

EVALUATION OF THE USE OF ANABOLIC STERIODS BY PHYSICAL ACTIVITY PRACTITIONERS IN BODYBUILDING ACADEMIES

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Abstract: Excessive concern with body aesthetics and the ease of marketing anabolic steroids has led the population to use them in an abusive and indiscriminate way, which causes damage to health. The consumption of anabolic steroids has increased worldwide. The objective of the research was to verify the use of anabolic steroids by bodybuilders in gyms. The research was conducted through a multiple choice questionnaire applied to 100 participants, men and women aged between 20 and 40 years. Among those interviewed, 46% have already used or still use this drug. The reasons presented are the search for definition or increase in muscle mass, aesthetics, improvement in performance, by the union of all these reasons and few cases for drug treatment. Many of the users know or have experienced side effects due to the administration of anabolic steroids. In view of the results, it can be concluded that the consumption of anabolic steroids is frequent, usually without medical advice and incorrectly or even excessively by users. Therefore, there is a great need to raise awareness and carry out campaigns on the use of anabolic steroids, so that users avoid any complications and health risks.

Keywords: Anabolic steroids; Side effects; steroids; drugs; Bodybuilding.

INTRODUCTION

Anabolic androgenic steroids (AAS), known as anabolic steroids, are synthetically developed mostly from the male sex hormone testosterone. This hormone is also found in women, being generated in the ovary, but in small amounts (Costa; Lima; Santos, 2021).

During World War II, the use of testosterone began to increase aggressiveness and muscle mass in soldiers. After that, in the 1950s, this hormone began to be synthesized and produced for medical purposes, helping to treat patients who are deficient in estrogen

production, in diseases characterized by muscle wasting and also in children with growth deficiencies, due to the acceleration of bone and muscle development (Hoberman; Yesalis, 1995).

Initially, anabolic steroids were consumed only by professional athletes who sought to improve performance in sports. However, they are currently being used by bodybuilders who attend gyms and by people looking to improve their physical and aesthetic appearance. Anabolic steroids are administered by sportspeople and athletes to increase their performance or to obtain the perfect body, which is greatly encouraged by the media and society, thus, EAA have become a means of obtaining results in a shorter time than conventional. This substance has its use prohibited and is conceptualized as doping (Costa; Lima; Santos, 2021).

Synthetic steroid hormones promote cell division and tissue growth, particularly muscle and bone tissue. The androgenic effects of this class of hormones are responsible for the growth of the male reproductive tract and development of secondary sexual characteristics, while the anabolic effects stimulate nitrogen fixation and increase protein synthesis. For this reason, testosterone has the effect of increasing muscle mass and decreasing body fat (Barros et al., 2014; Caregosa; Faro, 2016).

With medical follow-up, anabolic steroids are prescribed for the treatment of some health problems, such as: chronic obstructive pulmonary disease; compulsive diseases; abnormal puberty and retarded growth; hormone therapy in Turner syndrome; body mass gain in patients with cancer, AIDS, HIV, Crohn's disease, heart failure and cardiovascular disease; muscular diseases and dystrophies; osteoporosis; old age or andropause; both in obesity for weight loss and malnutrition; anemias; used for

hormone replacement in post-menopausal women, endometriosis; and in patients with breast and prostate cancer. Also for hormone replacement in hypogonadism, where the production of testosterone in men and estrogen in women is inhibited; for libido and sexual impotence, as there is an improvement in sexual function (Freitas et al., 2019).

Despite the benefits obtained by the correct administration and with medical follow-up, there is also a chain of serious side effects, both physical, psychological and psychiatric, during indiscriminate use and in high doses. This occurs because, generally, practitioners obtain anabolic steroids easily, without guidance, monitoring and medical prescription, thus causing adverse effects and becoming a public health problem (Kanayama; Kaufman; Pope, 2018).

