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Establishing Standardized Levels for the CMJ and SJ Tests Integrated into the My Jump 2 App: An Indicator for Selecting Algerian U13 football Players

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Abstract:

To support the call for the development of a reliable and objective methodology for identifying the characteristics of elite athletes and attempting to predict peak performance levels, the researcher developed selection and classification models by determining standard scores for explosive strength tests (CMJ and SJ). Given the nature of the research, the researcher adopted a descriptive approach using a survey method, where the research sample was selected using a purposive sampling method, comprising 252 soccer players in the under-13 age group representing various schools and soccer academies in the eastern region. After collecting and organizing the data, it was statistically analyzed using the SPSS 26 statistical package.

The researcher established standard reference levels. The arithmetic mean for the research sample in the CMJ test was (24.52 ± 4.27). The performance levels of the research sample were defined as follows: Very Good (Grade 5) [[37.328–32.24], Good [32.24–27.082], Acceptable [27.082–21.958], Weak [21.958–16.958], and Very Weak [16.958–11.834], while the arithmetic mean of the research sample in the test was –22.59 (sj4.38), and the levels were determined at the fifth grade: very good] 35.73–30.475], good [30.474–25.218], acceptable [25.218–19.962], weak [19.962–14.706], very weak [14.706–9.45] In light of these findings, the researcher made several recommendations, the most important of which was the need for coaches to rely on the physical tests under study and the standard levels established by the researcher during the selection process for soccer players under 13 years of age.

Keywords. Normative Levels/ CMJ/ SJ/ (U13).

Introduction

The fields of physical education and sports science have undergone significant development at various levels and across most sporting events and games, thanks to the contributions of the basic sciences and scientific research in advancing the sports movement to the highest levels. One of these sciences is the science of testing and measurement. There is an urgent need in sports science to develop an affordable, portable, and easy-to-use measurement tool **(Petrigna, 2019)** to measure, evaluate, and monitor athletic performance. This need has inspired specialists in the field of sports engineering to design and produce new applications integrated into tablets and smartphones as alternatives to laboratory devices and instruments, given the many challenges such as the high cost of laboratory equipment, the difficulty of transporting equipment to the field or people to the lab, and the need for regular maintenance **(Gencoglu, 2023) (Silva, 2021) (Brooks, 2018) (Ulupinar, 2020).** For example, the **My Jump2** app calculates jump height using high-speed video at 240 Hz captured by an iPhone camera; the app is inexpensive and practical and can be used in various sports **(Peng, 2024)** The app's accuracy has been validated on a group of professional soccer players **(Onat**

Cetin, 2024) and judo athletes **(Karsten, B. Marcolin, and A. Dantona, 2019, p. 78**) , elementary school children **(Bogataj, 2020),** older adults **(Cabral, 2018),** sports science students (Driller, 2017; Balsalobre, 2015), elite beach volleyball players (Medeiros, 2024), and athletes in fencing, swimming, and diving **(Peng, 2024)** The results of these studies indicate that the My Jump2 tool is valid, reliable, and useful for measuring jumping performance **(Karsten, B. Marcolin, & A. Dantona, 2019, p. 80),**

Jumping ability (explosive strength) is a critical athletic ability for successfully completing various sports events and has been shown to be associated with athletes' performance in competition **(Peng, 2024) (Prieske et al., 2019; Rodríguez-Rosell et al., 2017),** as well as its importance in the learning process and the acquisition of fundamental skills across various sports. Therefore, any skill, movement, or motor sequence requires an adequate amount of strength to be performed at a good level, or at least at an acceptable minimum level, which is evident in soccer players during powerful, rapid shots on goal, vertical jumps, the speed of side throws, and quick, sudden changes of direction in dribbling and sprinting **(Haroune, Ali, & Chachou1, 2024, p. 19).** Therefore, it is essential to understand it, as well as the methods for measuring and developing it, and to incorporate it into annual training programs. Tests and measurements are one of the key foundations for planning, monitoring, and evaluation, In addition to the **CMJ and SJ** tests—two common tests for vertical jump (VJ) used to assess lower-body explosive strength **(Karsten, B. Marcolin, & A. Dantona, 2019, p. 84)—**

The identification and assessment of athletic talent require a systematic approach based on specific criteria primarily linked to the requirements of the specific sport, relying on modern thinking and a well-studied scientific methodology that does not depend on random, spur-of-the-moment decisions lacking scientific basis, but rather on analytical studies and deeper intellectual analysis. In this context, a significant number of scientists and specialists agree that tests and measurements are the optimal objective means for conducting the selection, evaluation, and comparison of players, For comparisons to be made logically and to have clear significance, there must be standardized levels to facilitate the evaluation of results. This is confirmed by **Ben Qawa Ali,** a scientist specializing in talent selection in soccer, "Tests are the appropriate means for making comparisons between athletes, and the existence of standardized levels and criteria facilitates these comparisons, making them more accurate and objective.**" (Bousha, 2018, p. 117),** which is consistent with what **"Mohamed Sobhi** Hassanein" noted: Good tests include norms or standards. These norms or standards represent the normative values corresponding to the values derived from the tests, and the presence of standards allows the test-taker to identify their relative position within the group, which is an important and necessary step for achieving optimal assessment conditions. **(Hassanein, 2001, p. 154).** "Saleh Medhat" that the talent identification model must always take into account the requirements of the advanced level, and thus develop a test battery appropriate for the adolescent's age; standard levels must also be established for different age groups to serve as a benchmark, as well as gap analysis and monitoring of progress **(Saleh, 2019, p. 54**

