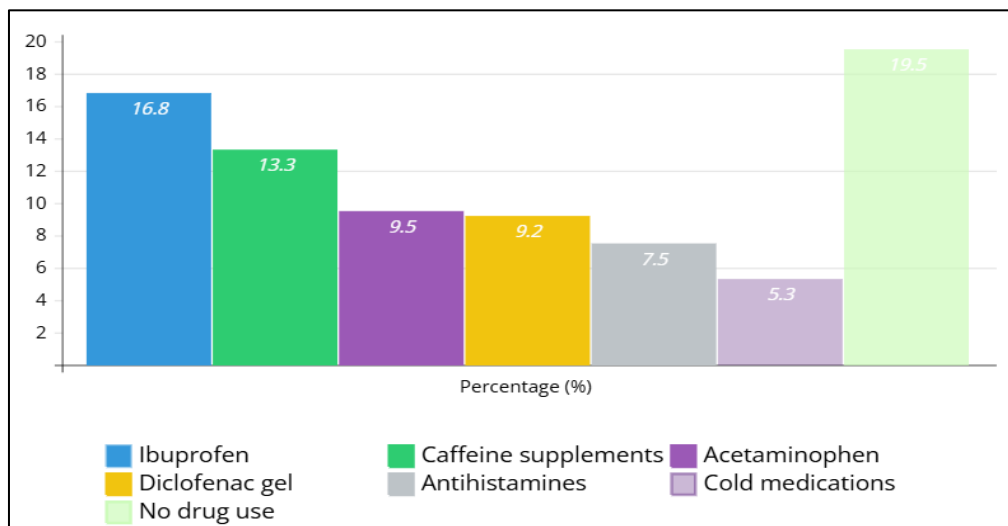


Figure 3: Distribution of Non-Prescription Drug Use Among Athletes

The figure illustrates the percentage distribution of commonly used OTC medications among athletes. Ibuprofen and caffeine supplements show the highest usage rates, while a notable proportion of athletes report no drug use, highlighting variability in medication practices across the sample.

4.3. Health Outcomes and Adverse Effects

The correlation between reported health outcomes and OTC drug use was also examined in the study. Some athletes complained of negative physiological reactions that were linked with taking medications.

These reactions were gastrointestinal symptoms, fatigue, dizziness and mild cardiovascular.

Table 3 indicates that gastrointestinal discomfort (18% of athletes), fatigue (12%) and dizziness (9

percent) were the most commonly reported side effects (Figure 4).

Table 3: Reported Adverse Effects of OTC Drug Use

Adverse Effect	Number of Athletes	Percentage (%)
Gastrointestinal discomfort	108	18
Fatigue	72	12
Dizziness	54	9
Headache	48	8
No adverse effect	318	53

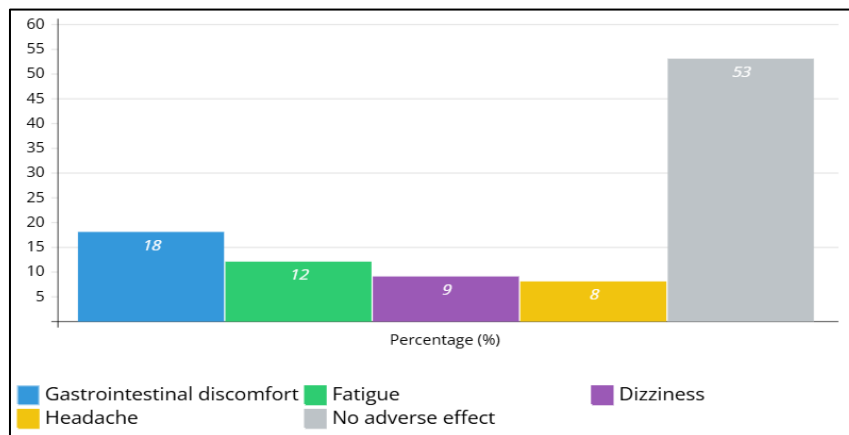


Figure 4: Reported Adverse Effects Associated with OTC Drug Use Among Athletes

The figure presents the distribution of reported adverse effects related to OTC medication use among athletes. Gastrointestinal discomfort and fatigue were the most commonly reported symptoms, while over half of the athletes indicated no adverse effects following medication consumption.

