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# RESEARCHARTICLE

## LOW BACK PAIN AMONG ADOLESCENT EGYPTIAN FOOTBALL PLAYERS (SURVEY STUDY)

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**ABSTRACT**

**Objective:** Low back pain affects millions of people and is one of the most common maladies prompting patients to seek medical attention. The relationship between physical activity and LBP in adolescents appears to be curvilinear. The particular type of physical activity has also been related to risk of LBP in adolescents. The incidence of low back pain (LBP) in athletes has been shown to vary greatly, depending on the physical demands and skill sets necessary for different sports. Low back pain rates rise in football, there is a lack of studies specifically investigating non-specific LBP in male professional football players. This research study aimed to investigate the prevalence of low back pain among adolescent Egyptian football players. **Methods:** This survey study was conducted among a total of 180 adolescent football players aged from 14 to 19 years old was recruited from 10 clubs in Cairo through 8 weeks. Three variables were assessed included the level of pain, functional disability level and ROM of lower back. Data collected with the use of the Arabic version of O'swestry Low Back Disability Questionnaire in a paper form, Visual analogue scale (VAS) and Smartphone inclinometer. **Results:** Out of one hundred and eighty subjects, only one hundred and seventy players participated in this study. In a last month prevalence of low back pain among the adolescent Egyptian football players, we found 66.47% prevalence of LBP with minimal disability. Regarding pain, 66.50% had LBP with mild pain level with a moderate correlation between the subject lumber spine ROM and LBP. **Conclusion:** This study concluded that our results further strengthen the evidence that LBP is already a common complaint in the population of adolescents. The overall prevalence of low back pain among adolescent Egyptian football players was high. The overall disability level among the players due to LBP was minimal. Moreover, our study contributed to be evidence that football game is one of the sport games that may lead to LBP in Egypt among the adolescent athletes.

## INTRODUCTION

Low back pain affects millions of people and is one of the most common maladies prompting patients to seek medical attention. The lifetime prevalence of LBP in the general population approaches 85% with 2% to 5% of people affected yearly (Timothy and Wiesel, 2002). It is wrong to believe that back pain only burdens adults: the yearly incidence during growth ranges from 10–20%, continuously increasing from childhood to adolescence (Hasler, 2013).The relationship between physical activity and LBP in adolescents appears to be curvilinear, with both low levels and very high levels of physical activity being associated with an increased risk of LBP in adolescents (Fritz and Clifford, 2010). The adolescent athlete is prone to some unique etiologies of low back pain not encountered in the adult athlete, secondary to the anatomic and physiologic differences between the adolescent and adult spine. Many of these differences are related to the normal growth process (Trainor *et al*., 2004).The incidence of LBP in athletes has been shown to vary greatly, depending on the physical demands and skill sets necessary for different sports. Football is a contact sport that is similar in many ways to soccer(Hides *et al*., 2010).Although LBP rates rise in football, there is a lack of studies specifically investigating non-specific LBP in male professional football players (Cali *et al*., 2013). Football-related back pain and injury has been studied more extensively than injury sustained in any other individual sport (Trainor and Wiesel, 2002). Low back pain has been reported as high as 27% in football (Cali *et al*., 2013). Therefore, the approach to the treatment of adolescent athletes with low back pain can be difficult and requires thorough understanding of spinal development (De Luigi, 2014). Given footballers are exposed to greater and more frequent mechanical stresses in training and competition, this scenario appears likely. In support of this contention, Greene *et al*. (2001) documented

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that athletes with a history of low back injury with current LBP have a 6 times greater risk for future injury. For athletes with a previous history of low back injury approximately a 3 times greater risk of injury exists.

**Purpose of the study:** The purposes of this study were to determine the prevalence of LBP among the adolescent Egyptian football players.

## MATERIALS AND METHODS

**Subjects:** In this study, a total of 180 male football players aged from 14 to 19 years were the target population. The subjects were recruited from 10 professional football clubs in Cairo. These clubs were: AL-Ahly Sports Club, Zamalek Sporting Club, Maadi Sports Club, Egyptian Shooting Club, Cairo Sporting Club, Wadi-Degla Sporting Club, El Mokawloon El Arab Sports Club, Gezira Sporting Club ,6th October Sports City Club and The Olympic Center For Training National Teams. The time frame for this research was in total of eight weeks to detect the last month prevalence of LBP. All the subjects who met the following inclusion and exclusion criteria were selected. Inclusion criteria were: age between 14 to 19 years old, only male football players can participate, free from any secondary complication such as deformities, sufficient cognition that enables them to understand the requirements of the study. All patients were referred by orthopedic surgeons who are responsible for diagnosis of cases based on clinical and radiological examinations.