In light of the foregoing, this study is an attempt to identify the root cause of the problem and arrive at specific, and realistic, based on a thorough analysis of the data, to determine the characteristics of the elite athletic model, identify selection criteria, attempt to predict peak performance levels, and develop selection and classification models by establishing normative levels for certain physical parameters. From this perspective, we can pose the following questions:

- General Question:

*What is the feasibility of establishing standardized levels for the research sample, based on the normal distribution of the **CMJ** and **SJ** tests, as an indicator for selecting Algerian soccer players under 13 years of age?*

The general question gives rise to the following sub-questions

- Specific Questions:

✓ What is the feasibility of determining normative levels for the research sample based on the normality of the distribution of CMJ test results as an indicator for selecting Algerian soccer players under 13 years of age?

✓ What is the feasibility of determining standard scores for the research sample based on the normality of the distribution of SJ test results as an indicator for selecting Algerian soccer players under 13 years of age?

-Study Hypotheses.

-General Hypothesis:

✓ Standard scores can be determined for the research sample based on the normality of the distribution of **CMJ** and **SJ** test results as an indicator for selecting Algerian soccer players under 13 years of age.

-Partial Hypotheses:

✓ Standard scores can be determined for the study sample based on the normality of the distribution of **CMJ** test results as an indicator for selecting Algerian soccer players under 13 years of age.

✓ Standard scores can be determined for the study sample based on the normality of the distribution of the **SJ** test results as an indicator for selecting Algerian soccer players under 13 years of age.

-Objectives of the study:

✓ To determine normative levels for the study sample based on the normal distribution of CMJ test scores as an indicator for selecting Algerian soccer players under the age of 13

✓ To determine normative levels for the research sample based on the normality of the distribution of SJ test results as an indicator for selecting Algerian soccer players under 13 years of age

- Significance of the Study:

The significance of this study stems from the fact that selection serves as a foundational reference in the field of sports, representing the first step toward achieving success. When selection is carried out carefully and on a scientific basis, emerging talent has a greater chance of success. Through this study, we also aim to provide scientific guidelines and establish a roadmap for the systematic implementation of this process, thereby enhancing the chances of

achieving positive results compared to primitive methods that may contribute to the marginalization of talents capable of achieving athletic development.

- Study Terminology:

- Levels:

These are criteria used to evaluate measurement results. A distinction can be made between Standards and Norms in that the former pertain to the field of athletic assessment at the decisive level, which express the level of proficiency representing the minimum standard of individual performance. They are a set of grades that classify measurement results as meeting requirements or falling short of them. The cutoff score is established based on external benchmarks, and the reference benchmark for levels known as Criterion Reference Levels (CRs), which are represented by descriptive terms such as: Pass, Fail, Exceeded-Met-Failed to Meet the Level **(Radwan M., 2021, p. 18)**

- Scores:

Standards are a set of scores derived using specific statistical methods from raw scores for test results, taking into account the distribution of scores obtained from administering the test to a random sample representative of the target population **(Sayed A., 2021, p. 148).** Thus, norms are empirically determined through the performance of a standardization group, and through this application, scores are ranked according to the performance of this sample. Norms serve as the basis for interpreting an individual's score on a test in light of the performance of other individuals to whom they belong, resulting in tests that are comparable between individuals or between tests. The raw score obtained by the examinee on the test has no meaning in and of itself—it can only be interpreted by comparing it to a specific standard **(Al-Fartousi, 2022, p. 139)** .

-Definition of a Standard Score:

The standard score is a standard and legal unit of measurement based on the arithmetic mean and standard deviation of the raw scores obtained from the sample or the original population, where the distribution of these scores is based on the standard normal distribution in terms of different standard deviation units **(Radwan and Ibrahim, 2024, p. 13).**

- Selection:

Selection is the process of identifying talented individuals who possess unique patterns of aptitudes and specific abilities that align with the requirements of a particular sport. **(Al-Shafei and Dorish, 2023, p. 291).**

-Research Sample and Field Procedures:

Research Methodology:

Given the nature of the topic and the requirements of the intended research, the researcher adopted a descriptive approach using a survey method, which is defined as a set of research procedures that work together to describe a phenomenon or topic based on the

collection, classification, processing them, and analyzing them sufficiently and accurately to derive their significance and arrive at conclusions or generalizations about the phenomenon or subject under study. **(Al-Fartousi and Al-Maidani, 2023, p. 157),** Although an accurate and comprehensive description is the primary goal of descriptive research, it often goes beyond description to interpretation, within the limits of the methodological procedures followed and the researcher's ability to interpret and draw inferences. The descriptive approach is based on a set of principles, the most important of which are abstraction and generalization. **(Al-Dailami, Ghuli, and Abdulrazzaq, 2022, p. 72).**

The study was conducted in accordance with the Declaration of Helsinki and in compliance with the institutional ethical standards of Abdelhamid Ibn Badis University – Mostaganem, Algeria, as well as Algerian national legislation governing scientific research (Law No. 98-11 and Law No. 18-11). It involved non-clinical and non-interventional physical fitness assessments conducted using standardized field-based protocols, with no medical, clinical, diagnostic, or therapeutic procedures. According to the institutional ethical review framework, this type of study is exempt from full Institutional Review Board (IRB) approval. Informed consent was obtained from all participants and/or their legal guardians prior to participation, and involvement in the study was entirely voluntary.

