Profile of Police Recruits' Knee Injuries during Academy Training in Kano, Nigeria

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Abstract

Background: *Knee injuries, occurring most often at a young age, are a significant cause of pain and disability in adulthood.* ***Objectives:*** *This study investigated the prevalence of knee pain, the association between knee pain and sociodemographic factors, and the physical activity level of newly recruited police cadets.* ***Methodology:*** *A knee pain-screening tool (KNEST) and international physical activity questionnaire (IPAQ) were administered to 125 volunteered cadets in Wudil police school in Kano, Nigeria. The study was a cross-sectional research design, and a purposive sampling technique was used to select the respondents. The data were obtained and analyzed using descriptive statistics of frequency distribution and percentages and inferential statistics of Chi-square & Pearson's correlation.* ***Results:*** *The prevalence of knee pain was 55.2%, with 50.6% in males and 62.5% in females. Right knee pain in 42.1% was the most prevalent, and the pain lasted less than seven days in 33.3% of respondents. The physical activity levels of police cadets were found to be high at 82.5%. There was no significant association between knee pain and Age ($r = 0.21$, $p = 0.273$), as well as knee pain and gender ($r = -0.116$, $p = 0.195$). However, there was a significant association between knee pain and level of study and physical activities among cadets, ($r = 0.005$, $p= 0.774$), ($r= -0.386$, $p=0.073$) respectively.* ***Conclusions:*** *This study concluded that there was a high prevalence of knee pain among police cadets in Kano and was associated with their level of education, while their physical activity level was very adequate.*

Keywords: *Knee injuries, police cadets, prevalence, recruits, physical activity*

Introduction

Police recruit training involves running for long-distance and duration, Jumping, rehearsing restraining of offenders, and other physically demanding tasks and sporting activities. Thus, police officers often suffer musculoskeletal injuries such as knee injuries and others. Knee injuries are a significant cause of pain and disability (Shawn *et al*., 2016). Global prevalence ranges between 10% and 25%, making it a widespread public health concern regarding healthcare costs and work disability (World Health Organization, 2017).

Majewski *et al*., (2006) study on the epidemiology of knee injuries in sports indicated that about 50% of the injuries were sustained by those aged 20–29 years old, meaning

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young persons are more vulnerable to knee pain. Shawn *et al*. (2016) stated that knee injuries are a primary cause of knee pain, and the prevalence of knee pain increases with age in both sexes. According to the study of Shawn *et al*. (2016), the most common diagnoses of knee injuries among athletes are ACL tear (20.3%), medial meniscus (MM) tear (10.8%), chondral lesion (10.6%), medial collateral ligament (MCL) tear (7.9%), contusion injury due to direct trauma (5.5%), lateral meniscus (L.M.) tear (3.7%), and patellar dislocation (3.3%).

Presence of the knee pain has been suggested to be a better predictor of functional status in patients with knee injuries than radiographic disease findings (Emily *et al*., 2017). According to a comprehensive population-based research of the incidence and risk factors of knee injuries in Finnish military conscripts published in 2013, more than 1 in 100 young adult men will be hospitalized each year owing to a knee injury while serving in the military. A third of all young adult male conscripts admitted to the hospital with knee injuries are expected to have a significant long-term disability (Kuikka *et al*., 2013). Most knee injuries (91%) occurred during military exercises (Taanila *et al*., 2009).

Traditionally, recruits have been selected from the broader community and had various degrees of fitness. These recruits are subjected to a great deal of physical stress once training begins. This possibility of a significant rise in physical stress could result in injury (Prigg *et al*., 2000). The consequence of these injuries on the recruits may be loss of employment/recruitment, psychological trauma, loss of person-hour, and economic loss. However, the literature on knee injuries in recruits in Nigeria is scanty. This may affect the need to provide physiotherapeutic and other medical facilities and interventions that can be provided to avert the consequences. Therefore, this study aimed to determine the prevalence of knee pain, the relationship between knee pain and demographic characteristics, and the physical activity levels of newly recruited police cadets.

Methods

A cross-sectional survey involving purposively selected one hundred and twenty-five (125) police cadets. Police cadets with a previous history of knee injuries before recruitment into academic training activities were excluded from the study. The research team sought and received ethical approval from the ethics committee of the Nigeria police academy Wudil, Kano state, before the commencement of the survey with ID: NPF/21/ECK/00139A. Informed consent from the respondents was sought and obtained before filling adapted questionnaires of the Knee pain screening tool (KNEST) questionnaire (Korff *et al*., 1992) and the International physical activity questionnaire (IPAQ). The questionnaires alongside the information sheet and informed consent forms were distributed through a senior police officer in the camp. The completed questionnaires were returned a week later.

