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BODYBUILDERS' KNOWLEDGE AND PERCEPTIONS
OF THE USE OF ANABOLIC STEROIDS

BY

JAMES P. COMBS

A research project submitted in partial fulfillment
of the requirements for the degree
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Abstract

Anabolic steroids were introduced into the United States in 1954. Today, there is mounting concern regarding the negative effects of their use.

Twenty-three (23) bodybuilders at a rural midwestern University were subjects of a research study regarding their knowledge and perceptions of positive and negative effects of the use of anabolic steroids. In response to a questionnaire, eighty-seven (87) percent of the subjects were aware of someone who used anabolic steroids. They noted the most common source for obtaining anabolic steroids were friends and physician prescriptions. The perceived beneficial effects noted by the subjects were increased body mass and increased body strength. The perceived negative effects were liver disease and hypertension. The findings of this study indicated the subjects knowledge of the use of anabolic steroids was acute. Their perceptions of the positive and negative effects were supported by the literature review.

I give permission to the College of Nursing, SDSU to publish this abstract in a collection of abstracts from master's projects and theses.

Signature

Date

BODYBUILDERS' KNOWLEDGE AND PERCEPTIONS
OF THE USE OF ANABOLIC STEROIDS

This research project is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the research project requirements for this degree. Acceptance of this project does not imply that the conclusions reached by the candidate are necessarily the conclusion of the major department.

Barbara Ward-Doherty, M.Ed., Ed.D. Date
Research Project Adviser

Marge Hægge, R.N., Ed.D. Date
Acting Dean, College of Nursing

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CHAPTER I

Introduction

Drug abuse in the general population is a significant problem. However, one specific type of drug abuse, that of anabolic steroids, is unique to competitive athletes. These athletes consider anabolic steroids "the breakfast of champions" (Hill, Saker, Sachs, & Brigham, 1983).

Anabolic steroids have been the foremost among many performance enhancers since their inception into competitive sports in the early 1950's (Cowart, 1987). The first reported use of steroids dates back to World War II. At that time, German troops were given anabolic steroids to increase muscle strength and aggression. In 1954, anabolic steroid use infiltrated athletics when they were administered to Russian athletes of both sexes (Perlmutter & Lowenthal, 1985). Today, in the United States, anabolic steroid use has spread from professional athletes to college and high school athletes. There have also been reports of non-competitive athletes using steroids (Perlmutter & Lowenthal, 1985). It is estimated that one million (1,000,000) Americans are using steroids for physique enhancement. These users, who are served by a black market, spend approximately one hundred million (100,000,000) dollars annually (Taylor, 1987).

Statement of the Problem

This study addressed the following questions:

1. What knowledge do bodybuilders have regarding the positive and negative effects of anabolic steroids?
2. What is the perception of bodybuilders regarding the positive and negative effects of anabolic steroids?

Significance of the Study

Research has shown that anabolic steroid use by bodybuilders produces adverse effects. The accentuation of secondary male sexual characteristics is the most common effect. There are more serious effects, such as peliosis hepatitis and hepatocellular cancer, which can be fatal. Familiarity with the positive and negative effects can provide a basis for patient assessment and patient education (Duncan & Shaw, 1985).

Because of the serious nature of the problem among athletes, educational institutions with athletic programs are developing drug screening programs. Nurses may find themselves assisting in the development of such programs (Duncan & Shaw, 1985). Therefore, it is incumbent on the nursing profession to become familiar with the results of the use of anabolic steroids. Nurses should become familiar not only with the positive motivational effects, but also with the negative effects which serve as motivational factors for using anabolic steroids. They must have this information to assess client needs and promote healthy lifestyles through education.

Objectives of the Study

The objectives of this study were:

1. Determine the perception of bodybuilders regarding the positive effects of the use of anabolic steroids.
2. Determine the perception of bodybuilders regarding the negative effects of the use of anabolic steroids.
3. Determine bodybuilders' knowledge of the use of anabolic steroids.

Definition of Terms

1. Anabolic steroids. Derived from the male hormone, testosterone, are synthetic chemical drugs. These drugs have both androgenic, or male characteristic-producing properties, and anabolic, or muscle-building properties (Duncan & Shaw, 1985).

2. Bodybuilders. In this study bodybuilders are male and female members of a power-lifting club.

3. Physical effects:

a. Positive effects. These include increased body strength; increased body mass; increased endurance; increased aggression; increased sex drive; decreased recovery time after exercise; decreased fatigue; and weight gain (Perlmutter & Lowenthal, 1985).

b. Negative effects. These include in males the tone of the male voice becomes higher; there is decreased size of testicles; breast enlargement; liver disorders; cardiovascular disease including hypertension and water

retention; mood changes; increased aggression; and decreased sex drive. In the female there is a deepening of the female voice; clitoral enlargement; increased body hair; liver disorders; cardiovascular disease including hypertension and water retention; mood changes; increased aggression; and decreased sex drive (Perlmutter & Lowenthal, 1985).