Research Sample:

Sample testing is an important objective for all scholars and researchers; the derivation of results depends on it, and consequently, the generalization of the results of the measured phenomenon to the original population from which the scientific phenomenon under study was derived. In this sense, the sample is: "a relative group from the original study population, selected in a specific manner" **(Al-Mashadani, 2019, p. 177).** Based on this, the researcher selected the research sample using a purposive method, estimating the sample size at: 252 soccer players in the under-13 age group from certain schools and soccer academies in eastern Algeria, in the provinces under the regional jurisdiction of the Regional Federation, Annaba, specifically the provinces of: Guelma, Souk Ahras, Tébessa, Annaba, and El Tarf. The study included 18 teams, and the following table lists the teams included in the sample.

Table 01: Research Sample Teams, Names, Logos, and Number of Players

Province	Team Name	Logo	Sample	Province	Team Name	Logo	Sample
TÉBESSA	A.M.F.J.T		14	Souk Ahras	M.M.S.A		14
TÉBESSA	A.S.B.C		14	Souk Ahras	Athetic Souk Ahras		14
TÉBESSA	S.C.T		14	Souk Ahras	E.S.S.S		14
TÉBESSA	SPORT ACADEMY Bir El Ater		14	—	—		—
Annaba	U.S.M.A		14	El Tarf	CHIHANI N.R.A.C		14

Annaba	SIDI AMAR I.R.B.S.A		14	El Tarf	O.S.M.T		14
Annaba	K.A.B		14	El Tarf	Academy El Draa		14
Annaba	O.M ANNABA		14	Guelma	A.R.G		14
Annaba	O.M ANNABA School		14	Guelma	A.S.G		14
Guelma	E.S.M.G		14	Guelma	S.C.B		14

- Control of research variables

✓ Control of the age variable: The study sample consists of soccer players under the age of 13 from the provinces under the jurisdiction of the Annaba League.

✓ The researcher personally oversaw the administration of the tests proposed and selected by expert doctors as critical requirements for selecting under-13 soccer prospects.
✓ Players older than 13 or younger than 12 were excluded.
✓ Goalkeepers were excluded because they have different requirements than other players; therefore, the 14 players from the exploratory study were excluded.
✓ Adopting a single set of measurement methods without changing the tools used, in order to achieve more accurate and objective results.
✓ Taking into account the element of excitement and motivation during each performance, test, or measurement so that the participant gives their maximum effort

- Physical Tests:

- Vertical jump test from a counter-movement position (contre mouvement jump) using the My Jump 2 app.
- Vertical jump test from a squat position (squat jump) using the My Jump 2 app.

- Scientific Basis of the Tests:

"The tests used in the field of physical education vary according to their objectives, and the sources from which these tests are obtained vary accordingly. All tests must be based on sound scientific principles so that we can use them to the fullest extent" **(Al-Janabi, 2019, p. 67).** These tests provide quantitative data on traits or characteristics measured with a high degree of validity, reliability, and objectivity **(Al-Hafiz & Shihata, 2020, p. 203)** Experts in measurement emphasize the importance of calculating the statistical properties of the scale and its items, which serve as an indicator of its accuracy in measuring what it was designed for **(Al-Hayani & Al-Hayani, 2022, p. 118).** The following is an overview of the scientific criteria that a good test must meet, which researchers should consider before using any test.

- Validity:

A valid test is one that accurately measures the element, trait, or phenomenon it was designed to measure, and does not measure other variables in addition to or in place of it. **(Al-Sayyid, 2021, p. 145),**

The **CMJ and SJ** tests integrated into the my jump2 app have achieved one type of validity, namely content validity, when the researcher presented them to a group of experts and specialists, and standardized by the logical validity of the specialists, and agreed upon by them as valid for the sample individuals (research sample) in measuring the trait to be measured in the fields of testing, measurement, training, and soccer; their number reached 12 experts and specialists.

- Reliability:

To determine the stability of the measurement, the researcher assessed reliability through test-retest methods. The tests were administered to a sample of 14 players under the age of 13 who are active in schools, and soccer academies in the municipality of Al-Sharia, Tebessa Province, on Monday, May **15, 2025, at 9:00 a.m**., and then re-administered under the same conditions seven days later, on Monday**, May 22, 2025**, to the same sample. According to **"Mohammed Jassim Al-Yasiri**": "A one-week interval between administrations of physical education performance tests is considered an appropriate procedure for obtaining the reliability coefficient using this method**" (Al-Yasiri, M., 2024, p. 87**). On this basis, the reliability coefficient was calculated using the intraclass correlation coefficient.

Table 02: The reliability coefficient was calculated using the intra-class correlation coefficient (ICC).

TESTS AND MEASUREMENTS	FIRST APPLICATION ($\bar{X}1$)	SD ($\Sigma 1\pm$)	RETEST ($\bar{X}2$)	SD ($\Sigma 2\pm$)	SIG	ICC	95% CI
COUNTERMOVEMENT JUMP (CMJ)	25.99	5.30	25.30	4.59	0.000	0.959	0.95
SQUAT JUMP (SJ)	23.49	4.59	23.48	4.21	0.000	0.961	0.95

Table interpretation:

The table showing the intraclass correlation coefficient **(ICC)** between the initial and retest administrations of the proposed test battery under study at a **95%** confidence interval **(95% CI)** indicates a statistically significant correlation for all tests, with **ICC** values ranging from **0.961** as the highest value and 0.959 as the lowest value, all of which indicate a strong correlation, suggesting that the tests under study have a high degree of stability. **(Weir, J. P., 2005, pp. 231–240), (Jarvis, S., O'Sullivan, L., Davies, B., Wiltshire, H., & Baker, J. S., 2009, pp. 217–230), (Ismail, 2019, pp. 112–128**).