Identifying Knee Pain

The KNEST is a simple tool for the identification of individuals with knee pain and their healthcare use. KNEST is said to be a valid tool for investigating the prevalence, severity, and duration of knee pain and the use of healthcare related to knee pain in the

community and primary care (Jinks *et al*., 2001). The KNEST has a reliability score of ≥ 0.6, and a good content validity concerning knee pain (Jinks *et al*., 2001).

Physical Activity Measurements

The International Physical Activity Questionnaire (IPAQ) was developed as an instrument for cross-national monitoring of physical activity and inactivity. The IPAQ instruments are said to have acceptable measurement properties, at least as good as other established self-reports (Craig *et al*., 2003). Craig *et al*. (2003) stated that IPAQ has a reasonable measurement property for monitoring population levels of physical activity among 18- to 65-yr-old adults in diverse settings. In addition, these authors mentioned that the short IPAQ form "last 7 d recall" is recommended for national monitoring and the long form for research requiring more detailed assessment.

Data Analysis

Descriptive statistics of frequencies, percentages, and tables were used to summarize the data. Inferential statistics of Chi-square were used to test for association between knee pain and other variables among the participants. SPSS version 25 was used to analyze the data. The level of significance, p-value, was taken as less than or equal to 0.05.

Sample Size

A purposive sampling technique was used to recruit the participants. Most knee injuries (91%) occur during military exercises (Taanila *et al*., 2009). Using Cochran's formula to calculate the sample size, we have

$$N = \frac{Z^2 p q}{E^2}$$

Where, N = required sample size, Z = confidence level = 1.96, P = estimated prevalence of knee injuries, E = marginal errors = 0.05, q = 1 – P, where P is the estimated, P = 0.91, Q= 0.09

$$N = \frac{(1.96)^2 \times (0.91) \times (0.09)}{(0.05)^2}$$

$$N = 125$$

Results

Social-Demographic Characteristics of the Participants

All the participants returned the completed questionnaires to the researcher making a 100% response rate. Most of the respondents were between the ages of 21-23 years (55.2%). Many of the respondents are Males (61.6%), and Level 4 cadets (44.0%) were the highest respondents in this study. (Table 1). The overall prevalence of knee pain was 55.2%, with 50.6% in males and 62.5%. The right knee (42.1%) was the most prevalent, and the pain lasted less than seven days (33.3%) in most of the respondents.

Most of the cadets had different interventions due to their pain. These interventions, among others, include physiotherapy (23.2%), prescription drug (27.5%), Knee injection (2.9%), traditional bone setting (2.9%), and a combination of some of

these treatments (20.3%). However, 11(15.9%) of the respondents never had any interventions. Table 2 summarizes the results of the KNEST. The majority of the participants had adequate PA levels with over 82% having a high PA level while the few others are moderately fit. See Table 3 for details.

Association of Knee Pain with Sociodemographic Factors

There was no significant association between knee pain and sociodemographic variables. However, a significant association was found between knee pain and physical activity, and educational levels. See Table 4 for details.

Table 1: Sociodemographic Characteristics of the participants

Variables	frequency (F)	percentage (%)
Age		
18-20	37	29.6
21-23	69	55.2
24-26	19	15.2
Gender		
Male	77	61.6
Female	48	38.4
Level of study		
Level 1	3	2.4
Level 2	34	27.2
Level 3	33	26.4
Level 4	55	44.0

Table 2: *KNEST Result of all Participants*

KNEST question	frequency (F)	percentage (%)
Knee pain		
No	56	44.8
YES	69	55.2
Laterality of knee pain		
Right knee	29	42.1
Left knee	27	39.1
Both knees	13	18.8
Chronicity[b]		
< 7 days	23	33.3
1 -4 weeks	25	26.2
<3 months	14	20.3
>3months	7	10.1
GP consultation		
No	39	56.5
Yes	30	43.5
Other healthcare use (NHS or private) [b]		
Drugs (prescription)	19	27.5

Physiotherapy	16	23.2
Hospital specialist	5	7.2
Knee operation	2	2.9
Knee injection	0	0
Acupuncture	0	0
Osteopath/TBS	2	2.9
Multiservice	14	20.3
No service	11	15.9

Key; [an] all the respondents, [b] respondents with knee pain

Table 3: International physical activity questionnaire result (IPAQ) RESULT

Value	frequency (f)	percentage (%)
High	104	82.5
Moderate	21	16.7
Low	0	0

Table 4: Association of knee pain with gender, age, and level of study factors

Variables	yes	no	χ^2	P-Value
Gender	69	57	1.679	0.195
Age	69	57	9.881	0.273
Level of study	69	56	1.112	**0.024***
Physical activity	69	56	18. 651	**0.043***

*p-value=<0.05

Discussion

The overall aim of this study was to investigate the prevalence of knee pain, its association with PA, and sociodemographic factors of newly recruited police cadets in Kano, Nigeria. The main findings of this study were that the prevalence of knee pain and physical activity level among newly recruited police cadets was high. In addition, there was a significant association between knee pain and PA and level of education.