5. Aggressiveness. A psychological shift in behavior, causing alterations in mood. Users become more violent and experience an increase in hostility (Coward, 1987).

6. Body mass. In this study body mass is defined as increased size and circumference of body muscles.

7. Weight gain. In this study weight gain is defined as gain in pounds.

8. Anabolic steroid drugs. Oral drugs included Anavar, Winstrol, dianabol and Primobolin. Injectable drugs include esters of testosterone, Decadurabolin, Primobolin and Teslac (Burkett & Falduto, 1984).

Organization of the Study

The remainder of this study will be organized as follows:

1. Chapter 2 contains a review of the literature and the research perspective.

2. Chapter 3 contains the methodology.

3. Chapter 4 contains the analysis of the research data.

4. Chapter 5 contains a summary of the study, implications of the study, limitations of the study, and recommendations for further research.

CHAPTER II

Review of Literature

This chapter consists of a review of the literature related to the history of anabolic steroid use, therapeutic uses of anabolic steroids, positive effects, negative effects, the nature of knowledge and perception, and the research perspective gained from the review of literature.

History

Anabolic steroids, derived from the male hormone testosterone, are synthetic chemical drugs. These drugs have both androgenic, or male characteristic producing properties, and anabolic, or muscle-building properties. Although there is still disagreement in the medical field, it is thought that anabolic steroids promote nitrogen retention, and increase protein synthesis, thereby building muscle mass, body strength, and increasing aggressive behavior (Duncan & Shaw, 1985).

In 1935, Kochakian and Murlin, researchers at the University of Rochester, Rochester, New York, studied the effects of the male hormone on the protein and energy metabolism of castrated dogs. Kochakian and Murlin concluded the male sex hormone could enhance the building of body tissues. In the research, the male hormone, precipitated from urine, was injected into castrated dogs. As a result, protein breakdown decreased and a positive nitrogen balance was achieved (Kochakian & Murlin,

1935). In 1938 testosterone was identified as the male sex hormone. At this time it was administered as a weight-gain stimulus in patients who were underweight and recuperating from systemic illnesses. Anabolic steroids were also used by the Allies to stimulate weight-gain in survivors of the German concentration camps (Mellion, 1984).

Testosterone's sex stimulating properties were documented in women in the early 1940s. Testosterone, given to healthy women, had three effects on the psychosomatic sexual mechanisms: 1) it heightened their susceptibility to psychosexual stimulation; 2) it increased the sensitivity of the external genitalia, especially the clitoris; and in thirty (30) of the women it increased the sexual gratification of the female subjects (Taylor, 1987).

Testosterone was further refined in the early 1950s by modifying the molecules. In so doing, researchers found it enhanced the anabolic effects and reduced the androgenic potency, thus producing greater muscle-building effects and fewer negative effects on secondary male sexual characteristics (Mellion, 1984).

In 1954 anabolic steroids infiltrated the sports world. At this time, Russian male and female athletes were given anabolic steroids to increase athletic performance (Mellion, 1984; Perlmutter & Lowenthal, 1985). Anabolic steroid use in the United States is attributed to John B. Ziegler, MD. He was a team physician for the United States weight lifters at the 1954 world

championships. Ziegler befriended a Russian physician who related that some members of the Russian team were using testosterone. He observed the Russian athletes and was impressed. When the United States weight lifting team returned to the United States, Ziegler began conducting case studies of anabolic steroid use on American weight lifters (Cowart, 1987). Following this period, there was an increased use by athletes experimenting with steroids to promote tissue growth, increased muscle mass, strength, and power (Taylor, 1987).

In the early 1960s, pharmaceutical companies began to advertise the tissue-building effects of steroids (Taylor, 1987). By the mid-1960s, there were reports of steroid use by athletes from many nations competing in events that required strength. In 1968, the International Olympic Committee Medical Commission developed a list of forbidden substances and mandated drug testing programs (Hanley, 1983). The first drug testing examinations began at bicycle races in Belgium (Mellion, 1984). It was not until 1976, however, that technology had become sophisticated enough to detect anabolic steroids in athletes participating in athletic events at the Montreal Olympic Games. Two-hundred seventy-five (275) tests were performed on athletes and eight (8) tested positive for the presence of anabolic steroids in their bodies. Because of the detection of anabolic steroids in athletes, the most sophisticated drug screening program to date was used at the 1984 Los Angeles Olympic Games (Mellion, 1984).

From 1960 and into the mid-1970s, research was aimed at the effects of anabolic steroids on muscle strength and athletic performance. The research has concentrated in these areas to the present time. Research results have demonstrated athletes who took anabolic steroids in low doses for short periods of time, using weight training and proper diet, significantly enhanced their muscle mass and strength (Taylor, 1987). However, the scientific community failed to distinguish between the effects of anabolic steroids on trained and untrained subjects. This misjudgment led to the publication of statements suggesting that steroids did not enhance athletic performance. Because of this error, research on the effects of steroids on athletes halted for several years. However, this did little to inhibit the rapidly rising use of steroids, and actually caused a loss of credibility for physicians and scientists. Physique-oriented bodybuilders continued using anabolic steroids for the muscle-building effects, and they experimented with steroids available on the black market (Taylor, 1987).