- Test specifications: The following tests were conducted as data collection tools for the research sample:

- Counter-movement vertical jump test using the My Jump 2 app

- Test objective: To measure lower-body explosive strength.

- Equipment: A solid, non-slip surface; shoes with stiff soles; a smartphone with the My Jump 2 app installed; a tripod; a smartphone holder; a whistle.

- Procedure: Warm-up, including five minutes of stretching exercises.

- Mount the smartphone with the My Jump 2 app on the tripod.
- The athlete stands with hands on hips, torso upright, and knees extended in front of the tripod at a distance that allows the phone's camera to capture the athlete's full body during the jump.
- After hearing the whistle, the athlete performs a quick downward movement (approximately 90-degree knee bend), followed by a quick upward movement as high
- as possible, keeping hands on the hips, and landing wit

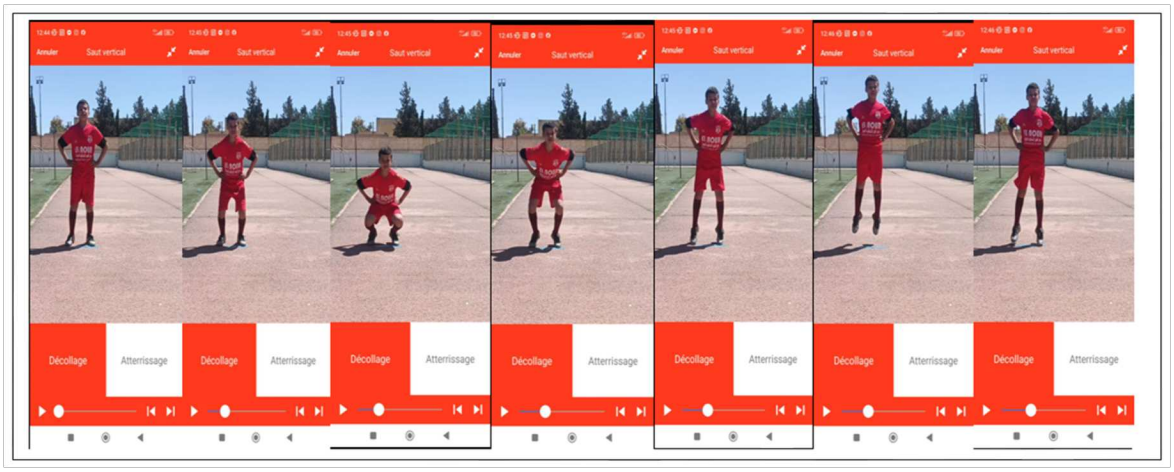
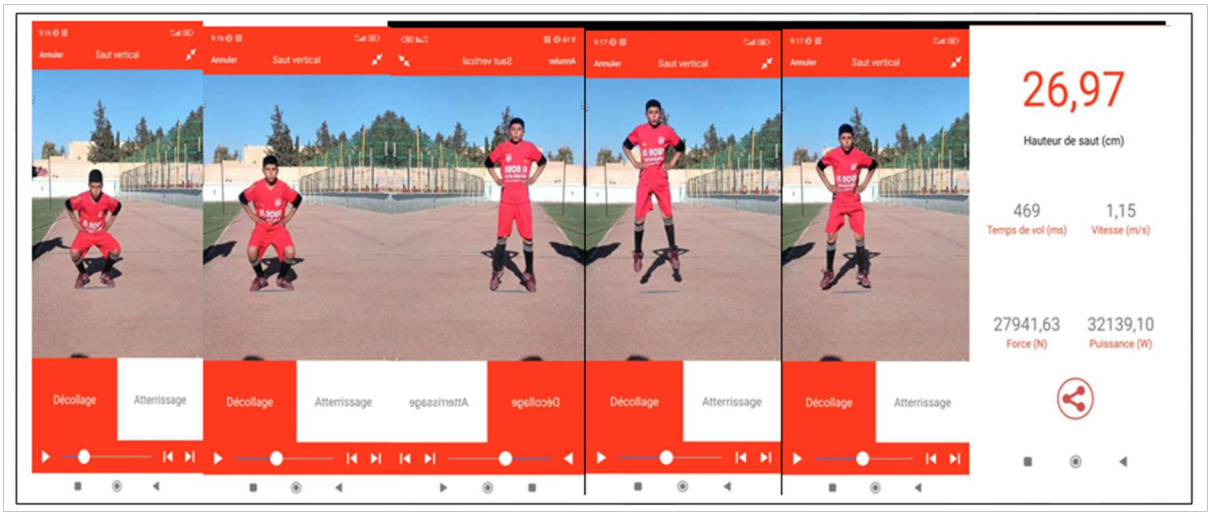


Figure01: Vertical jump test from a squat position using the My Jump 2 app

- **Test Objective: To measure lower-body explosive strength**.
- **Equipment: A firm, non-slip surface; shoes with firm soles; a smartphone with the My Jump 2 app installed; a tripod; a smartphone mount; a whistle.**
- **Procedure**:

- Warm up with stretching exercises for five minutes.
- Mount the smartphone with the **My Jump 2** app on the tripod.
- The athlete stands in front of the tripod at a distance that allows the phone's camera to capture the athlete performing the jump with their entire body.
- The athlete places their hands on their hips, bends their knees at **a 90-**degree angle, and positions their feet shoulder-width apart.
- Upon hearing the whistle, the athlete jumps upward, keeping their hands on their waist throughout the entire jump and maintaining knee extension while in the air.

