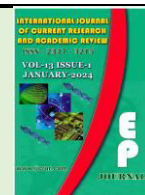




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Lower Back Pain among Senior Handball Players in Burkina Faso

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Abstract

This study aimed to study low back pain in senior handball players in the city of Ouagadougou. One hundred and eighty (180) active handball players with an average age of 26 (± 2.9) years, holders of federal licenses from the various handball clubs in the city of Ouagadougou took part in the study. The adapted Nordic questionnaire collected data on musculoskeletal disorders and the Visual Analogue Scale (VAS) was used to measure the intensity of pain. The data were processed using JASP version 0.19 software. The statistical significance level p was set at 0.05. The analysis of the results showed a prevalence of low back pain of 50% in handball players over the last twelve (12) months. These results indicate that these pains are very common during competition periods. A binary logistic regression established a significant relationship ($P < 0.05$) between occupied play positions and these pains. Lumbar problems are among the most important pathologies that can slow down the career of the Burkinabe handball player. There is a need to take these risks into account in future reflections on playing surfaces and the physical preparation of handball players.

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Keywords

Prevalence, lower back pain, trauma, handball, Burkina Faso.

Introduction

Exercising makes the body healthier and more productive. It is also a source of personal fulfillment through performance, medal acquisition and social contentment. The achievement of this dual individual and social objective leads states around the world to include sport in their development policy. On an individual level, it leads athletes to give the best of

themselves and sometimes to surpass themselves on the field of competition. This exposes them to various traumas, the consequences of which are felt through the symptoms, i.e. the pain (Lévesque *et al.*, 2011; Luiggi and Griffet, 2019; Sairyo and Nagamachi, 2016).

High-level sports have been identified as sources of pain in several parts of the body such as the neck, shoulders and lower back, particularly in young people (Vingård *et*

al., 1995; Le Goff *et al.*, 1999; Auvinen *et al.*, 2008; Tunås *et al.*, 2015).

Sports-related lower back pain seems to be the most recurrent, and in this regard Triki *et al.*, (2015) identified gymnastics, judo, handball and volleyball as sports with a high risk of lower back pain. On the subject of handball, L'Hermette *et al.*, (2006), based on an analysis of the physical demands of the game of handball, have established a close relationship between the practice of elite handball in the long term and the incidence of osteoarthritis of the hip. Other studies have found knee, ankle, and back pain in handball players in Europe and Asia (Triki *et al.*, 2015; Fritz *et al.*, 2020; Farahbakhsh *et al.*, 2018; Trompeter *et al.*, 2017; Kaux *et al.*, 2017; Piry *et al.*, 2011).

These different studies have shown that lower back pain is a very common concern among handball players (Trompeter *et al.*, 2017; Laver *et al.*, 2018).

In Africa, existing studies have focused much more on injuries during matches. They report that the majority of cases of injury concern the lower limb. Few studies have looked specifically at back pain as a musculoskeletal disorder in handball players in Africa. However, the conditions for playing handball are quite restrictive. According to the texts governing the practice of handball in Burkina Faso, handball is still in the amateur state. It is one of the so-called minor sports in Burkina Faso. To paraphrase Abalot *et al.*, (2017) this state of amateurism excludes its commercial aspect, which accounts for the lack of investment in this sport. However, the solicitation of the body in the practice of handball remains the same in competitions (Asembo and Wekesa, 1998; Abdelnour *et al.*, 2023; Onana, 2004; Abalot *et al.*, 2017). So the handball player is exposed to the same risks of trauma and injury and pain as his professional counterparts in his practice. It is therefore necessary to investigate this in this game environment. The present study aims to study lower back pain in senior handball players in the city of Ouagadougou over the last twelve months in order to contribute to better management and an in-depth knowledge of the influence of this pain on the quality of life of the handball player.

Materials and Methods

This study is of a descriptive cross-sectional type and took place in the city of Ouagadougou in Burkina Faso from October 2019 to July 2020. The city of Ouagadougou had during this period 25 clubs out of the

49 clubs that made up the Burkinabe handball federation (Directorate-General and Sectoral Statistics, 2022).

The study population consisted of senior handball players participating in the national championship during the 2019-2020 sports season. It appears that out of the 25 clubs, only 09 clubs had teams in the senior category.

The non-probabilistic method and the principled choice technique were used for the choice of respondents. Thus, we included all active players who were at least 21 years old, federally licensed and available at the time of the survey. Exhaustive sampling was used, i.e. all players who meet the conditions were surveyed, i.e. a total of 180 players of both sexes.