4.4. Relationship Between Drug Use and Performance Indicators

Correlation analysis was used to evaluate the relationship between performances and medication practices to check the relationship between the frequency of drug use and performance measures including VO₂ max and frequency of injuries.

Drug use frequency was moderately related to injury frequency ($r = 0.37$) as demonstrated in Table 4 that the more athletes were injured, the more frequently they took drugs. Conversely, the correlation between frequency of use of drugs and VO₂ max was comparatively low ($r = 0.08$), indicating that there was not much correlation between drug use and aerobic performance.

Table 4: Correlation Matrix

Variables	Drug Use Frequency	VO ₂ Max	Injury Frequency
Drug Use Frequency	1	0.08	0.37
VO ₂ Max	0.08	1	-0.21
Injury Frequency	0.37	-0.21	1

4.5. Summary of Results

The results show that the use of OTC drugs is a rather widespread practice in the sporting community and is closely related to injury management and recovery routines. The most commonly used drugs are analgesics and stimulant based drugs. Although most athletes did not complain of any serious adverse effects, a significant percentage of them had mild physiological consequences. Also, the statistical analysis indicates that the use of medication is moderately related to the occurrence of injuries but has a weak relation to performance indicators.

5. DISCUSSION

The current research discussed the trends of non-prescription drugs use among athletes and investigated the health, behavioral, and performance implications. The results suggest that over-the-counter (OTC) medication intake is a somewhat widespread among athletes and it is mostly related to the practice of injury management and recovery. The findings indicate that the most common type of drug is analgesic drugs especially the non-steroidal anti-inflammatory drugs (NSAIDs). This conclusion is aligned with the findings of the earlier studies, which suggested that athletes tend to use NSAIDs to

treat musculoskeletal pain and inflammation caused by massive training and competition (Leyk et al., 2023; O'Connor et al., 2019). Sportspeople face repetitive physical trauma, minor injuries rather often, which can promote the use of drugs of easy access to continue to engage in sports events (Harle et al., 2018).

The descriptive results further point out that the use of stimulant-based substances, especially caffeine supplements is very popular with athletes. Caffeine is normally used to improve stamina, alertness, and mental ability in training and competition. They are in line with the previous pharmacological studies that suggest that the use of stimulants is common in sporting settings because of the perceived ergogenic effects (Jakubowski et al., 2018). Nevertheless, the quality and accuracy of labeling of sports supplements have been questioned and could subject the athletes to unwanted ingredients or varying doses (Finan, 2023). Therefore, although stimulants can have short-term effects, they can be dangerous to the health and safety of the user on the unregulated use.

The review of health outcomes showed that significant percentage of athletes indicated negative physiological consequences of using medication. One of the most frequently reported symptoms was gastrointestinal discomfort, which is also consistent with the results of past studies that have demonstrated that the chronic use of NSAIDs can lead to adverse outcomes on gastrointestinal functions. The nature of the strenuous physical activity in itself can pose a stress on the gastrointestinal system, and the stress caused by the exercise in combination with taking medication can further add to the risk of developing gastrointestinal complications (Costa et al., 2022). Besides a gastrointestinal effect, it is also important to consider cardiovascular reactions in case athletes take some stimulant-based substances or medications affecting physiological regulation. Exercise inherently elevates heart work, and some substances can enhance the responses of the heart rate and blood pressure, which can make people more susceptible to health problems when they become engaged in vigorous physical activity (Franklin et al., 2021; Segreti et al., 2024).

The other significant result of the research is associated with the relationship between drug use and injuries. The findings indicate that there is moderate association between injury frequency and use of OTC medications meaning that those who experience injuries tend to use medications to manage and recover faster. This observation is corroborated by past studies revealing that athletes commonly use analgesics to manage pain and carry on with training

despite physical pain (Bursik et al., 2025). Whereas these practices might enable athletes to continue taking part in sports, they can also cover the symptoms of trauma and postpone the necessary healthcare. In addition, the regular intake of analgesics and anti-inflammatory medications can predispose a patient to renal complications, especially when endurance athletes are exposed to the long-term impact of physical activities and dehydration (Kulbacka et al., 2025; Ascher et al., 2022).