Figure 02: Vertical jump test from a counter-movement position (contre movement jump) using the My Jump 2 app.



• Statistical Methods:

The researcher used the Statistical Package for the Social Sciences (SPSS) version 26 to calculate the following statistical measures: (Mean), (Minimum), (Maximum), (Standard Deviation), (Interclass Correlation Coefficient), (Intraclass Correlation Coefficient), (Kurtosis), (Confidence Interval), (Cohen's d effect size), (Z-score), (T-score) (Pearson Correlation)

- Presentation and discussion of the results of the normal distribution of the data using measures of central tendency, dispersion, and skewness.

- Table: Shows the results of the normal distribution using measures of central tendency and dispersion

Table03: Results of the normality test using measures of central tendency and dispersion

Tests	Unit of Measurement	Mean	Med	Mode	Standard Deviation	Max Value	Min Value	Range	Skewness Coefficient	Kurtosis Coefficient
CMJ	cm	24.518	24.135	20.15	4.271	33.85	17.05	16.80	0.374	-0.759
SJ	cm	22.593	22.545	17.25	4.380	32.18	15.01	17.09	0.243	-0.769

Results of the normality test using measures of central tendency and dispersion

The table shows the arithmetic mean, the median standard deviation, the minimum and maximum values, and the skewness coefficient, and the kurtosis of the measures, as well as the tests specific to the research sample under analysis (two quantitative variables). It shows that all skewness coefficient values for the sample individuals fall within the range of (+3 to –

3), indicating the homogeneity of the sample individuals, This indicates that the sample results follow a normal distribution, which allows the researcher to proceed with the work, complete the statistical procedures to obtain, present, analyze, and discuss the results, and construct standard scores.

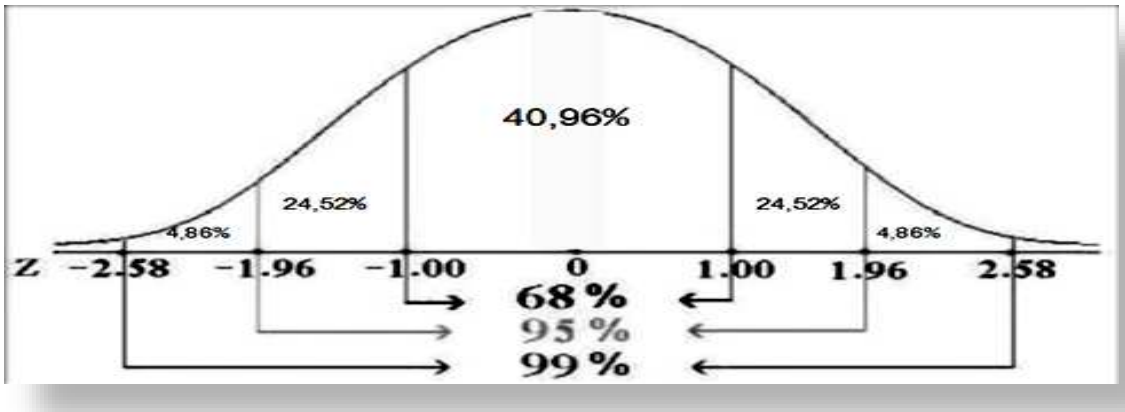


Figure 03: Presentation of the normal distribution curve

20 -32≤	≤32-44	≤44-56	≤56-68	68-80≤
Very Poor	Poor	Accepted	Good	Very Good

The Gaussian curve (normal distribution) was used because it possesses various statistical properties that are useful in developing test criteria or in obtaining various statistical information, Furthermore, the normal distribution is one of the most common distributions in the field of physical education, because the distribution of many of the traits and characteristics measured in this field approximates the normal curve **(Al-Ghani, 2019, p. 92).**

- **Discussion of the Results of the First Hypothesis:**

Table 04: Presentation and discussion of the results of the research sample in the CMJ test measurement.

Standard Score	Standard Level	Raw Score (cm)	Number of Players	Percentage (%)	Theoretical % (Normal Distribution)
68 – 80	Very Good	32.204 – 37.328	15	5.95%	4.86
56 – 68	Good	27.082 – 32.204	54	21.43%	24.52
44 – 56	Accepted	21.958 – 27.082	104	41.27%	40.96
32 – 44	Poor	16.958 – 21.958	79	31.35%	24.52
20 – 32	Very Poor	11.834 – 16.958	0	0.00%	4.86
Total			**252**	**100%**	**99.72%**

Figure 04: Comparison between the research sample results in the (CMJ) test and the normal distribution percentages.