**Inclusion criteria:**

- Age between 14 to 19 years old.
- Subjects should be football players.
- Suffering from chronic LBP based on referral from orthopedic surgeon who is responsible for the diagnosis of cases based on clinical and radiographic examinations.
- Duration of illness more than three months (Campbell and Muncer, 2005).
- Patients with a reduced ability to perform flexion of the trunk (Pfund and Zahnd, 2006).
- Subjects had sufficient cognition that enables them to understand the requirements of the study.

**Exclusion Criteria**

- Patients with any previous back surgery.
- Neurologic deficit.
- Patients with spondylolisthesis, hip arthrosis.
- Symptoms of vertigo or dizziness.
- Patients with congenital musculoskeletal deformity.
- Cardiopulmonary disease with decreased activity tolerance.
- Any spinal deformities such as scoliosis, hyper lordosis and kyphosis,
- Any gross spinal pathology such as tumor, infection, osteoporosis, spondylolysis.
- Visual or hearing disorders.

**Methods and Procedures**

At the beginning of the study, a letter was sent to the administrative staffs of the clubs detailing the study's aim and procedures. 3 of 10 clubs refused to participate, because they will be engaged in a final season matches and training camps. Consequently, the study was completed with 7 clubs among Cairo. All measurements were performed at team specific locations. This study was conducted in 3 phases by the same physiotherapist who was familiar with the whole assessment measurements. A detailed explanation regarding the study was given to all the players who participated in this study. All participants were asked to read and sign a consent form before the conduction of study. The questions were completed by the subjects in the presence of their trainer and the physiotherapist.

**Assessment tools:** The O'swestry Disability Index version 2.0 to detected patient's functional disabilities level. The Arabic version. Appendix 1

- Plan loading x-ray antro-posterior and lateral views to exclude any spinal deformities such as scoliosis, hyper-lordosis or kyphosis. Figure 1.
- Visual analogue scale (VAS) for measurement of pain intensity level.
- Smartphone inclinometer – (digital inclinometer- free version downloaded from App store - mobile phone Oppo F7): for measurement of lumber spine flexion and extension ROM.

**PROCEDUES:**

***Step 1: Investigations:***Study group were undergone a plan loading x-ray antro-posterior and lateral views to exclude anyspinal deformities such as scoliosis, hyper-lordosis or kyphosis.

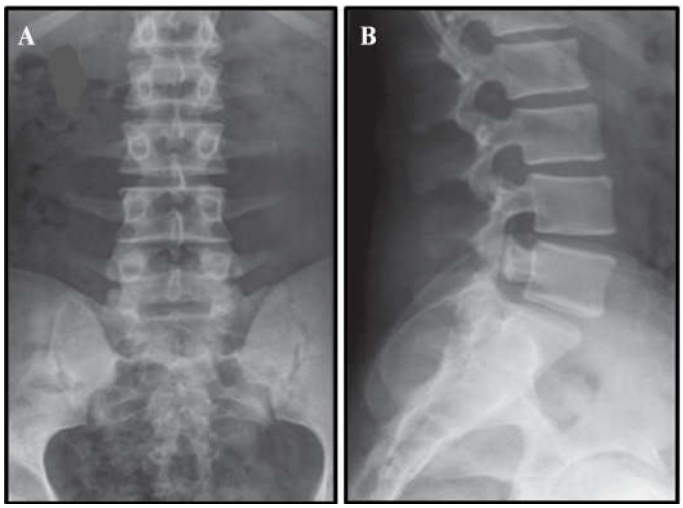


**Figure 1: Plain x-ray for one of the subject:**
**A) AP view of lumber spine. B) Lateral view of lumber spine. It shows normal lumber spine**

***Step 2:Pain Intensity Level Measurement:*** LBP level was measured by using the VAS. It is line of 10 cm, divided from 0 to 10, 0 refers to no pain and 10 refer to the worst pain.The players were asked to mark along the line at the point which refers to their level of pain (Lunderberg*et al*., 2001; Scrimshaw, 2001) only the attacks of LBP within the previous 4 weeks.