Allen Ryan, in 1981, a researcher in the field of steroids, published a review of twenty-five (25) research studies done between 1965 and 1977. The research he evaluated looked at the changes in strength and maximal oxygen consumption in athletes taking anabolic steroids. Ryan found in twelve (12) studies improvements were due to the use of anabolic steroids and in

thirteen (13) studies there was no statistical improvement (Ryan, 1981).

In 1977, based on a search of the literature, the American College of Sports and Medicine issued a position statement on the use and abuse of anabolic steroids in sports. This statement noted there was no conclusive evidence that large doses of anabolic steroids enhanced or hindered athletic performance (Medicine and Science in Sports, 1977). In 1984, the American College of Sports and Medicine revised their former position after reevaluating the literature. The revision stated that concurrent use of anabolic steroids and training, with dietary management, may enhance the performance of athletes (Sports Medicine Bulletin, 1984).

Today, in the United States, anabolic steroid use has spread from use by professional athletes to use by college and high school athletes. There have been unsubstantiated reports of non-competitive athletes using anabolic steroids (Perlmutter & Lowenthal, 1985). The American Medical Association passed a resolution in December 1986, acknowledging the recognition of wide-spread abuse of anabolic steroids. In the resolution, they stated it was their intention to support controlling the illegal diversion of anabolic steroids (Taylor, 1987). However, to date only four states, Texas, California, Ohio, and Alabama have passed legislation to control anabolic steroid use (Salva, 1987; Cowart, 1987).

Drug use has been documented in all of the competitive sports in which weight, speed, nerves, and endurance are factors (Duncan & Shaw, 1985). The drugs used most often by athletes can be combined into six categories: stimulants, analgesics, anti-inflammatory agents, anabolic steroids, diuretics, and antianxiety agents.

Anabolic steroids have been used by athletes competing in tennis, cycling, swimming, weightlifting, running, bodybuilding, pole vaulting, high jumping, and shot put and discus throwing. Gymnasts, skiers, skaters, and football players have also used anabolic steroids (Hill et al., 1983). Athletes who are training and competing actively, as well as older athletes denying the changes brought on by aging, may take anabolic steroids (Duncan & Shaw, 1985). Perlmutter and Lowenthal's research disclosed between eighty (80) and one hundred (100) percent of male bodybuilders at the national and international level use anabolic steroids during training (Perlmutter & Lowenthal, 1985). Women in competitive sports have used anabolic steroids, but not to the extent of men. However, women's use is on the rise at collegiate and international levels of competition (Goldman, Bush, & Klatz, 1984).

Therapeutic Uses of Anabolic Steroids

The foremost therapeutic indication for anabolic steroids is for the treatment of hypogonadism in males. The therapeutic outcome is to develop or restore male secondary sexual

characteristics and normalize male sexual behavior (Perlmutter & Lowenthal, 1985).

Anabolic steroids have been used in the treatment of starvation victims and patients who are chronically ill and debilitated. These drugs are given to produce a positive nitrogen balance, increase the appetite, and help the patients regain their strength and weight (Taylor, 1987; Perlmutter & Lowenthal, 1985).

Erythropoiesis promotion has been shown to occur while taking anabolic steroids. Erythrocyte counts in men and women, have increased with large amounts of anabolic steroids. Because of their effect on erythropoietin, anabolic steroids have been used in aplastic anemia, anemia of myelofibrosis, and anemia of renal failure (Perlmutter & Lowenthal, 1985).

Anabolic steroids have also been used in the treatment of hereditary angioneurotic edema which is an autosomal dominant disorder. When used for this disorder, anabolic steroid therapy has resulted in curing the disease (Perlmutter & Lowenthal, 1985).

Positive Effects

Duncan and Shaw reported in their study that athletes self-prescribed anabolic steroids for a variety of reasons. The most common reasons held by athletes are: anabolic steroids would increase their body strength; increase their lean body mass and their endurance; and shorten the recovery time after exercise so they could continue training (Duncan & Shaw, 1985).

Perlmutter and Lowenthal questioned whether anabolic

steroid use increased muscle strength. They had reached this conclusion because in half of the documented investigations they studied, improvements in muscle strength were demonstrated; however, in the other half of the documented investigations there were no improvements (Perlmutter & Lowenthal, 1985). Ryan's research revealed anabolic steroids did not contribute significantly to increase in muscle strength (Ryan, 1981). In contrast, Taylor found in most studies that the anabolic steroids significantly increased skeletal muscle mass and muscle strength in many subjects (Taylor, 1987). So there is conflicting evidence regarding anabolic steroid use and increased muscle strength.