In addition to sociodemographic variables (age, sex, height, occupation), variables related to pain such as location of pain, chronicity, manifestations as well as variables related to the practice of handball such as playing position, practice time were measured using the adapted Nordic questionnaire. This questionnaire is a recognized reliable tool for profiling musculoskeletal health (Forcier *et al.*, 2002).

The Visual Analogue Scale (VAS) is accepted in the literature as a reliable, fast and easy-to-use scale for assessing pain intensity. VAS with scores of 0 to 10 was used to assess pain intensity. Score 0 corresponds to no pain and score 10, extreme pain.

Statistical analysis

The data is processed using the JASP software version 0.19.1. Descriptive statistics for prevalences and logistic regression to determine factors related to lower back pain: Statistical results are considered significant at $P < 0.05$.

Results and Discussion

A recovery rate of 84.44% of the questionnaires was processed. The 28 questionnaires were rejected for failure to complete.

Characteristics of the respondents

The physical characteristics and experience of the study population have been presented in Table 1. A breakdown of this population by gender, age, body mass index (BMI) and years of experience in the senior category resulted in a roster of 103 male and 49 female players.

The average age of the population is 25.5 years with an average body mass index of 23.7 kg/m². In total, the number of years of experience in handball is 13.9 years with a seniority in the senior category of 4.9 years. The average training time is 254 hours

Prevalence of lower limb and back pain

Figure 1 shows the prevalence of pain in the last 12 months among the respondents. The prevalence of knee pain and lower back pain is 50.7% and 50%, respectively, and ankle pain is 40.8%. In the upper back, it reaches 11.8%. In short, 87.50% of the respondents had at least one pain in one of these identified areas during the last twelve months.

Prevalence of lower back pain by respondent characteristics

Figure 2 shows that 64.5% of respondents who have had back pain in the last twelve months are men. Wingers are the most affected (40.8%) among the different positions of play and 63% of these pains were experienced during the competition period.

Characteristics of the respondents' lower back pain

Table 2 shows the characteristics of back pain in handball players over the past twelve months. Of the 76 respondents with back pain, 10 or 13.2% had a medical consultation, three were diagnosed as suffering from a herniated disc, 01 from discarthrosis and 01 from muscle contusion. Among the respondents suffering from back pain, about 38% feel at least intense pain, 51% mild pain and the rest experience simple discomfort. These pains led 63.2% to be absent from training with 6.6% who had absences of more than 06 months.

Factors associated with respondents' back pain

Logistic regression was performed to determine the effects of age, gender, positions held by players and the circumstances of pain onset on the probability that handball players will have low back pain. Table III shows that the logistic regression model obtained is statistically significant, Chi two (125) $p < 0.001$. Regarding age, it appears that its increase in age is associated with a high probability of low back pain at 81.2%. Gender is not significantly associated with the presence of pain, but the poor condition of the pitches associated with the unsuitability of the players' shoes significantly increases the probability of lower back pain

to 78%. Finally, players who have both the position of winger and full-back have a significant probability of developing lower back pain.

The present study aimed to evaluate the prevalence, characteristics and factors associated with low back pain in senior handball players in Burkina Faso through the adapted Nordic questionnaire and the visual analogue scale. A squad of 180 players was surveyed and 84.44% of the data from these respondents was analysed, the rest having been discarded for failure to complete the questionnaire. The results obtained are based on data from the respondents who have filled in all parts of the survey tools. These respondents are composed of a squad of 103 male players and 49 female players. Their average age is 25.5 years with an average body mass index of 23.7 kg/m². At this age the osteoarticular system is maturing and can in principle support the load of the handball game. The body mass index corresponds to the range considered normal by the WHO (18.5 to less than 25).

The number of years of experience in handball is 13.9 years with a seniority in the senior category of 4.9 years. The average training time is 254 hours. These data indicate that the respondents started playing handball when they were on average 12 years old, this age corresponds to the beginning of the secondary school cycle in Burkina Faso. According to the teaching guide for Physical and Sports Education in Burkina Faso, the initiation of team sports begins during the first two years of middle school, which justifies these results.