The misuse and abuse of AAS presents several collateral damages for the men and women who use them. In men, it is reported: decreased libido and sexual impotence; sterility due to decreased and even suppressed spermatogenesis and testis atrophy; gynecomastia (breast enlargement); baldness; reduction of HDL cholesterol; cardiac and hepatic functional complications, causing infarction; gangrenes (tissue death caused by infection or lack of blood flow); organ failure, as well as several types of cancer that can lead to death (Parente Filho et al., 2020).

In addition to the adverse effects that can affect the organs, the most reported implications for women are: menstrual irregularity; voice thickening; hair growth on the face and body; clitoris enlargement and breast reduction. (Santos et al., 2020).

Some EAA compounds have an adverse effect on kidney function, since their use overloads the kidneys due to the imbalance caused in electrolytes and blood pressure, with greater side effects when doses are high, presenting symptoms such as edema, pain,

fever, renal colic, kidney enlargements and swelling in the back region (Parente Filho et al., 2020).

Studies confirm that long-term administration of high doses produces cardiovascular toxicity, leading to acute myocardial infarction, caused by significant reductions in diastolic measurements and cardiac muscle hypertrophy (National Institute on Drug Abuse, 2018; Angell et al., 2018).

Neurological effects are also mentioned more frequently for both genders, such as depression and insomnia, outbreaks and psychological and behavioral changes, involving, in some cases, episodes of aggression and violence (Santos et al., 2020).

The use of steroids is in most cases associated with the desire to have better physical performance, better aesthetic appearance, greater acceptance of the body and increased self-esteem. Therefore, exaggerated doses are common. In addition, in illicit practices there is a high probability of adulteration and contamination of the anabolic composition, thus increasing the danger in consumption.

Therefore, the objective of this research was to verify the consumption of anabolic steroids by bodybuilders in gyms to analyze the level of knowledge related to their administration and the risk factors of anabolic steroids, called "bomb", to the health of users.

MATERIALS AND METHODS

First, the research project was submitted to the Ethics Committee at Plataforma Brasil, under CAAE: 68021017.3.0000.5512. After approval, the work was conducted using multiple choice questionnaires applied to 100 physical activity practitioners, men and women aged 20 to 40 years. In this questionnaire, the use of anabolic steroids by bodybuilders in gyms was analyzed.

Participants were given Terms of Free and Informed Consent (ICF) to collect the athletes' signatures and confirmation that they were aware of the research.

SAMPLE

The 100 participants were chosen from gyms located in the city of São José do Rio Preto, in the state of São Paulo, Brazil.

In addition to being between 20 and 40 years old, athletes must meet the following criteria: be a bodybuilder in gyms for at least 01 year; Be able to answer the questionnaire related to the research; Be able to give your express informed consent to participate in the study. Athletes of both genders were interviewed for the preparation of the research.

SAMPLING

The questionnaire was applied directly to the 100 participants. The questions were structured with questions about the use of anabolic steroids and the interviewee's knowledge on the subject.

The questions described to the interviewees were the following: Have you ever used or do you use anabolic steroids? If yes, what is the reason? Who suggested use? How did you acquire information about anabolic steroids? Do you know of any unwanted effects or harm caused by anabolic steroids? Have you noticed any unwanted defects in your own body? Where did you buy the product? With a doctor's prescription? What substance have you used or do you use? What is the way to use it? How long have you been using it? Would you recommend or have you already recommended it to someone?

RESEARCH RISKS AND BENEFITS

This work offers minimal risk because it is a research that involves answering a

questionnaire applied to volunteers, and the researcher may lose data confidentiality.

As for the benefits of the research, these are based on the importance of informing practitioners of physical activity about the incorrect use of anabolic steroids, mainly in the prevention and care of health aiming at the non-development of pathologies, caused by excessive use and without previous guidance from a qualified professional.

DATA ANALYSIS METHODOLOGY

The results were analyzed and correlated among the research volunteers according to the aforementioned criteria. An informative program was used to characterize the sample and adequate statistical tests were used to analyze the relationship between the variables.

