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Establishing Normative Levels for the Push-Up Test Among Young Soccer Players

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ABSTRACT

This research aimed to establish normative levels for the push-up test among young soccer players and to compare these derived levels with those expected under a normal distribution. A descriptive research approach, with a survey design was used, involving a sample of 45 players (age = 12.73 ± 0.89 years, height = 1.48 ± 0.09 metres, mass = 42.64 ± 8.96 kg). Data were collected using the push-up test, and SPSS 27 was used for statistical analysis. The results identified three normative levels for the push-up test among young soccer players; a high percentage of players fell into the "medium" level, followed by the "poor" level, and then the "good" level. A comparison the observed distribution across these normative levels with the theoretical distribution (based on a normal distribution) revealed no statistically significant differences, supporting the suitability of these standards for classifying players based on their test results. Consequently, the researchers recommend adopting these levels for the age group targeted in this research. Future research could further refine these levels by accounting for various age, competitive level, and the distinct physical requirements of different playing positions to develop more specialised normative criteria.

Keywords: Normative levels; standards; push-up test; young categories; soccer

1. INTRODUCTION:

Soccer is a team sport that has grown rapidly, both globally and in the evolution of training methods and strategic planning. This has led sports professionals to incorporate knowledge from related fields such as testing and measurement to develop objective techniques for assessing players' capabilities. These approaches support guidance of the training process, monitoring of player development, and tracking of performance levels (Aboussif & Atmani, 2021, p. 360).

Enhancing players' physical and technical proficiency depends on effective planning and structured training regimens. This necessitates periodic testing to obtain precise data on players' performance, which can then be utilised for evaluation, ongoing monitoring, and talent selection. The importance of testing and measurement is multifaceted: it fosters a spirit of challenge and a desire for self-improvement (as knowing one's own performance level can motivate a player to exert greater effort and strive for growth); it helps in diagnosis and guidance; and it allows for the establishment of benchmarks and the determination of current performance levels. Consequently, this enables informed decision-making, the identification of strengths and weaknesses, and the implementation of targeted interventions to address shortcomings and elevate overall athletic performance (Gagaa & Zaoui, 2017, p. 138; Benhdia et al., 2020, pp. 212–213).

Cherabcha (2019) stated that "norms" are quantitative bases for evaluating an athlete's performance, determined in light of a reference group's actual performance; they are used to interpret an athlete's score and establish their relative standing compared to their peers (p. 106). In contrast, levels as noted by Bouali et al. (2018) are qualitative in nature and are defined based on what a phenomenon ought to be (p. 227).

Researchers across various fields have focused on testing and measurement. In handball, for instance, Amoura (2018) highlighted the importance of physical tests for assessing handball players' fitness levels. In soccer, Rami and Baouche (2017) discussed the importance of using physical and skill-based tests in the selection process for soccer players, while Seddaoui et al. (2018) examined the role of scientific testing and measurement in player selection within Algerian soccer. Other researchers have also investigated the psychometric properties of the push-up test (Baumgartner et al., 2002; Wood & Baumgartner, 2004; Fawcett & DeBeliso, 2014; Hashim et al., 2018; Clemons, 2019; Kellner et al., 2021).

Based on the above, it is essential to focus on young soccer players, as this stage represents a critical phase in their development. During this period, players undergo significant changes and growth in their physical and functional capacities, requiring continuous, systematic assessment. This evaluation ensures the training process is tailored to their specific characteristics while avoiding arbitrary or inappropriate criteria. Consequently, this research was conducted to address the following questions:

- What are the derived normative levels for the push-up test among young soccer players?
- Does the observed distribution of the derived normative levels differ from the theoretical distribution (based on a normal distribution) among young soccer players?

*** Research Objectives:**

This research aims to:

- Establish normative levels for the push-up test for young soccer players.
- Comparison of the observed distribution based on normative levels derived from a theoretical distribution (based on a normal distribution) among young soccer players.

*** Research Significance:**

The findings of this research can provide an evaluative reference to help young soccer coaches assess their players' upper-body muscular endurance (arms and shoulders). This, in turn, supports monitoring and helps guide training based on scientific principles.

2. RESEARCH METHODOLOGY AND PROCEDURES:

2.1. Research Approach:

Given the research's nature and objective, a descriptive research approach, with a survey design, was used to establish normative levels for the push-up test among young soccer players.

2.2. Research Population and Sample:

The research population consists of young soccer players active in the "University of Bouira Talents Club." We selected a convenience sample of 45 players with a mean age of 12.73 ± 0.89 years, a mean height of 1.48 ± 0.09 metres, and a mean mass of 42.64 ± 8.96 kg.