The behavioral variables affecting drug consumption in athletes also offer significant values in understanding the motivations to such acts. Pressure and demands on athletes to be faster in their recovery efforts tend to push them to focus on the continuity of performance, rather than on the long-term health benefit. Athletes in a competitive setting might view the use of medications as an obligatory measure to deal with pain and retain the training intensity (McDuff et al., 2019). Moreover, the social pressures in sports organizations, such as the culture of the team and the coaching demands can also lead to the normalization of pain playing. As it was stated by the past studies, organizational incentive and social norms within the elite sports environment may have a significant influence on the behavior in relation to drug-taking (Kegelaers et al., 2018). These behavioral dynamics are what the necessity to address the problem of medication usage as being not just a medical problem, but social and cultural phenomenon in the sporting life revolve around.

This study can be interpreted through the existing behavioral theories as well. According to the Health Belief Model, people make their health-related behaviors due to their perception of danger and utility. In sports, athletes might find the immediate value of analgesics and the preservation of performance preponderant over the possible long-term health hazards related to using the medication (Green et al., 2020). In the same vein, the Theory of Planned Behavior offers a conceptual framework of the role of attitudes and subjective norms as well as perceived behavioral control on the decisions of athletes concerning the use of medications. The athletes who think that the use of the medications is socially acceptable in the teams they are on or encouraged by coaching methods can be more inclined to use them (Ajzen, 2020).

In a general sense, the findings underline the importance of a better medication management practice in sports organizations. Even though anti-doping laws are based on the illegal use of drugs that increase performance, the extensive use of legal over-the-counter drugs is an under-studied issue in most

sports administration systems. Educational programs to be implemented in the context of effective medication management strategies should encompass medical monitoring of drug practices, training of athletes to adopt responsible and safe drug use in sport settings and encouraging the creation of guidelines (Abbasi Barazi, 2025). Moreover, pharmacological knowledge and behavioral understandings can be incorporated into sports medicine studies to offer more holistic measures on means of tackling the issue of medication risks in sports.

Overall, the findings of this study contribute to the already available body of literature that examines the issues of medication usage in sport by showing how the health of an athlete, behavior and performance demands are connected in a way that is multi-dimensional. These relationships will be central in determining evidence-based interventions that can foster the safety of athletes and their responsible use of medication besides facilitating sustainable performance of athletes.

6. CONCLUSION

The current study examined trends and an implication of non-prescription drug use by athletes in terms of health, behavior, and performance factors. The fact that non-prescription (OTC) medications are also used as a popular choice by sportsmen to address pains, inflammation, and fatigue after training and competition demonstrates this fact. Despite the fact that these drugs may have

short-term benefits in terms of pain control and the possibility to keep performance, the consequences suggest the potential health dangers of such a treatment in case of its regular or uncontrolled use. It was observed that a significant percentage of athletes had reported negative physiological outcomes, such as gastrointestinal discomfort and fatigue, which were attributed to regular practices of medication among athletes, implying that the health of an athlete is subject to change because of the practice. Moreover, the correlation between the frequency of injury and medication use was moderate, which was shown in the analysis that tends to believe that those athletes who suffered an injury are more inclined to use OTC drugs to recover and manage the pain. The competition, the demand to recover faster and the culture within a team are also competitive behavioral issues that can also lead to normalization of self-medication behavior within a sports setting. These results highlight how better awareness and monitoring of the use of medications in the sporting setting should be improved. The sports bodies, coaches, and medical workers are expected to enforce responsible medication use by educating and giving medical advice on the use and formulation of policies. When focusing on the physiological and behavioral sides of the medication use, the stakeholders will have a chance to promote safer health management approaches contributing to both the well-being and the sustainable athletic performance.

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