RESULTS

The survey was conducted with 100 respondents and conducted through a questionnaire containing multiple choice questions. The profile selected for research was regulars of weight training gyms, aged between 20 and 40 years, who made or use at least one type of anabolic steroid. The objective was to identify the level of knowledge of users in relation to their excessive consumption and the risks that such a practice can bring to the body.

Among the participating volunteers, 46% of bodybuilders assumed the use of anabolic steroids, with the age group between 20 to 30 years old (57%) and 31 to 40 years old (43%). Most respondents were men, 70%, and 30% women, as shown in Table 1.

When the purpose of using anabolic steroids was questioned, it was observed that the main intention was to seek definition or increase in muscle mass/hypertrophy (32%), followed by aesthetics (28%), performance improvement (8%), drug treatment (4%) and the rest (28%) for different reasons, such as

Have you ever used or used anabolic steroids?	
Yes	46%
No	54%
Reason for use:	
Hypertrophy or mass increase	32%
aesthetics	28%
Union of different motives	28%
performance improvement	8%
Medical treatment	4%
Gender of respondents:	
Female	30%
Male	70%

Table 1 – Percentage of athletes who use or have used supplements, reasons and time of use (n=100).

aesthetics and performance improvement, definition or increase in muscle mass and aesthetics, etc., still shown in Table 1.

The time of use of anabolic steroids by practitioners who said they did or had already used it is specified in figure 1. Where, the time of use of AAS of 12 weeks or more prevailed (26%).

Another question addressed was whether the bodybuilder obtained previous information about the use of anabolic steroids, and among users, 22% of practitioners acquired information about anabolic steroids through the internet, 20% through medical/scientific sources and by union of various means of information (books and internet, leaflets and doctors, etc.), 15% through Personal Trainer and also through friends/family, 6% through other means, such as books and 2% through supplement stores.

Table 3 refers to the representation of people who indicate or indicated the use of AAS to the interviewees and it can be observed that most practitioners (48%) reported that there was no suggestion by other people, followed by 28% by friends and family members, 13% by Personal Trainers and only 11% by doctors.

A large part of users (87%) reported having obtained anabolic steroids without a medical prescription, and only 13% with a medical prescription. Of the practitioners, 46% bought anabolic steroids through friends/family, 17% at junctions of places (internet and supplement store, pharmacies and friends/family, supplement store and gyms), 13% in supplement stores and pharmacies and 11% via the internet.

The preference for the use of steroids by the intramuscular route of administration was higher (59%) in relation to the oral route (17%). There are also users who use both oral and injectable drugs (24%), as shown in Table 3.

Figure 2 shows that most times the administration of injectable anabolic steroids is done by the user (37%). Friends (29%), pharmacist (18%), salesperson (8%) and Personal Trainer (8%) also contribute to this practice.

Among the anabolic steroids most consumed by bodybuilders, the most cited substance was Stanozolol (22%), followed by Testosterone (13%), Oxandrolone (9%), Deca Durabolin and Sustanon (4%). The use