***Step 3: The Functional Disability Measurement:*** The questionnaire was given to the subjects by the physiotherapist or the club trainer. It is consists of 10 multiple choice questions

for low back pain, the sex life section was excluded. So, only 9 sections were used to mark in the questionnaire. Subject selects one sentence out of six that best describe how his pain intensity level affects each function, higher scores indicated great pain. The questionnaires were then collected and then started to use the second assessment tool.

**Scoring the O'swestry disability low back pain questionnaire**: For each section of six statements the total score is five; if the first statement is marked, the score is zero; if the last statement is marked, it is five. Intervening statements were scored according to rank. If more than one box was marked in each section, we took the higher score. If all ten sections were completed the score is calculated as follow: If 16 (total scored) out of 50 (total possible score) x 100 =32%. If one section is missed (or not applicable) the score is calculated: example: 16 (total scored)/45 (Total possible score) x 100 = 35% therefore, the final score may be summarized as: (total score)/ (five x number of questions answered) x 100%. The authors suggest rounding the percentage to a whole number for convenience (Fairbank and Pynsent, 2000).

- Interpretation of scores 0% to 20% - minimal disability: The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
- 21%-40% - moderate disability: The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and thepatient can usually be managed by conservative means.
- 41%-60% - severe disability: Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
- 61%-80% - crippled: Back pain impinges on all aspects of the patient's life. Positive intervention is required.
- 81%-100% - Bed-bound or exaggerating: These patients are either bed-bound or exaggerating their symptoms. (Fairbank and Pynsent, 2000).

***Step 4: Range of Motion Measurement:*** By using a smartphone inclinometer, we measured the lumber spine ROM (Werner*et al*., 2014).The inclinometer app is a professional grade angle measurement instrument which measures the degree of tilt of a surface relative to the horizontal plane. The app uses the smartphone built-in accelerometer and a digital display to show the measured angle (Pourahmadi *et al*., 2016).

***Procedures:*** The lumber spine ROM of the players was measured in the fields of the clubs where they first performed a warm-up exercise supervised by the trainer and the physiotherapist. The warm-up exercise needed approximately 2 min to complete and consisted of lumbo-pelvic rotations in a crook lying position. The physiotherapist asked the players to rhythmically rotate the legs about 45◦ to the right and left. The players were also requested to keep their legs together and maintain the soles of the feet on the ground while doing the exercise (Kolber *et al*., 2013; Salamh and Kolber, 2013).Following the warm-up exercise, the lower back of the players was sufficiently exposed. The smartphone was kept horizontally, and then it was clicked in the position to set the Goniometer at zero (Bedekar *et al*., 2014).Afterward, subjects' skin was marked at the T12–L1 and S1–S2 spinal levels using black board marker. The smartphone inclinometer was placed on the landmarks with contact through the bottom side. In neutral position, the subjects were requested to stand in a comfortable position with their arms hanging loosely at their side. From this position, the subjects were asked to perform maximum lumbar spine flexion followed by maximum lumbar spine extension with their legs straight. To calculate total lumbar spine flexion and extension ROM with an inclinometer, the measurement from the S1–S2 was subtracted from the T12–L1 (Pourahmadi *et al*., 2016).The measurements were repeated again with every player for 3 times then we measure the mean value for each measurement. Feedback was also provided by the physiotherapist to encourage the players to make their maximum effort in order to reach the end of the available range Figure 2.