Anabolic steroids have been shown to contribute to increased aggressiveness and diminished fatigue (Perlmutter & Lowenthal, 1985). Mellion's research found an increase in aggressiveness, which allowed for more training, thereby increasing body strength (Mellion, 1984).

Taylor noted libido enhancement in male athletes while using anabolic steroids. He also noted there was a temporary decrease in libido when the drugs were discontinued (Taylor, 1987).

Burkett and Falduto found, in the results of their study, all of their subjects gained weight while on anabolic steroids. However, when the drugs were discontinued their subjects lost weight (Burkett & Falduto, 1984).

Negative Effects

Virilization in females, including hirsutism, clitoral hypertrophy, and a deepening voice are adverse effects attributed to the use of anabolic steroids. Feminization in males including high-pitched voice, testicular atrophy, gynecomastia, and premature epiphyseal closure, causing short stature (Perlmutter & Lowenthal, 1985). Taylor's research results supported Perlmutter and Lowenthal's findings. Taylor found the heavy use of anabolic steroids could reduce the height of adolescents by prematurely closing the epiphyses of long bones. This results in cessation of bone growth (Taylor, 1987). Hepatotoxicity including hepatic dysfunction, peliosis hepatitis, and hepatocellular carcinoma are adverse effects especially noted with anabolic steroids (Perlmutter & Lowenthal, 1985).

Mellion noted anabolic steroids depressed the gonadotropins, decreasing testosterone production. This, in turn, led to testicular atrophy, prostatic hypertrophy, and oligospermia (Mellion, 1984).

The use of anabolic steroids may be a serious risk factor for cardiovascular disease. The rise in serum cholesterol and lowering of the high-density lipoprotein (HDL) fraction may cause plaque build-up in the wall of blood vessels. This atherogenic property, combined with other adverse effects such as salt and water retention, blood clotting abnormalities, and hypertension, have the potential for devastation of the cardiovascular system

(Mellion, 1984; Taylor, 1987).

Summary

The highlights of the literature review pertinent to this study are as follows:

1. Testosterone was first produced in 1938. It was used for a stimulus for weight gain.

2. Anabolic steroids infiltrated the sports world in 1954 with use by Russian athletes. At the same time, John B. Ziegler, MD., began case studies of anabolic steroid use among weight lifters in the United States.

3. A therapeutic indication for anabolic steroids is for the treatment of hypogonadism in males.

4. Positive effects include increased body strength, increasing lean body mass and endurance, and shortening recovery time after exercises.

5. Negative effects for females include hirsutism, clitoral hypertrophy, and a deepening voice. The negative effects for males include high-pitched voice, testicular atrophy, gynecomastia and premature epiphyseal closure causing short stature. Hepatic dysfunction, peliosis hepatitis, and hepatocellular carcinoma are adverse effects especially with oral anabolic steroids.

Research Perspective

Knowledge

Dr. Howard E. Wilkening, psychologist and editor of The Psychology Almanac, defines cognition as: "the process or act of knowing, perceiving, or of gathering knowledge together. The faculty of apprehending, knowing, thinking, and of information-processing." He noted cognition covered many "intellectual aspects of knowledge." The intellectual aspects he identified were remembering, reasoning, values, attitudes, and motives (Wilkening, 1973, p. 46).

For measurement purposes, Benjamin S. Bloom believed "... the recall situation involves little more than bringing to mind the appropriate material" (Bloom, 1969, p. 201).

In a test situation, the process of relating requires the organization of a problem presented in such a way that "it will furnish the appropriate signals and cues for the information and knowledge the individual possesses" (Bloom, 1969, p. 201).

Perception

Anita J. Harrow stated perception is "the process by which a learner becomes aware of himself and his environment through various sense modalities." Harrow identified the following sense modalities: 1) Visual perception: ... a learner's interpretation of a stimulus coming through the organs of sight; 2) Auditory perception: a learner's interpretation of a stimulus

transmitted through the organs of hearing; 3) Kinesthetic perception: a learner's interpretation of a stimulus received through the muscles. All perception "... is modified by psychological and physiological characteristics and past learning experiences and is based upon current needs of the learner and his individual values and goals" (Harrow, 1972, p. 183).

The research perspective for this study was developed after a review of the literature. It identified cognition as a process of gathering knowledge which covered many aspects of the intellect. To measure knowledge, Bloom (1969) noted an individual must be furnished "appropriate signals." This was done with the questions on the survey. From the knowledge base, the perception of whether something impacts positively or negatively on an individual is up to the sense modalities. The sense modalities are modified by psychological and physiological characteristics. Thereby, in this study, the subjects were asked, from their experience, the benefits they perceived as positive or negative to self.

CHAPTER III

Methodology

This chapter contains the methodology which includes: a description of the research design, the sample, the research tool, the method of data collection, and the procedure for analysis of data.