2.3. Research Scope:

The research focused on young soccer players active in the "University of Bouira Talents Club" during the 2025–2026 sports season. The field study was conducted at the players' training facility.

2.4. Research Instruments:

*** Push-Up Test:**

- Purpose: To measure the muscular endurance of the upper body (arms and shoulders).

- Target Group: Males aged 10 years through the university level.

- Equipment Required: A flat surface.

- Test Procedures: The participant assumes a prone position (face down) on the floor, keeping the body straight without any arching. The evaluator places their palm on the floor and gives the signal to begin. The participant performs the movement by bending their arms until they touch the back of the evaluator's hand, then returning to the starting position. The participant continues for as many repetitions as possible until exhaustion.

- Scoring: Each participant is allowed only one attempt; the number of correctly performed repetitions is recorded (Allaoui & Radwan, 2001, pp. 116–118).

*** Reliability of the Test:**

The reliability of the test was verified using the test-retest method with an interval of approximately two weeks; the results are presented in the table.

Table 1: Intraclass correlation coefficient between the test and the re-test

	N	**ICC**	**95% Confidence Interval**	
Lower	**Upper**			
Test	20	0.92	0.73	0.97
Re-test				

The table shows an intraclass correlation coefficient (ICC) of 0.92 (95% CI: 0.73 – 0.97), indicating excellent reliability.

2.5. Statistical Analysis:

The collected data were analysed using SPSS software (version 27). The following were calculated:

- Intraclass correlation coefficient (ICC Interpretation: "less than 0.5 poor reliability, 0.5 - 0.75 moderate reliability, 0.75 - 0.9 good reliability, greater than 0.90 excellent reliability") (Koo & Li, 2016, p.158).
- Shapiro-Wilk test.
- Minimum and maximum values.
- Mean.
- Standard deviation.
- Frequencies.
- Percentages.
- Standard score (z-score), calculated as z = (x – mean) ÷ standard deviation (using values of -1, 0, and +1) to define the boundaries of the raw scores.
- Chi-square test.

Note: The figures were generated using SPSS and Excel.

3. PRESENTATION OF RESULTS:

The table shows that the Shapiro-Wilk value is not statistically significant (Sig > 0.05); therefore, the data are normally distributed.

Table 2: Shapiro-Wilk test for normality.

Variable	Shapiro-Wilk	df	Sig
Push-up	0.98	45	0.717

Furthermore, the Q-Q plot shows that the points cluster around the reference line, supporting the assumption that the data are normally distributed.

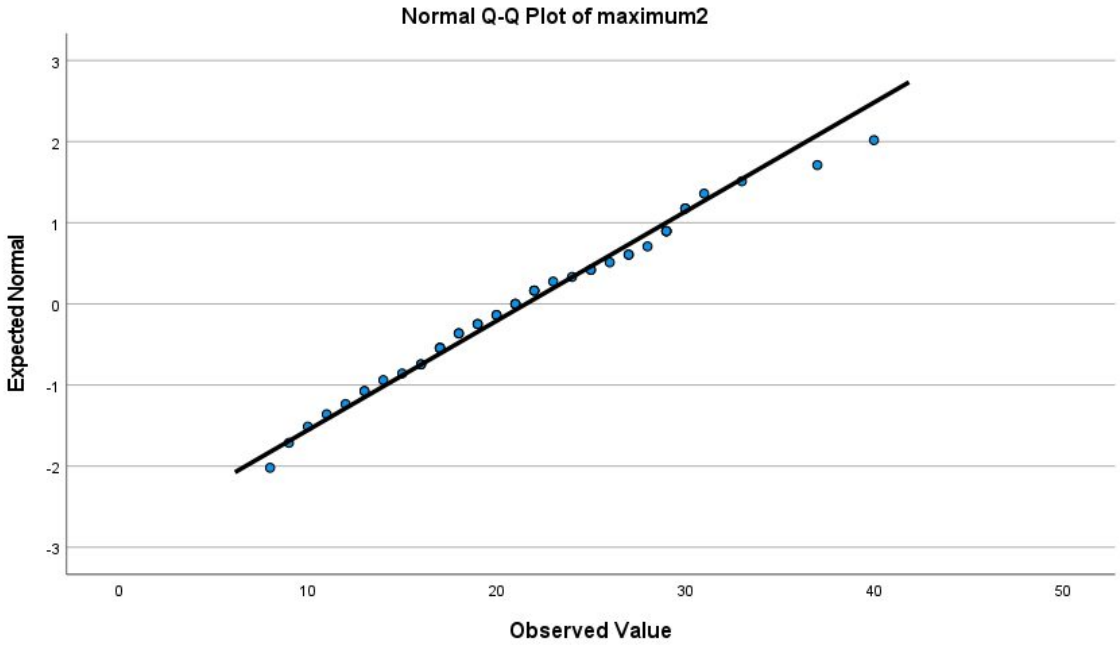


Figure 1: Q-Q plot for a normal distribution

Table 3: Descriptive statistics for the push-up test.