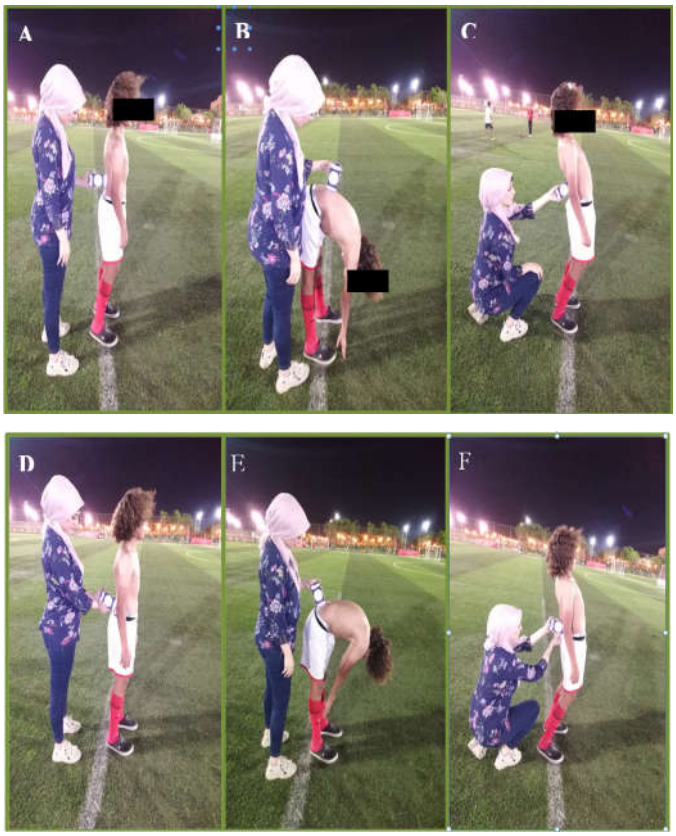


**Figure 2. Measurement of lumbar spine ROM using the smart phone inclinometer app. A) Starting position with mobile phonewasplacedontheT12–L1 spinal level. (B) Maximum flexion was measured at the T12–L1 spinal level. (C) Maximum extension was measured at the T12–L1 spinal level. (D) Starting position with the mobile phone was placed on the S1–S2 spinal level. (E) Maximum flexion was measured at the S1–S2 pinal level. (F) Maximum extension was measured at the S1–S2 spinal level**

**Statistical analysis:**Descriptive statistics of mean, standard deviation, frequencies, percentages and confidence interval (CI) were utilized in presenting the subjects demographic and LBP data. Pearson's chi-square statistics was utilized to examine associations between LBP prevalence and subject characteristics. Spearman Correlation Coefficient was conducted to determine the correlation between VAS, ODI and ROM. The level of significance for all statistical tests was set at $p < 0.05$.All statistical measures were performed through the statistical package for social studies (SPSS) version 25 for windows.

## RESULTS

### Demographic data

**Physical characteristics of the study group:**170 adolescent Egyptian football players participated in this study. Their mean ± SD age, weight, height, and BMI were 17.31 ± 1.55 years, 68.04 ± 5.76 kg, 177.05 ± 6.25 cm and 21.69 ± 1.48 kg/m² respectively as shown in Table 1

**Study population:**The study population was the adolescent male Egyptian football players in Cairo. The LBP was measured by Visual analogue scale (VAS) and the O'swestry Disability Index (ODI). A total number of 180 questionnaires had given to 180 players from 7 professional clubs in Cairo. However, 9 players declined to participate in this study. Thus, 171 questionnaires were collected. From a total number of 171 players, 170 of them had given the consent but 1 player provides incomplete answers. Figure 3

**Prevalence of LBP:** The Last month prevalence of LBP was 66.47% with 95% CI of 59.07- 73.13% Figur 4.

### Characteristics of LBP:

***Regarding the VAS:***57 (33.5%) of the study group were free of pain.70 (41.2%) of the study group had VAS score of 1, 39 (22.9%) had VAS score of 2 and 4 (2.4%) had VAS score of 3. So, 66.50% of the total study group had a mild low back pain Table 2.

***Regarding the ODI:*** The overall response rate was 94.44% for the questionnaire given to the players. As stated in methodology in order to achieve our objective in this study. Among the football players that responded to the questionnaire, there were 113 of them who had LBP. However, one of the subjects gave an inadequate answer Table 3**.** In our study, 170 (100%) of the study group had ODI score of 0-20% which represent minimal disability Table 4.

***Correlation between VAS and ODI:*** The correlation between VAS and ODI was strong positive significant correlations (r = 0.93, p = 0.0001). Figure 5