Research Design

The design chosen for this study was a non-experimental, exploratory design. It utilized a questionnaire for the purpose of determining the knowledge and perception of male and female body-builders regarding the positive and negative effects of the use of anabolic steroids.

Sample

The target population for this study included all bodybuilders attending a university in a rural midwestern state. The accessible population was bodybuilders who volunteered for the study while attending a power-lifting club meeting.

Research Tool

A self-administered questionnaire, developed by the researcher, was used in this study. The questionnaire was developed based on the review of literature (Appendix A). The tool was reviewed for content validity by a panel consisting of two medical doctors, a human sexuality counselor, and a

bodybuilder. All of the panel were familiar with the effects of the use of anabolic steroids.

A pilot study was used to test the instrument. It was tested on subjects and changes were made as deemed appropriate.

The data for this study were collected during the fall semester, 1987 at a rural midwestern university in the following way:

1. Permission was obtained from the University Human Rights Subject Committee.
2. Permission was received from the faculty advisor of the bodybuilding club to attend a meeting. At this meeting, the researcher asked members to participate in the study. The members agreed to become subjects in this study.
3. The subjects were provided with a cover letter and the questionnaire. The cover letter explained the purpose of the study (Appendix A). The subjects were guaranteed anonymity through omission of any identification on the questionnaire. The subjects were informed that all responses to the questionnaire were confidential.
4. Completed questionnaires were collected by the researcher.
5. The responses on the questionnaire were tabulated. Descriptive statistics were used to analyze the data.

CHAPTER IV

Analysis of the Research Data

This chapter presents a descriptive analysis of the data related to demographic characteristics of the sample, the subjects' perception of the positive and negative effects of the use of anabolic steroids and bodybuilders' knowledge regarding the use of anabolic steroids.

Descriptive Analysis

Demographic Data

Frequencies and percentages were calculated for the data based on individual responses of the questionnaire. The demographic characteristics of the all Caucasian sample are recorded below.

Sex. Seventeen (74 percent) subjects were male and six (26 percent) were female.

Age. Seventeen (74 percent) subjects were ages 18-20 years old, three (13 percent) were ages 21-23, one (4 percent) was 24-26 years of age and two (9 percent) subjects were older.

Knowledge of the Positive Effects

Question number five (5) asked the subjects to list the positive effects for taking anabolic steroids. Twenty-two (22) subjects responded and one (1) did not respond to the question. As presented in Table 1, seventeen (77 percent) subjects indicated

Table 1

Perceived Positive Effects of the Use of Anabolic Steroids

Positive Effects (n-22)	Frequency (f)	Percent (%)
Increased Body Mass	17	77
Increased Body Strength	15	69
Decreased Recovery Time After Exercise	6	27
Increased Endurance	4	18
Increased Aggression	4	18
Weight Gain	2	9
Increased Sex Drive	1	5
Other Responses (Single Responses)	14	

increased body mass as a positive effect, fifteen (68 percent) indicated increased body strength, six (27 percent) indicated decreased recovery time after exercise, four (18 percent) indicated increased aggression and four (18 percent) indicated increased endurance. Two (9 percent) indicated growth while two (9 percent) indicated definition of body mass. The following single responses were made by individual subjects. These singular positive effect responses each represented (5 percent) of the sample. The responses were increased sex drive, increased cardiovascular condition, increased vascularity, psychological strength, increased nitrogen balance, unusually high hormone

level, a possible increase in oxygen uptake, gain speed, helps one look better, and an increased energy level.

Perception of Personal Benefits Derived from the Use of Anabolic Steroids

Twenty-two (22) subjects responded to question number six (6) and one (1) did not respond. The subjects were asked to list which of the positive effects of anabolic steroid use they would find most beneficial to themselves. As illustrated in Table 2, ten (46 percent) subjects indicated increased body mass would be most beneficial, eight (36 percent) indicated increased body strength, four (18 percent) indicated decreased recovery time after exercise and two (9 percent) indicated increased aggression would be most beneficial to self. The following responses made by individual subjects each represented (5 percent) of the sample. The responses were increased endurance, weight gain, trimmer and faster, increased nitrogen balance, increased energy, increased muscle tone and one (1) gave no response.

Knowledge of Negative Effects

Twenty-three (23) subjects responded to question number seven (7). It asked the subjects to list the negative effects they were aware of in using anabolic steroids. Seventeen (17) male subjects and six (6) female subjects responded. Six (6) male subjects responded concerning negative effects for females. No female subjects responded concerning negative effects for males.