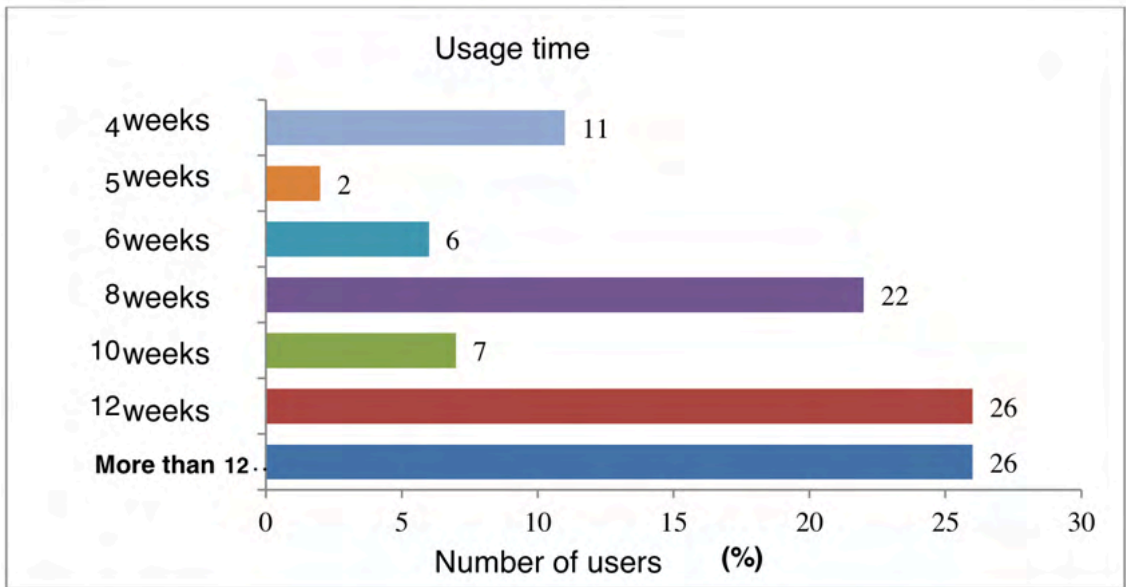


Figure 1 – Representation of the time of use of anabolic steroids (n=46).

The person had prior knowledge about the use of anabolic steroids:	
Yes	40%
No	60%
How they acquired information about anabolic steroids	
Internet	22%
Medical/scientist sources	20%
Personal trainer	15%
Family friends	15%
Others	6%
Supplement store	2%

Table 2 - Where the individual obtained information about nutritional supplements(n=46).

Who suggested using:	
There was no suggestion by someone else	48%
Family friends	28%
Personal trainer	13%
Doctor or Nutritionist	11%
Where did you buy the substance:	
Family friends	46%
supplement store	13%
Internet	11%
pharmacies	13%
Academy	17%

Had a medical prescription:	
Yes	13%
No	87%

What is the means of administration?	
Intramuscular	59%
oral route	17%
Both oral and injectable	24%

Table 3 – Information on who indicated the administration of nutritional supplements and where the purchase was made (n=46).

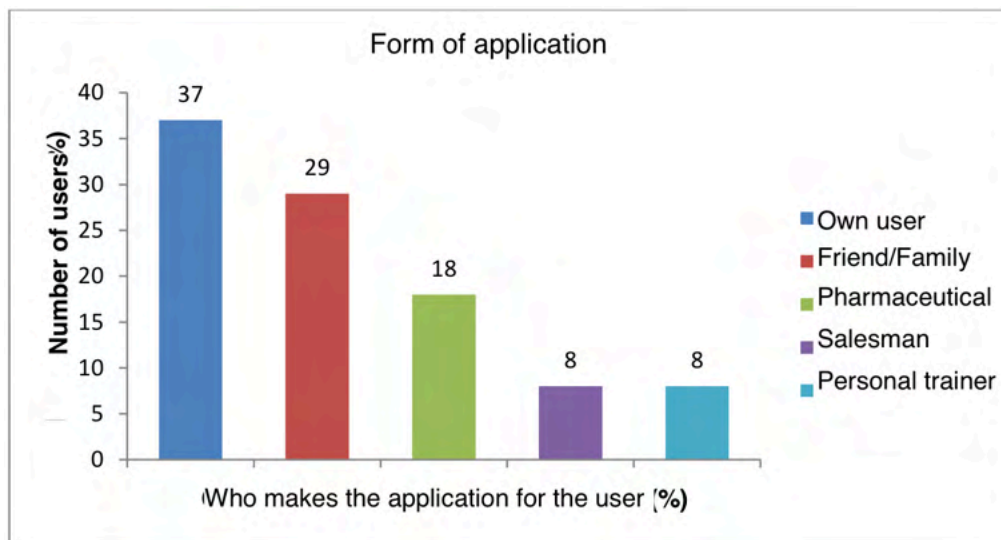


Figure 2 – Representation of how the individual performs the application of the intramuscular injectable anabolic steroid (n=46).