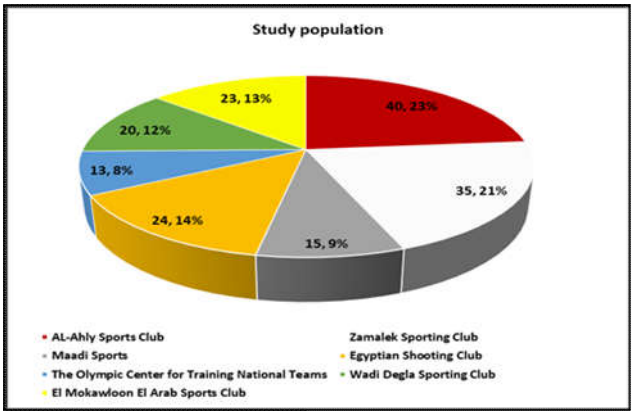


**Figure 3. Study population distributions**

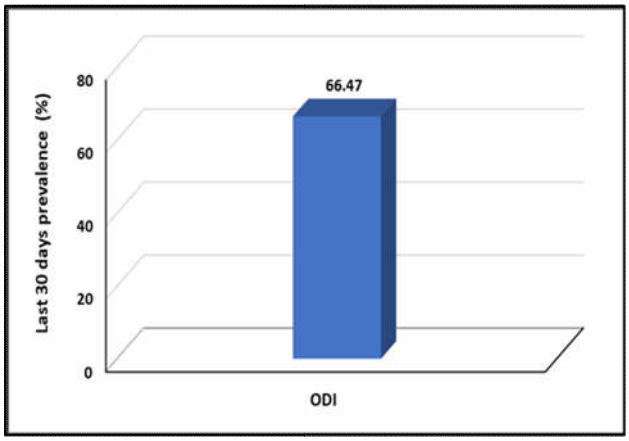


**Figure 4.Last month prevalence of LBP in the study group**

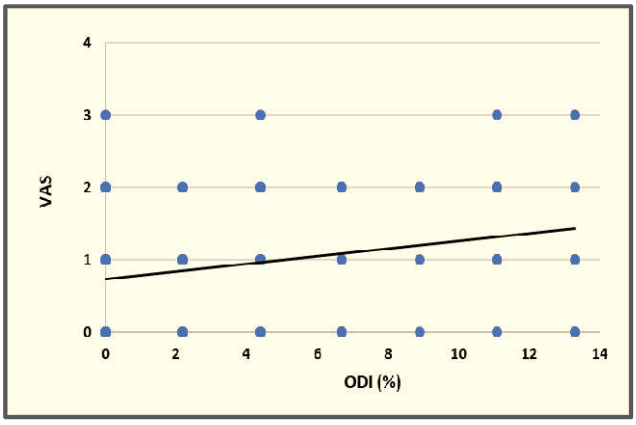


**Figure 5. Correlation between VAS and ODI**

## DISCUSSION

This study was designed to discuss the prevalence of low back pain among adolescent Egyptian football players in Cairo clubs. LBP in adolescents was considered for many years to be rare and an indication of serious disease. There has been increased awareness of low back pain in adolescents with several studies showing that LBP is highly prevalent in the early years of life (Balagué *et al*., 2003).Prevalence of LBP in this study group was found to be 66.47%. In recent years there has been a considerable increase in research studies that examine the prevalence of LBP adolescent athletes. Some studies showed higher prevalence rates than the oldest ones, and studies with a better methodology exhibited higher lifetime prevalence rates than studies that were methodologically poor (Cakmak, 2004; Sjolie, 2004). Several studies which were conducted previously found out that there was a high prevalence of low back pain among adolescents (Alshagga, *et al*., 2013; Gilkey *et al*., 2010; Jacobs *et al.,* 2013; Balagué *et al*., 2012; Carlson, 2009).

All those studies supported our study as it revealed that a one month prevalence of low back pain among adolescent Egyptian football players is high. Among the total of 94.44% (n=170) of sample size involved in this study, 33.5% (n=57) of players reported absence of low back pain whereas 66.47% (n=113) of players reported that they were having low back pain. In contrast, other authors of more recent studies have found, however, that LBP is not uncommon in adolescents and that most cases are musculoskeletal in origin (Fritz *et al*., 2010). When comparing the literatures that exist, it is not entirely clear whether competing athletes are at a risk of a higher prevalence or increased severity of low back pain compared with the non-athletic population (Hoskins, 2012). This variability found in the prevalence estimates may be due to differences among the studies in such factors as the age of the sample, the sample size the definition of LBP, the LBP recall

**Table 1. Descriptive statistics for the mean age, weight, height and BMI of the study group**

| | $\overline{X}$ ±SD | Minimum | Maximum | Range |
|---|---|---|---|---|
| Age (years) | 18.01 ± 2.35 | 14 | 22 | 8 |
| Weight (kg) | 68.04 ± 5.76 | 54 | 77 | 23 |
| Height (cm) | 177.05 ± 6.25 | 162 | 186 | 24 |
| BMI (kg/m²) | 21.69 ± 1.48 | 18.69 | 25.91 | 7.23 |

