



Inventory Development for Assessing Narcotic Effects on Physical and Mentally of Elite Sports Persons in Maharashtra

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Abstract:

The use of performance-enhancing drugs such as narcotics is rapidly increasing among sportspersons despite their harmful effects on health and well-being. Although sports authorities publish a list of banned drugs every year, many athletes remain unaware of these substances and their adverse effects.

Objective: *The objective of this study was to develop a standardized questionnaire to assess the physical and mental effects of narcotics on elite sportspersons.*

Method: *This study employed a developmental research design to develop a standardized questionnaire assessing the physical and mental effects of narcotic drugs on elite sportspersons. The questionnaire was structured around three key dimensions: demographic details of sportspersons, the physical and mental health implications of drug abuse, and the drugs most commonly used by sportspersons. Based on these dimensions, 75 test items were initially developed and evaluated by 10 experts in sports medicine and psychology, who provided feedback and suggestions for necessary modifications. The revised questionnaire was then administered to 30 randomly selected sportspersons aged 18 to 27 years as a first try-out. After incorporating their feedback, the modified questionnaire was re-administered to the same participants following a one-month interval to assess reliability using the test–retest and split-half methods. The preliminary version of the questionnaire was subsequently administered to a larger sample representing 20% of the male sportsperson population (n = 2000). The collected data were analysed through item analysis, item discrimination, and factor analysis. Reliability and validity coefficients were re-established using the large-sample data, and finally, gradable norms were developed, leading to the finalized version of the questionnaire.*

Results: *The results indicate that the finalized questionnaire retained 60 items, each with five alternative responses using a Likert five-point scale. The coefficients of reliability and validity were found to be 0.70 and 0.73, respectively. The established norms ($Sk = -0.177$, $\sigma_{sk} = 0.010$,*



$Ku = 0.761$, $\sigma_{ku} = 0.015$) demonstrated a bell-shaped distribution, with 1σ , 2σ , and 3σ encompassing 65.35%, 94.41%, and 100% of the sample, respectively. These findings suggest that both the grading system and the norms of the questionnaire are reliable and valid.

Conclusion: The questionnaire is capable of assessing the physical and mental effects of narcotics among elite sportspersons with acceptable levels of reliability and validity.

Keywords: Development, validation, inventory, physical and mental effects of narcotics

Introduction

Doping in sports involves the use of banned substances or drugs and is prohibited by both national and international sports governing bodies, including the World Anti-Doping Agency (WADA), which carries out extensive scientific testing and initiatives to promote anti-doping awareness. Despite these regulations, the use of performance-enhancing drugs remains widespread worldwide. Athletes often misuse such substances to improve performance, enhance personal appearance, or alleviate pain. The earliest documented use of performance-enhancing drugs dates back to 668 B.C. While some drugs have legitimate applications in sports medicine, many carry significant health risks. When used legally, under medical prescription and supervision, drugs are generally not harmful. Previous research indicates that the main motives for using performance-enhancing drugs include gaining a competitive edge, increasing muscular strength and endurance, and shortening recovery time from injuries. Furthermore, doping may also be driven by the desire to improve body image and the strong ambition to win.

The use of performance-enhancing drugs, such as narcotics, is increasing rapidly despite their adverse effects on health and well-being. Although sports authorities publish a list of banned drugs every year, many sportspersons remain unaware of these substances. Therefore, the objective of this study was to develop a standardized questionnaire to assess the physical and mental effects of narcotics on elite sportspersons.

Materials and Methods

This developmental research aimed to standardize a questionnaire for assessing the physical and mental effects of narcotic drugs using established methods. The questionnaire was



organized into three dimensions: Dimension A – demographic details of sportspersons, Dimension B – physical and mental health implications of drug abuse, and Dimension C – drugs most commonly used by sportspersons. Based on these dimensions, 72 questions were initially framed. These items were reviewed by 10 experts (5 from sports medicine and 5 from psychology) who provided comments and suggested modifications. After incorporating expert feedback, the questionnaire was administered to 30 randomly selected sportspersons (both sexes), aged 18–27 years from Maharashtra, as a first try-out. A draft of the questionnaire was then revised considering the participants’ comments and responses regarding doping agents, their usage, and doping control measures. For further evaluation and clarity, the revised questionnaire was re-administered to the same participants after one month as a second try-out. Feedback on items that were unclear, confusing, or ambiguous was recorded to improve the questionnaire. Reliability and validity were initially established using the test–retest method, resulting in a preliminary version of the questionnaire. The preliminary questionnaire was then administered to a larger sample representing 20% of the male sportsperson population ($n = 2000$, aged 18–27 years), and the data were subjected to item analysis. Coefficients of split-half reliability and validity were re-established using this large-sample data. After testing the normality of the data (S_k , σ_{sk} , CR of S_k , K_u , σ_{K_u} , CR of K_u , and percentage distribution at 1σ , 2σ , and 3σ), gradable norms were established, and a Likert five-point scale grading system was incorporated. This process finalized the questionnaire.