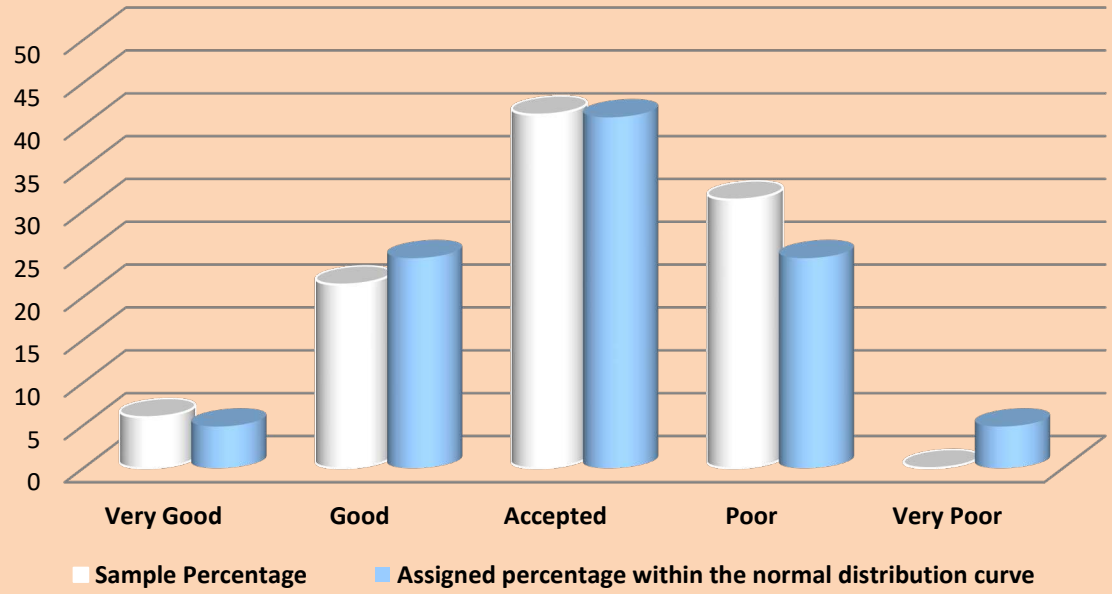


Table shows the number of players and the corresponding percentages for each standard level, as well as the theoretical percentages within the normal distribution curve for the CMJ test.

The results in the table show that the arithmetic mean of the raw scores for the **CMJ** test was **24.52,** with a standard deviation **of 4.27.** Following statistical processing of the standard scores—which were determined by the T-scores based on the Z-scores— Based on the raw results of the research sample in this test, it was found that the highest percentage was at the "Acceptable" level **(41.27%),** representing **104 players,** corresponding to raw scores **[27.082–21.958** and the standard score range **[44–56],** while the second-highest percentage was for the "weak" level at **31.35%,** representing 79 players, corresponding to the fifth grade **[21.958–16.958]** and the standard grade **[32–44**]. The "Good" level ranked third at **21.43%,** representing **54** players, corresponding to the fifth grade **[32.204–27.082 ,** and a standard score of **[56–68],** while the **"very good"** level ranked fourth at **5.95%,** equivalent to **15** players, with a raw score **of [37.328–32.204 [,** and the standard score **[68–80[.** Meanwhile, the "very poor" level ranked fifth at 0%, representing 0 players, at the fifth percentile **[16.958–11.834[** and the standard score **[20–32[.**

The researcher attributes these results to coaches' neglect of this characteristic, both during the selection process and during physical conditioning, despite its critical importance in determining players' skill levels. It can be said that specialized sports, in all their forms and types, rely in their performance specifications, and their achievements, in one way or another, on muscular strength and muscle contraction. Performance in all athletic activities depends on how the body moves and the muscles that control body movement through contraction and relaxation to move the limbs from one position to another. The stronger the muscles, the more effective the contractions; this is reinforced by **"Ahmed Shawky 2023**," who states that

developing explosive strength is considered the most important and effective factor in showcasing modern techniques in soccer, as evidenced by the high emphasis on muscular strength. and "George Cazorla" emphasizes that explosive strength is one of the most important indicators accompanying physical preparation in modern soccer, and that field experience has confirmed this. **(Cazorla, 2013, p. 128).** In addition, scientific training builds muscular strength, and motor speed is a requirement for performance at the competitive level. This ability distinguishes elite athletes, as they possess the capacity to combine the components of strength and speed to produce a powerful and rapid movement pattern **(Radwan, 2017, p. 85**). Al-Hazaa believes that the highest rate of muscle strength development in young athletes due to physical training occurs during the growth period, which takes place between approximately **12 and 15 years** of age, when male characteristics become more pronounced, immediately preceding the stage of maturity, and continues for two or three years thereafter.

The researcher believes that a soccer player's explosive strength is crucial for skills and movements that require rapid muscle contractions, and is responsible for many factors of excellence and reaching the highest levels. It is clearly evident in the ability of the leg muscles to score, pass, tackle, and jump, as well as in the player's ability to gain confidence, resist opponents, and avoid injury during constant contact with opponents

Based on the above, the student researcher concluded that the majority of players' results in the counter-movement vertical jump **(CMJ**) test fell within the average range, Based on this, comparisons between levels were determined to yield the final level, which represents the true range of the research sample's levels, enabling us to issue a final judgment using a statistical test based on the normal distribution. The researcher notes that the standard scores for each player in a specific category ensure the accurate classification of all statistical variables that may influence the final decision regarding the standard scores for the vertical jump test from the counter-movement jump **(CMJ)** among under-13 soccer players

Accordingly, after presenting the analysis of the various results, the first sub-hypothesis was clearly confirmed, which states that standard levels can be determined for the research sample based on the normal distribution of the **CMJ** test scores as an indicator for selecting Algerian soccer players **under 13 years of age**.