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Push-up	45	8	40	21.56	7.43

The table shows a minimum of 8 and a maximum of 40, while an arithmetic mean of 21.56 and a standard deviation of 7.43

Table 4: Theoretical percentages for the proposed levels, based on a normal distribution.

Levels	%
Poor	15.87
Medium	68.27
Good	15.87

The table shows that the "poor" and "good" levels correspond to 15.87%, while the "medium" level corresponds to 68.27%, according to the normal distribution.

The table shows that the highest percentage (71.11%) was recorded at the medium level, with 32 players; this is followed by 15.56% at the poor level, with 7 players; and finally, 13.33% at the good level, with 6 players.

The table shows that the Chi-square value (Chi-square = 0.24) is not statistically significant (Sig > 0.05). This indicates no statistically significant differences between the observed distribution of players by the derived normative

Table 5: Derived normative levels, raw score boundaries, and the number and percentage of players in each level.

Levels	Raw scores	n	%
Poor	less than 14	7	15.56
Medium	14 - 29	32	71.11
Good	more than 29	6	13.33
Sum		45	100

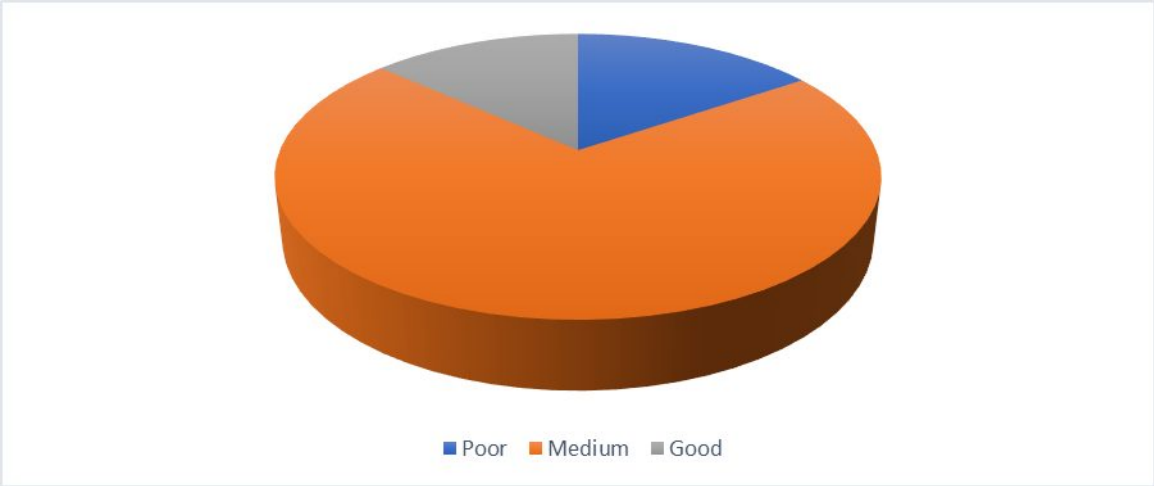


Figure 2: Distribution of players according normative levels

Table 6: Chi-square test for comparing the observed distribution of players with the theoretical distribution.

Percentages according to the normal distribution	Percentages achieved according to the test	Observed frequencies	Expected frequencies	Chi Square	df	Sig	Signification
15.87%	15.56%	7	7.14	0.24	2	0.888	Not significant
68.27%	71.11%	32	30.72				
15.87%	13.33%	6	7.14				

levels and the theoretical distribution (based on a normal distribution). This suggests a good alignment between the two distributions, further supporting the suitability of the derived normative levels for classifying players based on their test results.