Results

The results indicate that the initial questionnaire consisted of 75 questions. Based on expert suggestions, only 66 modified items were retained in the final version of the questionnaire. The 66-item questionnaire was first administered to 30 sportspersons representing various sports and re-administered to the same sample after a one-month interval. The test–retest reliability coefficient ranged from 0.60 to 0.65, and expert evaluations confirmed that the questionnaire demonstrated content validity. Subsequently, the preliminary version of the questionnaire was administered to a larger sample ($n = 2000$). The collected data were processed for item analysis, which included two types of evaluation for each item: degree of item difficulty (item-difficulty index or cP) and item discrimination (Upper-Lower Index,



ULI). The dimension-wise average values for item-difficulty and item-discrimination are presented in Table 1.

Table 1: Values of item-difficulty index and item-discrimination of the questionnaire on “assessing the physical and mental effects of narcotic drugs” (Dimension-wise)

Dimension	No. of items retained	item-difficulty-index or cP	item-discrimination
A) Demographic details of sportspersons	Item Nos. 1, 2, 3, 4, 5, 6, 7, 21, 22, 23, 24, 25, 26, 27, 41, 42, 43, 44, 45, 46 Total = 20 Questions	0.63*	0.46**
B) Physical and mental health implications of drug abuse	Item Nos.8, 9, 10, 11, 12, 13, 14, 28, 29, 30, 31, 32, 33, 47, 48, 49, 50, 51, 52, 53 = 20 Questions	0.59*	0.39**
C) Drugs most commonly used by sportspersons	Item Nos. 15, 16, 17, 18, 19, 20, 34, 35, 36, 37, 38, 39, 40, 54, 55, 56, 57, 58, 59, 60= 20 Questions	0.61*	0.43**
Retained items = 60 * Accepted range of cP value: From 0.5 to 0.7. ** Accepted range of Item discrimination: Above 0.33			

Table 1 shows that the values of item difficulty and item discrimination were retained within the normal range. Item analysis revealed that Dimension A (Demographic details of sportspersons), Dimension B (Physical and mental health implications of drug abuse), and Dimension C (Drugs most commonly used by sportspersons) each retained 20 questions, resulting in a total of 60 questions in the final questionnaire. The distribution of performance scores in the questionnaire was negatively skewed ($Sk = -0.380$), with a standard error of skewness (σ_{sk}) of 1.0852. Since the mean represents the large sample ($n = 2000$), it is assumed to reflect the population mean. Table 2 shows that the standard error of skewness ($\sigma_{sk} = 1.0852, p > 0.05$) was not significant even at the 0.05 level, as the critical ratio (CR) of skewness was 0.357, far below 1.96. This indicates that the skewness of the distribution is close to normal, and the normal probability curve is nearly symmetrical. The Kurtosis value of the scores was 0.252, indicating a leptokurtic distribution, which suggests homogeneity in the sample. A homogeneous group typically produces a normal probability curve, and thus, the questionnaire scores represent a normal distribution. The standard error of Kurtosis (σ_{ku}) was



0.010, and the CR value for Kurtosis (CR = 1.375) was below 1.96, indicating that the kurtosis value was not significant ($p > 0.05$). Therefore, both skewness and kurtosis of the scores did not differ significantly from a normal distribution. This conclusion was further supported by the percentage-wise distribution of scores: 65.35% of scores fell within 1σ , 94.41% within 2σ , and 100% within 3σ , confirming a normal distribution. In conclusion, the distribution of scores in the questionnaire (assessing the physical and mental effects of narcotic drugs) is normal, enabling the establishment of norms for the questionnaire.