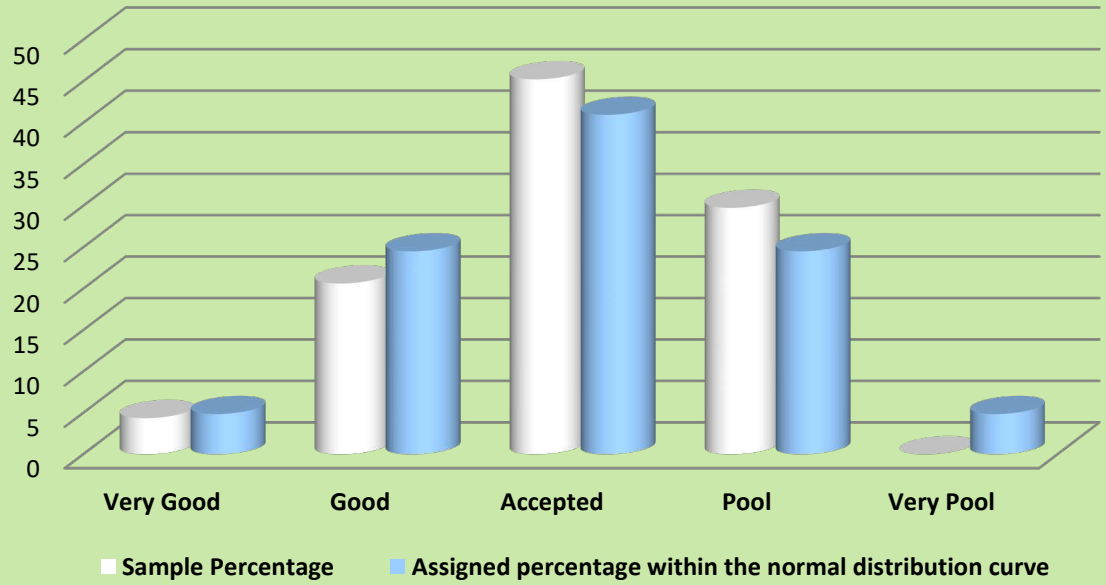
- **Discussion of the Results of the Second Hypothesis:**

Table 05: Presentation and Discussion of the Results of the Research Sample in the Squat Jump (SJ) Vertical Jump Test.

Standard Score	Standard Level	Raw Score (cm)	Number of Players	Percentage (%)	Theoretical % (Normal Distribution)
68 – 80	Very Good	30.474 – 35.73	11	4.37%	4.86
56 – 68	Good	25.218 – 30.474	52	20.63%	24.52
44 – 56	Accepted	19.962 – 25.218	114	45.24%	40.96
32 – 44	Poor	14.706 – 19.962	75	29.76%	24.52
20 – 32	Very Poor	9.45 – 14.706	0	0.00%	4.86
Tota			252	100%	99.72%

Table shows the number of players and the corresponding percentages for each standard level, as well as the theoretical percentages assigned within the normal distribution curve

Figure 05: Comparison of research sample results in the Squat Jump **(SJ)** test against the percentages of the normal distribution curve.



The results in the table show that the arithmetic mean of the raw scores for the SJ test was **22.59,** with a standard deviation of **4.38.** Following statistical processing of the standard scores determined by the t-scores, based on the z-scores, Based on the raw results of the research sample in this test, it was found that the highest percentage was at the "Acceptable" level (45.24%), representing **114 players**, at raw score **[25.218–19.962]** and standard score [56–44]. The second-highest percentage was for the "poor" level **at 29.76%,** representing 75 players, corresponding to the fifth grade **[19.962–14.706]** and the standard score range [44–32 , while the "Good" level ranked third at 20.63%, representing **52 players**, at the fifth grade **[30.474–25.218]** and the standard score **[68–56],** while the "Very Good" level ranked fourth

at **4.37%,** equivalent to **11** players, corresponding to the fifth grade **[35.73–30.474]** and the standard grade **[80–68].** The **"very poor"** level ranked fifth with a percentage of **0%,** representing 0 players, at the fifth **grade [14.706–9.45]** and the standard grade **[32–20].**

The results of the current study are consistent with many previous studies, such as the study by **Ben Nima Ben Ouda (2018)** found that the results for the majority of the research sample were limited to the levels (weak – acceptable – good). Consequently, he views these results as falling within the average and acceptable range, predicting a bright future if the students receive sufficient follow-up and care to reach higher levels **(Ouda, 2018, p. 214)** He also believes that strength is no less important than other physical attributes, as lower-body muscle strength is a crucial factor—given that soccer players use their legs throughout all phases of the game. Furthermore, many researchers have noted that numerous physical attributes, including speed, rely on strength for prediction, training, and . We also find that the power to jump in order to head the ball toward the goal for scoring depends on this physical attribute and is therefore the factor that determines the achievement of good results in some cases. In the same context and in confirmation of the results of the current study, we find the study by **"Bboucha and Haib (2018)** , where the results of the Sargent test among youth soccer players in western Algeria showed that the majority of the research sample fell into the levels (Acceptable – Good – Very Good), with the number of players in each level being approximately 142, 56, and 10, respectively **. (Beboucha, 2018, p. 66)**

The same researcher believes that this group possesses a very high vertical jump capacity, which will help them achieve good results in soccer in the future, noting that the vertical jump results were similar to the speed test results.