Table 2

Perceived Positive Effects Most Beneficial to Subjects if They
Were to Use Anabolic Steroids

Positive Effects (n-22)	Frequency (f)	Percent (%)
Increased Body Mass	10	46
Increased Body Strength	8	36
Decreased Recovery Time After Exercise	4	18
Increased Aggression	2	9
Increased Endurance	1	5
Weight Gain	1	5
Other Responses (Single Responses)	6	

Males

As Table 3 illustrates, thirteen (77 percent) male subjects indicated liver disorders as negative effects in using anabolic steroids, five (29 percent) indicated hypertension, five (29 percent) indicated sterility, five (29 percent) indicated kidney damage, and three (18 percent) indicated increased water retention. Three (18 percent) subjects indicated decreased sex drive and three (18 percent) subjects indicated breast enlargement as negative effects. Three (18 percent) subjects indicated mood changes as a negative effect, two (12 percent) indicated increased aggression and two (12 percent) indicated acne as a negative

Table 3

Negative Effects of the Use of Anabolic Steroids as Perceived by Males*

Negative Effects for Males (n-17)	Frequency (f)	Percent (%)
Liver Disorders	13	77
Hypertension	5	29
Increased Water Retention	3	18
Decreased Sex Drive	3	18
Breast Enlargement	3	18
Increased Aggression	3	18
Mood Changes	2	12
Decreased Size of Testicles	1	6
Makes Voice Higher	1	6
Other Responses (Single Responses)	38	

* Categorized by Researcher

effect of using anabolic steroids. The following single responses were made by individual subjects. Some of the responses fell into two categories: negative cardiovascular effects, and negative effects on the hormone system. Six (6) responses fell into the cardiovascular category. The subjects listed heart problems, heart failure when older, irregular high pulse rate, heart attack, increased heart rate and heart disease. Seven (7) responses were

in the hormonal category. They listed the following effects: voice higher, decreased size of testicles, drastic swings in hormonal balance, decreased hormone production, male characteristics became feminized and female characteristics became masculinized. Also listed were damage to the sex organs, and abnormalities of hormones. Other individual responses were seriously affects one's health later in life, harmful if overused, puts too much stress on body, tears muscle, burnout, became somewhat deformed, chubby face, loss of hair, chance of ulcers, decrease in nitrogen balance, deteriorated internal organ, bad for entire body, shrinks up when you go off them, very addictive, possible premature death, and tumors of other internals.

Females

As illustrated in Table 4, two (33 percent) female subjects indicated liver disorders were negative effects if one was using anabolic steroids. Two (33 percent) subjects indicated getting caught was a negative effect. The following responses were made by individual female subjects. The responses were deepening voice, increased aggression, increased heart rate, some effect on the reproductive system, permanent skin discoloring, weight gain, bad for inner body, doesn't believe in steroid use, drastic body hormonal changes, sterility, death from overuse and hard on the body especially in female.

Table 4

Negative Effects of the Use of Anabolic Steroids as Perceived by Females*

Negative Effects for Females (n-6)	Frequency (f)	Percent (%)
Liver Disorders	2	33
Increased Aggression	1	17
Mood Changes	1	17
Increased Body Hair	1	17
Deepening Voice	1	17
Other Responses (Single Responses)	11	

*Categorized by Researcher

Males Responding to Negative Effects for Females

As presented in Table 5, three (50 percent) of the male subjects responding to negative effects on females indicated increased body hair as a negative effect. The following responses were made by individual subjects. The responses were deepening voice, clitoral enlargement, and decreased sex drive.

Bodybuilders' Awareness of the Use of Anabolic Steroids

Twenty-three (23) subjects responded to question number three (3), which asked the subjects if they were familiar with the use of anabolic steroids in bodybuilding. Twenty (87 percent) answered yes and three (13 percent) answered no, as indicated in Table 6.

Table 5

Male Responses Regarding Negative Effects for Females

Negative Effects (n-6)	Frequency (f)	Percent (%)
Increased Body Hair	3	50
Deepening Voice	1	17
Clitoral Enlargement	1	17
Decreased Sex Drive	1	17

Table 6

Subjects' Familiarity With the Use of Anabolic Steroids in Bodybuilding

Response	Frequency (f)	Percent (%)
Yes	20	87
No	<u>3</u>	<u>13</u>
Total	23	100

Question number four (4) asked the subjects what source they were aware of for obtaining anabolic steroids. Twenty-two (22) subjects responded and one (1) did not respond. As Table 7 indicates, nineteen (86 percent) subjects indicated friends were a source for obtaining anabolic steroids, twelve (55 percent) indicated physician prescription, eleven (50 percent) indicated mail order, nine (41 percent) indicated the black market, eight (36 percent) indicated coaches and four (18 percent) indicated classified advertisements were a source for obtaining anabolic steroids. One (5 percent) subject indicated lifters who are acquaintances in the gym as a source and a single respondent (5 percent) indicated dealers.

Table 7

Subjects' Awareness of Sources for Obtaining Anabolic Steroids

Source (n-22)	Frequency (f)	Percent (%)
Friends	19	86
Physician Prescription	12	55
Mail Order	11	50
Black Market	9	41
Coaches	8	36
Classified Advertisements	4	18
Other Sources	2	9

Twenty-three (23) subjects responded to question number eight (8). The subjects were asked if they knew anyone who used anabolic steroids. Seventeen (74 percent) subjects indicated they knew someone who used anabolic steroids and six (26 percent) indicated they did not know anyone who used anabolic steroids, as presented in Table 8.