4. DISCUSSION OF RESULTS:

Three normative levels were established, with a large percentage of the players falling into the medium category. Comparing the observed distribution across these normative levels with the theoretical distribution (based on a normal distribution) confirmed that these levels are suitable for classifying players according to their test results. The findings can be interpreted in light of the players' physical characteristics. However, they have a significant level of upper body muscular endurance (arms and shoulders), which still requires further improvement. This may be due to the nature of the training programs designed for this group, which priorities other physical capacities deemed more critical for soccer, while placing less emphasis on upper-body (arms and shoulders) muscular endurance. Yet upper-body muscular endurance is an important supporting attribute for players, contributing to balance, stability, performance in one-on-one duels, and motor coordination. Furthermore, as noted by Kević et al. (2013), it indicates health and well-being, as well as the capacity for repetitive force generation. This aligns with Baumgartner et al. (2002), who found a correlation between modified push-up test results and strength and endurance in the arms and shoulder girdle.

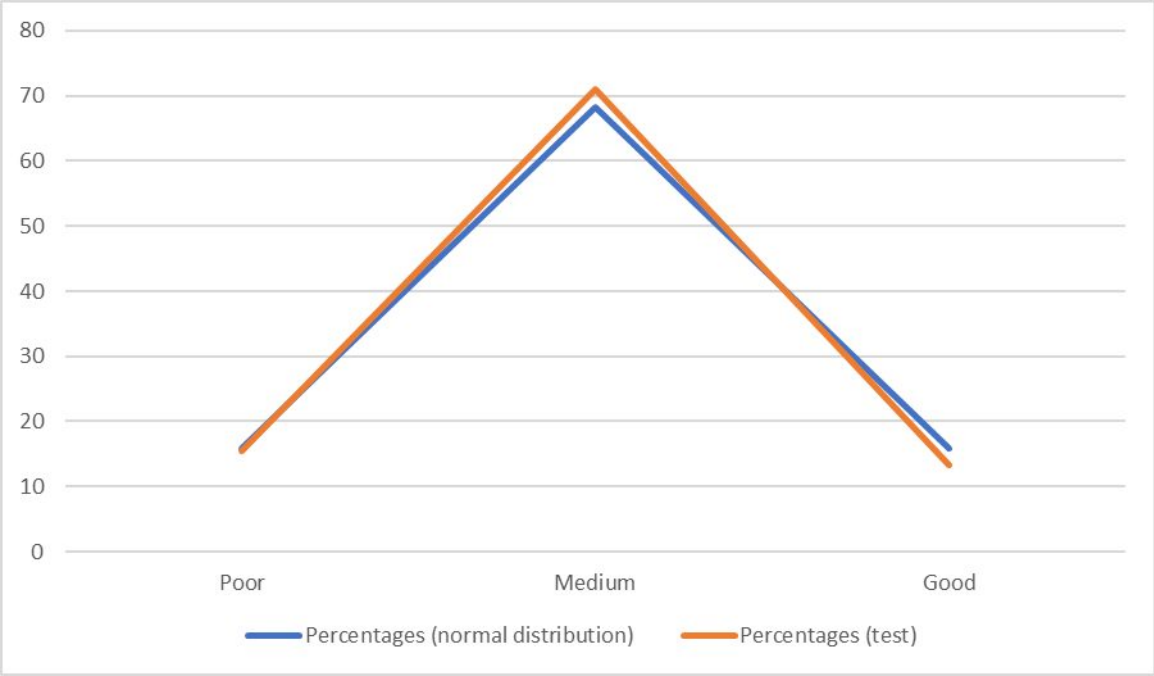


Figure 3: Percentages prescribed according to the normal distribution and the percentages achieved at the derived normative levels (test)

Conversely, players in the “poor” category may lack sufficient time or specialized training to develop upper-body (arms and shoulders) muscular endurance. Meanwhile, some players in the “good” category may reflect individual differences in physical development and adaptation to training.

these derived normative levels may have helped classify players according to their potential. Youcef khodja and Merabet (2020) recommended: "relying on normative levels to evaluate players and determine their true level" (p. 523). Similarly, Benhdia et al. (2020) recommended using tests and measurements in assessments to avoid subjectivity (p. 223).

5. CONCLUSION:

This research aimed to establish normative levels for the push-up test among young soccer players. After data collection and analysis, we identified three normative levels for the test. A high percentage of players fell into the "medium" category, followed by the "poor" category, and then the "good" category. A comparison between the observed distribution across these normative levels and the theoretical distribution (based on a normal distribution) showed no statistically significant differences, confirming that these levels are suitable for classifying players based on their test results.

These findings can help coaches of young-level teams evaluate and monitor players, as well as guide training programs. Consequently, the researchers recommend adopting these test levels for the specific age group targeted in this research. Future research could further refine these normative levels by accounting for various age, competitive levels, and the distinct requirements of various playing positions, thereby developing more specialized normative criteria.