Regarding the prevalence of pain, the survey revealed that those of knee and lower back pain are 50.7% and 50% respectively. At the ankle, it is 40.8%. In the upper back, it reaches 11.8%. In short, 87.50% of the respondents had at least one pain in one of these identified areas during the last twelve months. These results corroborate those of [Trompeter et al., \(2017\)](#) who reported a prevalence of low back pain ranging from 24 to 66% in athletes over the last twelve months. The same type of study found prevalence of 17% to 94% during the last twelve months. This situation can be explained by possible microtraumas suffered by the tendons, muscles or intervertebral discs over time (11) ([Basei, 2005](#)). In the Burkinabe context, this high prevalence can be explained by a strong presence of risk factors related to the time and conditions of learning handball. As the results indicate, the respondents have an average of 13.9 years of experience in handball and the average age of starting their career is 12 years. That is to say, the

majority of handball players started playing at a young age. It should be noted that at this stage, on a physical level, the player has not yet finished growing. His body is very fragile at this age, whereas the initiation to this stage is not necessarily done by a handball specialist but by a physical education and sports teacher who is most of the time a generalist. This can therefore lead to anatomical imbalances that can cause irreversible trauma. However, in Burkina Faso in terms of the quality of infrastructure, the recommended conditions are not always met to guarantee the health of athletes.

In the seven (07) clubs where the surveys were conducted, there is only one that trains on a field with a tartan floor (soft material that can absorb a shock). The six (06) other clubs train on fields with concrete floors (a mixture of gravel, sand and cement, bitumen or clay). At the national level, it appears from the statistical yearbook of the Ministry in charge of Sports that Burkina Faso had in 2020, 45 mono handball boards on concrete, two of which were indoor with floors and 38 on clay. However, for many years, the official floor of competitions organized by the International Handball Federation has been a "Taraflex" laminate flooring, allowing shock absorption and thus reducing stress on the joints (Kaux *et al.*, 2017).

In Burkina Faso, it is on types of pitch with hard ground that players have played for an average of 13 years. This means that players are, for the most part, exposed to risk factors, especially following a landing phase after a jump which is subject to many traumas. This confirms the results obtained on the associated factors that show in the present study that the poor condition of the pitches associated with the inadequacy of the players' shoes significantly increases the probability of lower back pain to 78%. This result confirms that of Kaux *et al.*, (2017) in a study of the top six Dutch handball divisions, who reported that one of the leading causes of trauma is hitting the ground or the posts. This is one of the proofs that the spine of athletes is highly stressed and susceptible to structural disorders. As a reminder, the lumbar spine is the part most sensitive to the various shocks because it is from there that they originate before diffusing to the peripheral parts of the body.

Indeed, the same observation is made through the studies of Tunas *et al.*, (2015) which aimed to compare the prevalence of low back pain in elite female footballers and handball players to a non-professional active control group. The results of their study obtained through the standardized Nordic questionnaire showed that 59% of

handball players had experienced low back pain in the last 12 months. This rate is higher than the 50% figure found in our study, but it is still higher (Tunas *et al.*, 2015).

In our study, 64.5% of male gamers are affected by lower back pain compared to only 35.5% of female gamers. These results compared to those of the study by Triki *et al.*, (2015) are higher but agree that male players are the most affected. These authors found in their study that in handball, 16.7% of men were affected by lower back pain compared to 13.2% of women, which shows that overall men are more exposed than women. The difference in proportion could be explained by the difference in study sample sizes. This could be explained both by the overly physical commitment of the men during the matches compared to the women but also by their too high intensity of play (Triki *et al.*, 2015).

Despite the quality of the playing fields, it should be added that contact with opponents, the lack of physical fitness management, poor posture and gestures during games can also be sources of trauma for the lumbar spine. As a reminder, the lumbopelvic complex plays a major role in the practice of high-level sport.

So, it is important to remember that when biomechanical principles and laws are not respected, it does not guarantee the safe and optimal achievement of sports performance. That is to say, when a mechanical analysis of the gestures is carried out on the athlete's movement, it can be a source of performance improvement. However, everything suggests that handball is a sport with a high risk of low back pain. With a significant frequency of 50%, lower back problems are therefore on the list of pathologies that can slow down the career of a handball player of all kinds.

The results of our study show that age is associated with a high probability of low back pain at 81.2%. Similarly, it appears that the poor condition of the pitches associated with the unsuitability of the players' shoes significantly increases the probability of lower back pain to 78%. Finally, players who have both the position of winger and full-back have a significant probability of developing lower back pain ($p < 0.05$). This means that the prevalence of low back pain in players would also depend on the stability of the player in a fixed position. Indeed, with the shooting techniques that differ according to the positions of play occupied on the field, the back is solicited in a different way at each position, leading to an increase in risk.