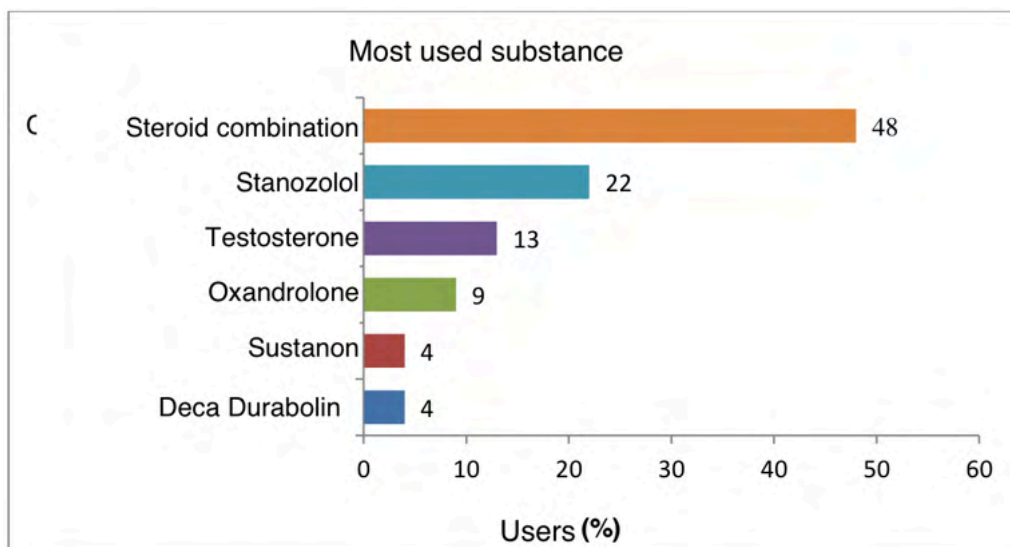


Figure 3 – Representation of the substances most used by users who practice bodybuilding (n=46).

Knowledge about unwanted effects caused by anabolic steroids:	
Yes	52%
No	48%
Have you noticed any unwanted effects on the body?	
Yes	39%
No	61%
Would you indicate or have already indicated the use to someone else?	
Yes	70%
No	30%

Table 4 - Knowledge about the unwanted effects caused by the use of nutritional supplements (n=46).