Table 8

Subjects' Awareness of Persons Who Have Used Anabolic Steroids

Response	Frequency (f)	Percent (%)
Yes	17	74
No	<u>6</u>	<u>26</u>
Total	23	100

The seventeen respondents who answered yes to question number eight (8) were then asked where those who used anabolic steroids obtained them. As shown in Table 9, nine (53 percent) subjects indicated the anabolic steroids were obtained from friends, five (29 percent) indicated mail order, two (12 percent) indicated coaches and two (12 percent) indicated the black market were sources for obtaining anabolic steroids. The following responses were made by individual subjects. The responses were physician prescription, classified advertisements, dealers from the West Coast and local dealers. Two (12 percent) answered they

knew of anabolic steroid use but did not know where the anabolic steroids were obtained. One subject remarked that the users would not reveal the information and another subject didn't want to ask because he would want to take them if he knew.

Table 9

Subjects' Knowledge of Sources for Persons Who Have Used Anabolic Steroids

Sources (n-17)	Frequency (f)	Percent (%)
Friends	9	53
Mail Order	5	29
Coaches	2	12
Black Market	2	12
Unknown	2	12
Physician Prescriptions	1	6
Classified Advertisements	1	6
Other Sources (Single responses)	2	12

Summary

This concludes the analysis of the data and description of the sample. The analysis of the data included the subjects' perception of the positive and negative effects of the use of anabolic steroids and the bodybuilders' knowledge regarding the use of anabolic steroids.

CHAPTER V

Summary, Implications, Limitations and Recommendations

This chapter presents a summary of the research problem and research perspective, a summary of the major findings and conclusions as related to the objectives of the study, a statement of implications of the study derived from the research findings and conclusions, limitations of the study and recommendations for further study.

SummaryResearch Problem

Anabolic steroids infiltrated the sports world in 1954 with use by Russian Athletes. At the same time, John B. Ziegler, MD., began case studies of anabolic steroid use among weight lifters in the United States. A review of the literature related to the problem indicated, at the present time in the United States, anabolic steroid use has spread from use by professional athletes to use by college and high school athletes (Perlmutter & Lowenthal, 1985).

It has been estimated between eighty (80) and one hundred (100) percent of male bodybuilders at the national and international level use anabolic steroids during training (Perlmutter & Lowenthal, 1985). Women's use of anabolic steroids is on the rise at collegiate and international levels of

competition (Goldman et al., 1984).

The objectives of this study were to determine:

1. The perception of bodybuilders regarding the positive effects of the use of anabolic steroids.
2. The perception of bodybuilders regarding the negative effects of the use of anabolic steroids.
3. The bodybuilders' knowledge of the use of anabolic steroids.

Research Perspectives

A research perspective was developed after a review of the literature. Knowledge and perception formed the framework of the research perspective. A questionnaire designed by the researcher was administered to members of a bodybuilding club in a rural midwestern university. Twenty-three (23) subjects responded to the questionnaire. The responses on the questionnaire were tabulated and a descriptive analysis, based on the frequency and percentages of the responses, was used to examine the data.

Major Findings

The major findings of the study as related to the objectives were:

Objective 1: Determine the perception of bodybuilders regarding the positive effects of the use of anabolic steroids.

1. The subjects reported that increased body mass and

increased body strength were the predominant positive effects of the use of anabolic steroids.

2. The review of literature produced the following positive effects of the use of anabolic steroids: increased body strength, increased body mass, increased endurance, increased aggression, increased sex drive, decreased recovery time after exercise, decreased fatigue and weight gain. The subjects in this study identified seven (7) of eight (8) findings as reflected by the literature, which might indicate their perception of the positive effects of anabolic steroid use was acute. The one positive effect not identified by the subjects was decreased fatigue. Only five (5) percent of the subjects identified increased sex drive as a positive effect.

3. Personal benefits derived from the use of anabolic steroids were identified by the subjects in this study as increased body mass and increased body strength. The review of literature noted increased sex drive and decreased fatigue would be perceived as beneficial. However, no subjects in this study indicated increased sex drive or decreased fatigue as most beneficial to self.

Objective 2: Determine the perception of bodybuilders regarding the negative effects of the use of anabolic steroids.

1. The subjects identified that liver disorders were the major negative effects of the use of anabolic steroids. Although not well-documented in the review of literature, twenty-nine (29)

percent of the subjects in this study each reported sterility and kidney disorders as negative effects of the use of anabolic steroids.