Table.1 Physical characteristics and experience of the population

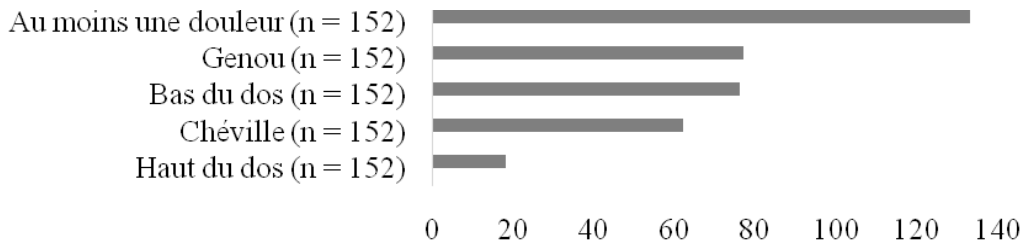
	Age (year)	IMC (Kg/m2)	AH (year)	ACA (an)	TEE (hours)
Masculine (n=103)	25.8±2.8	23.8±2.6	14.2±2.1	4.7±3.6	262.9±53.8
Feminine (n=42)	24.8±3	23.5±2.2	13.2±2.2	5.2±4	238±36.8
Total (n=152)	25.5± 2.9	23.7±2.5	13.9±2.2	4.9±3.7	254,9±50,2

Note: the results presented are means ± ecartype; n = enrolments; BMI = Body Mass Index; ACA = Seniority in the senior category; AH = Seniority in handball; TEE: Estimated training time per year

Table.2 Characteristics of the respondents' lower back pain

Characteristics		Frequencies	Percentage (%)
Medical consultation	Consultation	10	13,2
	Without consultation	66	86,8
Type of pathologies identified	Hernie discale	3	3,9
	Discarthrose	1	1,3
	Paravertebral muscle contusion	1	1,3
Pain intensity	Intolerable pain	1	1,3
	Severe pain	4	5,3
	Moderate pain	25	32,9
	Mild pain	39	51,3
	Simple discomfort	7	9,2
Impotence	Absence from training	48	63,2
	Nothingness	28	36,8
Duration of impotence	Less than 6 weeks	43	56,6
	6 weeks and more	5	6,6

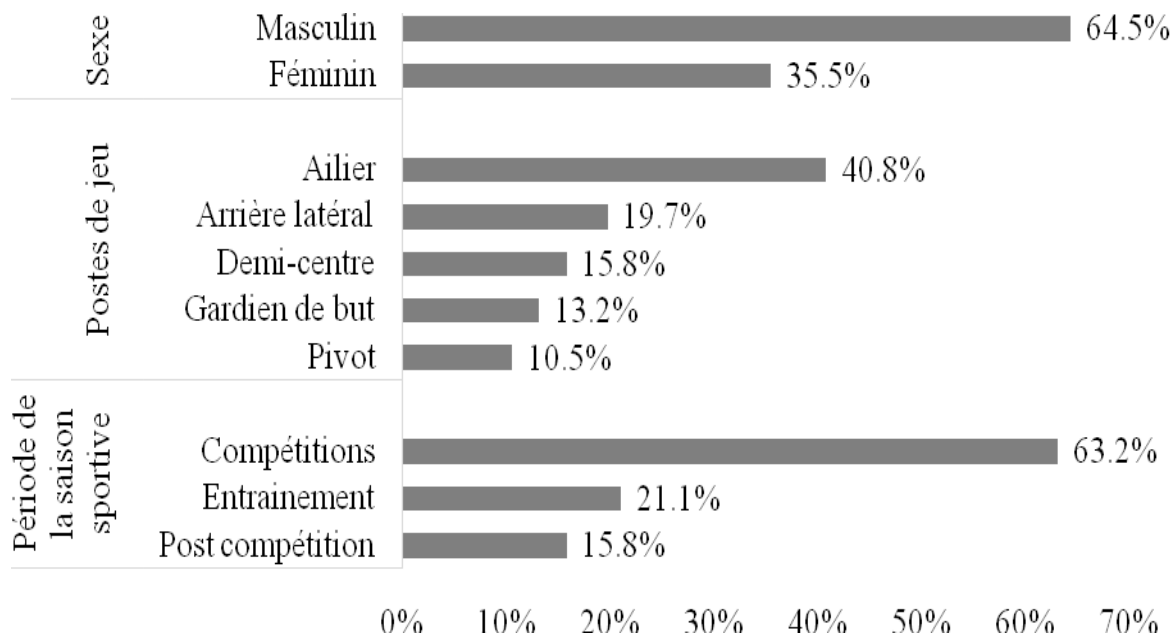
Figure.1 Location and prevalence of pain during the last twelve months