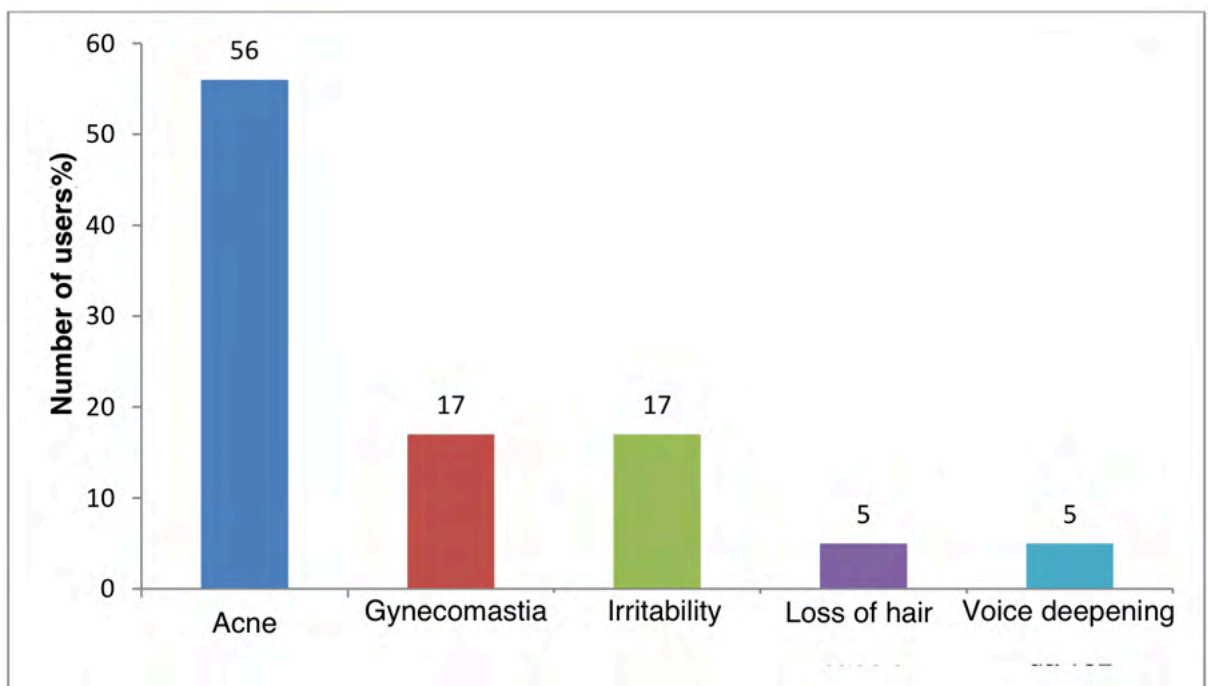


Figure 4 – Undesired effects most observed by anabolic steroid users (n=46).

of a combination of several drugs, however, prevailed (48%) in relation to the use of these isolated substances, such as Stanozolol with Oxandrolone; Sustanon with Deca Durabolin; Sustanon with Stanozolol; among others, as shown in Figure 3.

From the bodybuilders who use it, 39% reported the presentation of undesirable effects caused by anabolic steroids. And 52% reported already knowing the unwanted effects caused by anabolic steroids.

When approaching the user about recommending EAA to other people, the majority, 70% stated that they would indicate its use. Only 30% of respondents would not indicate the use of substances (Table 4).

The most observed unwanted effects are shown in Figure 4. The most cited was acne (56%), followed by adverse reactions of irritability, gynecomastia, hair loss and voice deepening (Figure 4).

DISCUSSION

This work aimed to investigate the use of anabolic androgenic steroids (AAS) by athletes from bodybuilding gyms. Of 100 practitioners in these gyms, 46% (n=46) assumed the consumption of anabolic steroids, predominantly male (70%) and 53% of respondents said they did not use them.

This evaluation was also carried out by researchers Morato, Barros, Silva (2020) in the city of Porto Velho in the state of Rondonia, Brazil. They found that 30% of their respondents (n=180) use anabolic steroids (AAS), 87% male and 13% female aged between 18 and 35 years.

Currently, the abusive use of anabolic steroids has been growing worryingly among the population, especially among young bodybuilders who seek the anabolic effect of the drug on muscle mass, forgetting the androgenic actions that are often associated with this effect. When the purpose of using

anabolic steroids was questioned, it was observed that the main intention was to seek definition or increase in muscle mass/hypertrophy (32%), followed by aesthetics (28%), performance improvement (8%), drug treatment (4%) and the remainder (28%) due to the combination of different reasons, such as aesthetics and performance improvement, definition or increase in muscle mass/hypertrophy and aesthetics, among others.

Dissatisfaction with the slowness of muscle growth in “natural” bodybuilding or the feeling that they are working out but not developing muscle was brought up by some informants as a reason for using anabolic steroids. Among 24 users of anabolic steroids, Simões; Favero (2016) also found that 66.6% use it for body aesthetics. Through a survey on anabolics in Crossfit, where 20.9% are users, researchers Higino and Freitas (2021) received responses to the goal of aesthetics 45%, yield 26.8%, strength 16.9%, treatment 5.6%, do not know 1.41%, another 4.2%.