In contrast to local studies that provided strong evidence of Algerian youth players' average explosive strength, we find the study by **"Omar Khalil Shargab" (2011):** which was conducted on a sample of youth players from professional clubs in Palestine. The study's results in the static vertical jump test showed that the arithmetic mean of the research sample reached 26.358, which, according to the author, indicates a weakness in this trait among Palestinian youth players compared to the standard levels and ideal ratios in the study **(Sharghab, 2011, p. 117).** The researcher attributes the weakness of this characteristic in the study sample to the fact that coaches do not use exercises and drills that combine speed with strength during muscle contractions, which would lead to an improvement in explosive strength.

Based on the foregoing, and considering the normative scores achieved on the **SJ** test by the study sample as shown in the table, and considering the normative levels achieved in the SJ test by the study sample as shown in the previous table, which were established using normative scores based on the fifth percentile for **the under-13 age** group of youth soccer players in eastern Algeria, in which most of the achieved scores were close to the expected scores within the normal distribution curve, and since the standards were derived from within the studied phenomenon rather than from outside it, they are therefore a true representation of the research sample's level in the SJ test, and the results can be generalized to the research population, consisting of soccer **players under 13 years** of age in the provinces under the regional jurisdiction of the Annaba **League (Tebessa, Annaba, El Tarf, Souk Ahras, Guelma).** In light of the results, it can be said that the second hypothesis has been largely confirmed. Consequently, after presenting and analyzing the various results, it is clearly confirmed that the second sub-hypothesis has been verified, which states that standard levels

can be determined for the research sample based on the normality of the distribution of the SJ test as an indicator for selecting Algerian soccer players **under the age of 13.**

- Conclusion

The talent selection system today represents an important and distinctive field in the sports movement; it is an indispensable foundation of the state's sports structure and a key pillar in the competitive sector. Clubs, schools, academies, and sports federations are all considered responsible for identifying athletically talented individuals, and subsequently for classifying and nurturing them, preparing them in a manner that ensures their development and excellence, and ultimately their achievements at the Arab, regional, continental, global, and Olympic levels. Global experiences indicate the necessity and importance of academic training for everyone working within the selection system so that it acquires a scientific and academic character, enabling specialists and coaches to comprehend and understand the scientific foundations upon which this process is based, which include the necessity of thorough familiarity with the requirements of the targeted specialized sport. Furthermore, the importance of this work in strengthening the future of soccer in Algeria cannot be overlooked, as it can lead to improving the level of training and developing youth soccer players under the age of 13. Moreover, this research can be used as a starting point for future studies and applied research in this field. Based on the analysis conducted by the researcher, a set of conclusions was reached, which we summarize in the following points:

- The tests under study exhibit a high level of validity, reliability, and objectivity.
- All skewness coefficient values fall within the range of ±3, indicating that the aforementioned test data follow a normal distribution.
- Establishment of standard levels for the CMJ test integrated into the My Jump 02 app to measure explosive power, as identified by expert doctors as critical requirements for selecting U-13 soccer prospects.
- Establishing standard levels for the SJ test integrated into the My Jump 02 app to measure explosive strength, as identified by expert doctors as critical requirements for selecting U-13 soccer prospects.

- Suggestions and Recommendations

Based on the researcher's findings, the following recommendations are made:

- Coaches should adopt the standard levels and scores established by the researcher in the selection process for under-13 soccer players.
- The necessity of relying on scientific principles in the selection process for talented young players, in accordance with the game's requirements, to prevent the loss of emerging talent.
- Adopting the CMJ SJ tests to measure lower-body explosive strength, integrated into the my jump2 app, which the researcher used in the objective assessment process, and promoting their adoption for player selection in the under-13 age group.
- Conducting similar research and studies on other abilities (cognitive, functional) in the assessment of young players at soccer schools and academies in Algeria.
- Repeating such research every four years to account for changes in player levels and the emergence of new athletic talents who can be nurtured and guided in a manner suitable for soccer players.

- Strive to achieve effective coach training by finding ways and mechanisms to enrich their knowledge base and field experience in the area of player selection through the organization of seminars, courses, and training sessions on objective assessment methods.
- Develop a strategy based on scientific principles.
- Retraining coaches on modern theoretical concepts related to the selection process.

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- Ethics Statement:

The study was conducted in accordance with the Declaration of Helsinki and in compliance with the institutional ethical standards of Abdelhamid Ibn Badis University – Mostaganem, Algeria, as well as Algerian national legislation governing scientific research (Law No. 98-11 and Law No. 18-11).

The study involved non-clinical and non-interventional physical fitness assessments using standardized field-based protocols widely used in sports science research. It did not include any medical, clinical, diagnostic, or therapeutic interventions, and the procedures did not expose participants to risks beyond those associated with routine physical activity.

According to the institutional ethical review framework of Abdelhamid Ibn Badis University – Mostaganem, studies limited to standard non-interventional physical performance assessments are considered exempt from full Institutional Review Board (IRB) approval. Therefore, formal IRB approval was not required for this study.

- **Data Availability Statement:**

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request, for purposes of scientific verification and reanalysis.

- **Competing interests:**

The author declares no competing interests .

- **Consent for Publication:**

Written informed consent was obtained from all participants and/or their legal guardians prior to participation in the study. This consent included permission for participation in the research, data collection, and explicit authorization for the publication of the study findings, including the use of participant images for scientific dissemination purposes.