	Haut du dos (n = 152)	Chéville (n = 152)	Bas du dos (n = 152)	Genou (n = 152)	Au moins une douleur (n = 152)
■ Fréquence	18	62	76	77	133
Pourcentage	11.84%	40.79%	50%	50.66%	87.50%

Table.3 Factors associated with respondents' back pain

Deviance	AIC	df	p	McFadden R ²	Nagelkerke R ²	Tar R ²	Cox & Snell R ²
210,717	212,717	151		0,000		0,000	
154,161	208,161	125	< ,001	0,268	0,414	0,319	0,311
						95% Confidence interval	
				Estimation	Odds Ratio	p	Lower Bound Upper Bound
Age				-0,208	0,812	0,016*	-0,377 -0,039
Gender (Female)				-0,812	0,444	0,085	-1,737 0,113
Circumstances of accession							
Poor condition of the land				0,263	1,301	0,761	-1,432 1,959
Contact on the ground and poor condition of the ground				-1,349	0,259	0,047	-2,683 -0,016
Field contact and others				-1,191	0,304	0,240	-3,179 0,796
Shoe quality				-0,212	0,809	0,827	-2,119 1,694
Contact on the ground and unsuitable shoes				-0,365	0,694	0,652	-1,952 1,222
Poor condition of the pitch and unsuitable shoes				-2,557	0,078	0,035*	-4,929 -0,184
Positions held							
Winger				-0,686	0,504	0,315	-2,023 0,652
Lateral Rear				0,744	2,105	0,390	-0,953 2,442
Centre-half				0,256	1,292	0,782	-1,561 2,073
Pivot				0,982	2,670	0,277	-0,789 2,753
Winger and full-back				-2,172	0,114	0,040*	-4,241 -0,102
Winger and centre-half				-0,643	0,526	0,467	-2,377 1,090
Wing and pivot				-2,031	0,131	0,122	-4,605 0,544
Full-back and centre-half				-1,742	0,175	0,108	-3,865 0,380
Centre-half and pivot				-1,102	0,332	0,457	-4,008 1,804
<i>Note. The "no pain" lower back level is coded as class 1.</i>							
* = $p < 0,05$							

Figure.2 Prevalence of lower back pain by respondent characteristics

Wingers who are generally more technical for shots while guards have a higher running pace and who make the most passes. The player who occupies several positions at the same time is more exposed to lower back pain, especially during periods of competition, which are periods of great motivation when the levels of play are high. To this must be added the quality of their shoes which is the cause and the condition of their playing field because it must be remembered that better quality shoes could help absorb shocks on a hard ground (Piry *et al.*, 2011).

Conclusion

Lower back problems are very common in the sports world. This study, which exposes the prevalence of low back pain among senior handball players in the city of Ouagadougou, shows a high prevalence in this population. Compared to the data in the literature, the quality of the training grounds seems to be the main reason. Up to 50% of respondents have experienced low back pain in the past twelve (12) months. The main consequences of this state of affairs are more or less long absences from training sessions. Indeed, lower back pain can lead to an absence from training that can go as far as stopping it for a while. In the most serious cases, they lead to disability of the person. If the pain is ignored and the risk factors are still present, the trauma sets in permanently. Taking medication can be a solution to

reduce the pain. However, this only masks the problem without providing a solution.

Therefore, the treatment of low back pain must involve effective prevention. This prevention begins with the awareness of the essential consideration of the risk factors for low back pain.

While the knowledge of the clinical signs, pathophysiology and anatomical pathology of these traumas is the responsibility of doctors, the mastery of the analysis of sports movement and the main risk factors, i.e. biomechanical factors, should be the responsibility of physical activity and sports professionals. It is therefore important for the sports specialist to have a well-planned schedule of training sessions and exercises to allow athletes to always be at their best.

In short, this study offers data on MSDs among handball players in the city of Ouagadougou. However, it gives rise to other reflections, for example on the construction of land with absorbing materials, derived from endogenous materials.

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