The period of use of anabolic steroids by practitioners who said they did or had already used it is specified in Figure 1. Where, the time of use of AAS of 12 weeks or more prevailed with 26% of the responses. The time interval that a user administers one or more AAS is called a cycle, this cycle can last from 4 to 12 weeks, depending on the substance and the dose used. It may involve several drugs at the same time or doses that are gradually increased and then decreased.

It is important to point out that, when questioning users about their previous knowledge of the use or administration of steroids, the majority (60%) admitted not knowing this information.

The internet has been a means of communication widely used to obtain information about AAS. However, this means is not always reliable and does not present the possible side effects caused by AAS. In the

present study, it was possible to observe that the means of greater information about AAS was through the internet (22%), followed by scientific sources and also by friends who use them.

In this research, for 48% of the user athletes the search for the beginning of the administration had no suggestion from another person, for 28% there was a suggestion from family or friends, from 13% the indication was from the personal trainer and only 11% reported the indication by a doctor or nutritionist (Table 3).

With regard to the acquisition of AAS, in this present study, 46% bought anabolic steroids through friends/family, 17% merged places (internet and supplement store, pharmacies and friends/family, supplement store and gyms), 13% in supplement stores and pharmacies and 11% on the internet. Which means a high chance of buying adulterated or contaminated products, as the vast majority do not have a quality certificate.

When answering the questionnaire of this research, it was observed that users did not feel comfortable talking about the use of these substances, mainly because the majority of users do not have a medical indication. Since, few reported the use of AAS as a drug treatment, represented by only 4% of users. Such values are relatively low, since they have a single purpose for use under medical prescription and pharmaceutical guidance. Still, on the subject, the results pointed out revealed the indiscriminate use and the practice of self-medication of AAS, since 96% of those who use it are not guided by doctors (Table 3).

The only safe and permitted way to use anabolic steroids, according to Law No. 9,965 of ANVISA of 2000, is through a medical prescription, where their use must not be administered in other circumstances.

There are many medical indications for the

use of AAS, such as in male hypogonadism and in the treatment of muscle wasting in AIDS patients. However, it appears that currently it is the incorrect use that has been growing worryingly among the population, especially among young bodybuilders, who seek the anabolic effect of the drug on muscle mass, forgetting the androgenic actions that often present themselves. associated with this effect.

The lack of medical follow-up was also described in the study by Ferreira et al. (2014), where none of the 127 participants who reported using AASs acquired them with a medical prescription, still, admitted that the purchase was made on the recommendation of common people, without the necessary training on the necessary clinical check procedures.

Among the anabolic steroids most consumed by bodybuilders, the most cited substance was Stanozolol (22%), followed by Testosterone (13%). The use of the combination of several drugs prevailed (48%) in relation to the use of these isolated substances, such as Stanozolol with Oxandrolone, Nandrolone associated with Testosterone, Testosterone with Stanozolol, among others (Figure 3).

In research carried out by Morato; clay; Silva, (2020) the 3 (three) most used anabolic steroids among users are Sustanon® (Testosterone Propionate), Winstrol® (Stanozolol) and Hemogenin® (Anadrol or Oxymetholone) with 33.7%, 30.1% and 24.1% respectively. Followed by Depo-testosterone® (Deposteron or Testosterone Cypionate) at 21.7%, Deca-durabolin® (Nandrolone Decanate) at 20.5%, Oxadrolin® (Oxandrolone) at 16.9%, Androgenol® (Testosterone Propionate)) and Dianabol® (Metandronstenolone) with 12%, GH® and Durabolin®.

The anabolic steroids Nandrolone Decanate and Testosterone Sustanon

Propionate are among the most used products by both middle class and lower class users. Often, the anabolic steroids used are the ones with the most affordable prices, however, users with a higher economic profile use imported drugs at a higher price. These strategies used to circumvent the ban lead to damages such as: the use of drugs of dubious quality or unsuitable for human consumption (such as veterinary products) purchased on the so-called black market that involves the trade of anabolic androgenic steroids (Cecchetto et al., 2012; Morato; Barros; Silva, 2020).