Table 2: Characteristics of Distribution of Scores Obtained by the Subjects in the questionnaire (Assessing the physical and mental effects of narcotic drugs)

Statistical Measures	Distribution Characteristics of Ss' Scores in the Questionnaire
Mean (Pts.)	092.26
SD	009.120
QD	001.360
Skewness (Sk)	000.177
Kurtosis (Ku)	000.761 ^{lk}
Standard Error of Skewness (σ_{sk})	001.0852
Standard Error of Kurtosis (σ_{ku})	000.010
CR of Skewness	000.357 ^a
CR of Kurtosis	001.375 ^a
Distribution of Scores	
1 σ distance	065.350
2 σ distance	094.410
3 σ distance	100.000
^a Not Significant even at the 0.05 level ($p > 0.05$) ^b Significant at the 0.05 level ($p < 0.05$) ^c Significant at the 0.01 level ($p < 0.01$) ^{lk} Leptokurtic	



The subjects’ scores in the questionnaire were grouped and divided into logical step-intervals for **frequency distribution**. Using the distributed frequency data, **measures of central tendency** and **measures of variability** were calculated following standard statistical procedures. Finally, **percentile norms** were determined from the grouped data. The midpoints of each step were calculated and arranged, and the resulting **percentile norms** are presented in Table 3.

Table 3: Percentile Norms of the Questionnaire (Assessing the physical and mental effects of narcotic drugs)

Percentile Norms	Raw Scores in the Questionnaire	Percentile Norms
99	115& above	99
95	113.28	95
90	111.76	90
85	109.66	85
80	107.35	80
75	104.39	75
70	101.36	70
65	97.73	65
60	94.12	60
55	92.47	55
50	91.56	50
45	90.12	45
40	88.43	40
35	86.65	35
30	84.45	30
25	83.14	25
20	81.55	20
15	79.25	15
10	76.72	10
5	75&below	5

The results of the **percentile norms** were further used to determine performance grades in the newly developed questionnaire. Grading, based on the **percentile method**, was derived for the subjects using standard techniques. The derivation of grades for the test items is presented in Table 4. Grading was computed according to the **Likert five-point scale**, allowing

the raw scores obtained in the questionnaire to be easily interpreted. This enables classification of an individual’s performance as **excellent, good, average, fair, or poor**.

Table 4: Grading Scale of Performance in the Questionnaire (Assessing the physical and mental effects of narcotic drugs)

Grades	Raw Scores (achieved in the questionnaire)	Grades
Excellent(A)	115& above	Excellent(A)
Good(B)	104.40-114.99	Good(B)
Average(C)	83.15-104.39	Average(C)
Fair(D)	76.73-83.14	Fair(D)
Poor	76.72 & below	Poor

he results ultimately indicate that the norms developed in this study are sufficiently **reliable and valid** for assessing sportspersons’ Assessing the physical and mental effects of narcotic drugs.

4. Discussion

The use of drugs to enhance sports performance among athletes has become a global social concern. Although sports administrators are making significant efforts to discourage this practice, its incidence continues to rise. Since no such tool existed for Indian players, the researcher developed a questionnaire to assess the physical and mental effects of narcotic drugs among sportspersons.

The development of the inventory followed methods described by earlier investigators, ensuring a standardized test development process. Item analysis was an integral step, where each item underwent two types of evaluation: item difficulty (cP value) and item discrimination. Accepted values for item difficulty ranged from 0.5 to 0.7, while values above 0.33 were considered acceptable for item discrimination. Based on this analysis of 75 items, 60 items were retained in the final inventory. Since no parallel inventory existed, construct validity was established through item-total correlation, correlating each individual item score with the total score obtained by the large sample (n = 2000). The resulting validity coefficients ranged



from 0.68 to 0.71, confirming the validity of the questionnaire. Additionally, split-half reliability was determined by calculating the correlation between scores of even- and odd-numbered items, yielding $r = 0.73$ ($p < 0.01$), indicating good reliability.

5. Conclusion

The newly developed questionnaire, consisting of 60 items with five alternative responses (Likert’s five-point scale), demonstrates a significant level of reliability and validity. It provides gradable norms for effectively assessing the physical and mental effects of narcotic drugs among elite sportspersons representing various sports events.

7. Recommendations

The newly developed questionnaire can serve as a standardized tool to assess the knowledge and awareness of narcotics among elite sportspersons. Sports authorities and coaches may use it to identify athletes at risk of narcotic abuse and provide timely guidance and interventions. With slight adaptations, the questionnaire can be applied across different age groups, genders, and levels of sports participation, enhancing its usefulness. Regular administration of the tool can help monitor trends in narcotic use and evaluate the effectiveness of anti-doping education programs. Additionally, future research could explore correlations between questionnaire results, actual doping behaviour, and other psychological or performance-related factors. Overall, the questionnaire can inform the development of preventive strategies and awareness campaigns within sports institutions.

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