REFERENCES:

Aboussif, M., & Atmani, A. (2021). Establishing normative standards for certain physical abilities of football players based on their playing positions (U17 category): A field study of clubs within the biskra provincial football league. *Sports System Journal*, 8(3), 359-376. https://asjp.cerist.dz/en/article/162903

Allaoui, M. H., & Radwan, M. N. (2001). *Motor performance tests*. Dar Elfikr Elarabi.

Amoura, Y. (2018). The importance of physical tests in assessing the physical fitness level of handball players: A case study of the GSP Team (Under 21, male). *Sciences and Practices of Physical, Sporting, and Artistic Activities*, 7(1), 112-121. https://asjp.cerist.dz/en/article/32501

Baumgartner, T. A., Oh, S., Chung, H., & Hales, D. (2002). Objectivity, reliability, and validity for a revised push-up test protocol. *Measurement in Physical Education and Exercise Science*, 6(4), 225-242.

Benhdia, G., Madani, M., Houar, A., & Bengoua, A. (2020). Designing normative standards for evaluating the skill performance of football players in the first and second national professional leagues. *Journal of Science and Technology of Physical and Sports Activities*, 17(4), 211-225. https://asjp.cerist.dz/en/article/137273

Bouali, L., Youssef Achira, E., & Zeddam, A. (2018). Normative standards for specific physical, health, and functional characteristics of students at the institute of physical education and sports, hassiba benbouali university. *Journal of Science and Technology of Physical and Sports Activities*, 15(2), 223-238. https://asjp.cerist.dz/en/article/40927

Cherabcha, R. (2019). Developing normative standards for a physical ability test battery for female student admissions at the institute of sciences and techniques of physical and sports activities, university of souk ahras. *Scientific Journal of Physical Education and Sports*, 18(1), 62-71. https://asjp.cerist.dz/en/article/94851

Clemons, J. (2019). Construct validity of two different methods of scoring and performing push-ups. *Journal of Strength & Conditioning Research*, 33(11), 2971–2980. https://doi.org/10.1519/JSC.0000000000002843

Fawcett, M., & DeBeliso, M. (2014). The validity and reliability of push-ups as a measure of upper body strength for 11-12 year-old females. *Journal of fitness research*, 3(1), 4-11.

Gagaa, T., & Zaoui, A. (2017). Establishing normative standards for selected physical fitness tests from the eurofit battery for U17 handball players (IRBM club): A survey research. *Màarif*, 12(22), 291-304. https://asjp.cerist.dz/en/article/53714

Hashim, A., Ariffin , A., Hashim , A. T., & Yusof, A. B. (2018). Reliability and validity of the 90º push-ups test protocol. *International Journal of Scientific Research and Management*, 6(6), https://doi.org/10.18535/ijsrm/v6i6.pe01

Kellner, P., Neubauer, J., & Polách, M. (2021). Objectivity of push-up tests and technique assessment. *Journal of Physical Education and Sport*, 21(4), 1629-1634. https://doi.org/10.7752/jpes.2021.04206

Kević, G., Siljeg, K., Mrgan, J., & Sporis, G. (2013). How to measure muscular endurance in children: a new approach. *Collegium Antropologicum*, 37(2), 385–3

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, 15(2), 155–163. https://doi.org/10.1016/j.jcm.2016.02.012

Rami, A., & Baouche, K. (2017). The importance of using physical and skill-based tests in the selection process for football players: A field study conducted on teams in the bouira regional football league (U17 category). *Sports System Journal*, 4(1), 236-268. https://asjp.cerist.dz/en/article/19280

Seddaoui, C., Hadjar, M. K., & Houar, A. (2018). The status of scientific tests and measurements in the player selection process for algerian U18 football. *Journal of Science and Technology of Physical and Sports Activities*, 15(4), 81-97. https://asjp.cerist.dz/en/article/52312

Wood, H. M., & Baumgartner, T. A. (2004). Objectivity, reliability, and validity of the bent-knee push-up for college-age women. *Measurement in Physical Education and Exercise Science*, 8(4), 203–212. https://doi.org/10.1207/s15327841mpee0804_2

Youcef khodja, H., & Merabet, M. (2020). Establishing normative levels for certain skill-based abilities as an indicator for selecting male high school basketball players (aged 16–18): A field study in the Batna region (Oum

El Bouaghi, Khenchela, and Batna). *Journal of Sports Creativity*, 11(5), 503-525. https://asjp.cerist.dz/en/article/138579