$\overline{X}$ : Mean SD: Standard deviation

**Table 2. The frequency distribution of VAS of the study group**

| | Study groups | | | |
|---|---|---|---|---|
| N (%) | 170 (100%) | | | |
| VAS | 0 | 1 | 2 | 3 |
| N (%) | 57 (33.5%) | 70 (41.2%) | 39 (22.9%) | 4 (2.4%) |

**Table 3. Response Rates of the O'swestry Disability Questionnaires**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| O'swestry Disability Questionnaire | 170 | 99.70% | 1 | 0.30 % | 171 | 100.0% |

**Table 4. The frequency distribution of ODI of the study group**

| | Study groups | | | | |
|---|---|---|---|---|---|
| N (%) | 170 (100%) | | | | |
| ODI | 0% to 20%: minimal disability | 21%-40%: moderate disability | 41%-60%: severe disability | 61%-80%: crippled | 81%-100%: bed-bound or exaggerating |
| N (%) | 170 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |

period, the strategy for extracting data and the methodology used (Jekel *et al*., 2007).According to the literatures on the epidemiology of LBP in adolescents, the prevalence rates increase with the age of the subjects (Sjölie *et al*., 2001; Auvinen *et al*., 2008).These results are somehow supporting our results among the adolescents age group according to the old definition of adolescence age range. As our study showed that the LBP prevalence in the players aged from 14-19 years old was (66.47%).This illustrates a high prevalence of LBP among this population. Questions have been raised regarding LBP at the junior level of sporting competition given that participation in adolescent sports has been found to be a risk factor for LBP and sport participation produces higher LBP prevalence than in non-athletes, particularly in males (Hoskins *et al*., 2010). Low back pain is frequently encountered in adolescent athletes. The adolescent athlete is at risk for significant structural injuries as well as non-mechanical problems (De Luigi, 2014). However, it remains to be seen whether a greater focus on prevention and treatment can eliminate the risk and consequences of future LBP episodes and minimize future chronicity (Hoskins *et al*., 2010). Despite the large number of people participating in sports, only a small number of studies about the prevalence of LBP and sport-related risk factors for LBP among elite football players were found, these finding are supported by this studies (Manek *et al*., 2005; Donzelli *et al*., 2006; da Fonseca *et al*., 2006; Sorosky *et al*., 2008; La Touche *et al*., 2008; Choi *et al*., 2010; Reiman, 2009; Lederman, 2010). Recently, professional football players have experienced LBP more severely and frequently than non-athletic controls, particularly in the male population (Feldman *et al*., 2001).The football player carries a significant risk for acute and overuse injuries in the low back region due to excessive working of muscles in trunk, which over time, can lead to spinal mechanical overload (Dick *et al*., 2003; Hides *et al*., 2010; Renkawitz *et al*., 2006). A study conducted at 2014 showed that the 12 month prevalence of LBP among young elite athletes with an average age of 18 years among football players this was 64% (van Hilst *et al*., 2015). Another study in 2012, reported that respectively 1.3% and 6.5% of all the elite male football players experienced LBP (Eirale *et al*., 2012). Our results have been also emphasizing these findings. These studies where done in different age groups and showed different outcomes. Therefore, this study tried to answer this question concerning young elite athletes in field of football.

***Limitations:*** In this study, there is a lack of a detailed history regarding LBP in the Oswestry disability questionnaire. The risk factors that may lead to LBP among the players were not clearly asked. The use of the Oswestry disability Questionnaire required the participants to remember and indicate the history of LBP attacks within the last month and to recall the activities that were affected by LBP. Therefore, the accuracy of information cannot be definite as some of them may be not sure or unable to recall regarding their LBP.

***Recommendations:*** There should be a development of risk factors assessment tools or questionnaire that can help to identify the specific exercise or training program and exposure hazards for the adolescent football players. Hence, the future studies on the similar topic should be more emphasis on the causes, risk factors and preventions of LBP in adolescent football players without the history LBP. Current LBP disability questionnaires only measure daily activities that impede their ability to accurately measure disability in an athlete with LBP. Therefore, we suggest that sport related activities be included in outcomes assessments of low back pain disability among athletes.

## Conclusion

In conclusion, our results further strengthen the evidence that LBP is already a common complaint in the population of adolescents. The overall prevalence of low back pain among adolescent Egyptian football players was high. The overall disability level among the players due to LBP was minimal.

Moreover, our study contributed to be evidence that football game is one of sport games that may lead to future LBP Egypt among adolescent athletes.

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