2. The review of literature produced the following negative effects of the use of anabolic steroids: for males, makes voice higher, decreased size of testicles, breast enlargement, liver disorders, mood changes, increased aggression, decreased sex drive, increased water retention and hypertension; for females, deepening voice, clitoral enlargement, increased body hair, liver disorders, mood changes, increased aggression, decreased sex drive, increased water retention and hypertension. The subjects in this study identified fourteen (14) of eighteen (18) findings as reflected by the literature, which might indicate their perception of the negative effects of anabolic steroid use was acute. The four (4) negative effects not identified by the subjects were for females: clitoral enlargement, decreased sex drive, increased water retention and hypertension.

Objective 3: Determine bodybuilders' knowledge of the use of anabolic steroids.

1. Eighty-seven (87) percent of the subjects in this study were familiar with the use of anabolic steroids in bodybuilders.

2. Two (2) major sources for obtaining anabolic steroids were friends and physician prescriptions.

3. Seventy-four (74) percent of the subjects in this

study knew someone who used anabolic steroids. Of the seventy-four (74) percent who knew someone who used anabolic steroids, fifty-three (53) percent of the subjects indicated friends as sources for obtaining the anabolic steroids.

Conclusions

The subjects in this study reported that increased body mass and increased body strength were predominant positive effects of the use of anabolic steroids. The subjects identified seven (7) of eight (8) findings as reflected by the literature, which might indicate their perception of the positive effects of anabolic steroids was acute. The personal benefits derived from the use of anabolic steroids were identified as increased body mass and increased body strength. The subjects in the study identified liver disorders as the major negative effects of the use of anabolic steroids. The subjects identified fourteen (14) of eighteen (18) findings as reflected by the literature, which might indicate their perception of the negative effects of anabolic steroid use was acute. Eighty-seven (87) percent of the subjects in this study were familiar with the use of anabolic steroids in bodybuilders. Two major sources for obtaining anabolic steroids were friends and physician prescriptions. Seventy-four (74) percent of the subjects knew someone who used anabolic steroids. The major sources for obtaining anabolic steroids for these people were friends.

Implications of the Study

The major findings of this study were as follows: the subjects were knowledgeable regarding the positive effects of the use of anabolic steroids, knowledgeable regarding the negative effects of the use of anabolic steroids and knowledgeable regarding the sources for obtaining anabolic steroids. The following implications were developed because of the findings:

1. Education should be emphasized regarding the potential serious negative effects, which outweigh the positive effects as perceived by the subjects in this study.
2. Health care professionals should participate in the educational process.
3. Health care professionals should become familiar with the use and the negative effects of anabolic steroids.
4. Health care professionals should be aware of their clients' use of anabolic steroids.

Limitations of the Study

1. The sample was a non-probability sample. Therefore, the findings of this study are restricted to the sample.
2. The instrument was developed by the researcher. Therefore, the validity and reliability of the instrument must be considered a limitation.
3. The subjects may have indicated their attitude in responding to certain questions rather than their personal knowledge of the statement.

4. The questionnaires were distributed to members of a bodybuilding club at a rural midwestern university. Therefore, findings may reflect responses of bodybuilders who may be homogenous in their characteristics and beliefs.

Recommendations for Further Study

The researcher recommends the following for further research:

1. A replication study be done using a different population or sample.
2. An in-depth study be done regarding the use of anabolic steroids in rural midwestern states.
3. A study focusing on the physiological responses to the type and amount of anabolic steroids used.
4. A study focusing on the physiological responses to frequency and route of administration (oral or injected) of anabolic steroids used.

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APPENDIX A

As a part of my graduate studies in Nursing at South Dakota State University, I am working on a research project regarding the level of knowledge and the perceived benefits of the use of anabolic steroids.

Your involvement in the project will include completing a questionnaire. Please do not write your name on the questionnaire. Your responses will be completely anonymous and all individual survey results will be confidential.

Your completion of the questionnaire will indicate your agreement to voluntarily participate in this research project. You may withdraw from this study at anytime without consequences.

Your participation in this study will help health care professionals understand bodybuilders' level of knowledge and the perceived benefits they find of the use of anabolic steroids. You may obtain information regarding the results of the study by contacting the researcher whose address and telephone number is listed below.

Thank you very much for your time and consideration.

Jim Combs
SDSU Health Service
219 West Hall
688-4157

Bodybuilders' Questionnaire

Please check all appropriate answers.

1. Male
 Female

2. Age
 18-20
 21-23
 24-26
 Older

3. Are you familiar with the use of anabolic steroids in bodybuilding?
 Yes
 No

4. Which of the following sources are you aware of for obtaining anabolic steroids?
 physician prescription
 black market
 friends
 mail order
 coaches
 classified ads
 other (please specify)

5. Please list the positive effects that you are aware of for taking anabolic steroids:

6. Which of the above positive effects you have listed would you perceive as being most beneficial to yourself if you were to use anabolic steroids?

7. Please list the negative effects you are aware of in using anabolic steroids:

8. Are you aware of anyone who has used anabolic steroids?

_____ Yes

_____ No

If yes: Where did they obtain the anabolic steroids?