In the United States, the most used substances among athletes are testosterone, stanozolol, nandrolone and boldenone (Pope et al., 2014).

As for the mode of administration, the preference for the use of steroids by the intramuscular route was higher (59%) compared to the oral route (17%). There are also users who use both oral and injectable (24%). Most oral androgens have hepatic metabolism and manifest high hepatotoxicity, while the injectable one can result in hematoma and infection. Chronic use causes a cumulative increase in the severity of side effects.

As for the application of AAS by the intramuscular route, it was reported that 37% are performed by the user himself. Such a practice is extremely dangerous due to the consequences of the application error, such as tissue necrosis at the site and microbial contamination and even the acquisition of HIV and hepatitis by sharing syringes. In addition, 29% reported being injected by a friend/family, 18% by a pharmacist, 8% by the salesperson (8%) and 8% by their personal trainer (Figure 2).

The users' knowledge about the possible side effects of the use of EAAs was also one of the points elucidated and it was possible to

observe that even when knowing about the dangers of administering anabolic steroids many people prefer to risk their health. From the questions addressed, it is possible to observe that individuals demonstrate a total lack of concern regarding the consumption of anabolic steroids in correct doses and accompanied by preliminary clinical examinations. In a survey carried out by Carneiro-Junior, Silva, Almeida (2016), among 50 respondents, 78% said they were aware of the unwanted effects.

The abuse of these substances has adverse effects that are serious and complex, including serious neurotoxic problems. Morphological changes in nervous tissue and death of neurons have already been reported in several studies. These morphological alterations, together with the physiological alterations, trigger, in several ways, clinical symptoms in the nervous system. The indiscriminate use without medical prescription and in extremely high doses, in addition to the use of products of clandestine origin and of veterinary use, increase the adverse effects impairing the hepatic, cardiovascular, hormonal, behavioral, reproductive and somatic functions, and some damages are irreversible and may lead to loss of organ function and death.

About these adverse effects caused by AAS, 39% had some adverse reaction. The appearance of acne was one of the most cited, represented by 56% of users, followed by gynecomastia and irritability. According to the literature, this undesirable effect occurs due to the stimulation that EAA exert on the sebaceous glands, causing skin oiliness to increase when used continuously (Figure 4).

The researchers Neves, Sá, Silva and Aoyama (2021) interviewed 63 gym goers over 15 years old, among them, 41 men and 22 women, of whom 64.7% reported acne, 17.6% acne associated with gynecomastia, as well as

another 17.6% claim irritability in addition to acne.

In Morato's study; clay; Silva (2020) 23.81% reported the appearance of acne, 13.10% increased libido, 10.71% aggressiveness and mood change, 9.52% hypertension, 8.33% nausea or vomiting, 5.95% decreased of libido, 2.38% atrophy of the testes, 1.19% claimed depression, addiction and other symptoms was reported by 11.90%.

When approaching the user about the indication of EAA to other people, the majority, 70% would indicate its use, even knowing the risks and problems that these can cause in the health of those who consume it. Only 30% of respondents would not indicate the use of substances.

CONCLUSION

Most anabolic steroids are derived from the hormones testosterone and progesterone,

and can be administered orally or injected. They have several beneficial effects in the treatment of diseases, but when used for aesthetic purposes, they can bring health risks.

According to the results obtained, it can be observed that people are increasingly looking for the use of anabolic steroids, especially bodybuilders, with the objective of quickly obtaining the perfect body sculpture, due to the ideal standard imposed by the media, even if such act may affect and bring risks to your health.

Therefore, there is a great need for public awareness as well as greater control over their marketing and campaigns on the use of anabolic steroids, so that users can avoid any complications.

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