The high prevalence of knee pain among the participants agrees with previous literature showing a high prevalence of knee OA among the general population (A. Akinpelu, Maduagwu, Odele, & Alonge, 2011; A. O. Akinpelu, Alonge, Adekanla, & Odole, 2009; Cross *et al*., 2014). Although, the incidence of musculoskeletal injuries is higher in people undergoing special training like in the military and paramilitary (Jackson, 2001). The result of this study is in tandem with a previous study by Ibeachu *et al*. (2019) which, reported a high prevalence of knee pain among young adults that is associated with physical activity. Louw *et al*. (2008) in a systematic review affirmed that knee injury prevalence ranges between 10% and 25%, with more recent studies reporting higher percentages.

The prevalence of knee injuries has been higher in females (De Loes *et al*. 2000; Giugliano and Solomon, 2007; Louw *et al*. 2008; Ingram *et al*. 2008), which agrees

with this study. However, Kim *et al*. (2011) and Ibeachu *et al*. (2019) reported contrary findings in which males have a higher prevalence. Knee joint laxity is menstrual cycle-dependent, and coincides with significant elevations in estradiol levels in females (Shultlz *et al*., 2005). This could explain the higher prevalence in females. Other reasons might be a gender differences in knee anatomy, kinematics, and hormonal influence (Hame and Alexander, 2013). Even though evidence has shown that women are more affected and burdened with pathologies of the knee (Felson *et al*., 1987; Felson *et al*., 1995; Akinpelu *et al*., 2009; 2011), there was no significant association found between knee pain and gender in this study despite females being more prevalent with knee pain.

Part of the conditions for entry into the Nigeria Police Academy Wudil is the individual must be within 18-22 years and unmarried. Therefore, most respondents were within the age group 21-23 years, and all are single. Although in a study by Neogi (2013), an increase in age increases the likelihood of developing knee pain and the persistence of symptoms. However, no significant association was found between knee pain and age in this study. This might be because the cadets are within almost the same age group. The main risk factor for developing knee pain is the sudden increase in physical activities associated with the training.

Meanwhile, the presence of pain in this study was 27.2%, 12.8%, and 11.2% for the right knee, left knee, and both knees, respectively. This is like Kim *et al*., (2011) findings in which the right knee (10.3%) was the highest reported. However, Ibeachu *et al*. (2019) concluded that bilateral knee pain (44%) was more prevalent in their study.
In this present study, a significant association was found between knee pain and level of education, indicating the higher educational level an individual is, the better awareness they have in preventing knee pain.

Although there is conflicting evidence of the most effective management of knee conditions (DeLoes, 2000; Johnson, 2007; Shamliyan *et al*., 2012), the majority of the respondents in this study have sought intervention, and many still seek and undergo treatment (Gobi *et al*., 2003; Feller *et al*., 2003; Smith *et al*., 2004).

This study showed that over 60% of the participants sought one type of medical treatment or the other. This is contrary to Ibeachu *et al*., (2019) findings, where 52% of the respondents seek medical care for their knee pain. Although, Jink *et al*. (2017) opined that most young people often delay approaching health professionals for complaints of knee pain hoping the pain would disappear over time.

A previous study has shown that low levels of physical fitness can predispose cadets to injuries and future health problems (Roseland *et al*., 2003). The findings of this present study indicated that most cadets are adequately fit. This may be because the training had already commenced before the data collection, indicating adequate physical fitness that police cadets received during their training. However, this does not rule out the possibility of knee pain or injuries even though they are physically fit, as evident in this study. Although, the prevalence could have been higher where low fitness levels.

Limitation of Study

This study although was a cross-sectional survey was limited by the police institution not allowing the researcher to get across the cadets directly due to their recruiting policy. This may have hindered the proper screening and assessment of the recruits which would add value to the study.

Conclusion

This study concluded that there was a high prevalence of knee pain among police cadets in Kano and was associated with their level of education. Their physical activity level was also very adequate. We, therefore, recommend the police institution raise awareness of risk factors that could predispose cadets to knee injuries.

Recommendations:

Therefore, it was recommended that police institutions should invite health professionals to raise awareness of knee pain risk factors and how to prevent and manage them among new police recruits. In addition, the cadets' physical fitness levels should be maintained throughout their active service year to reduce the risk of knee pain and other musculoskeletal injuries to enhance their excellent quality of life.

Conflict of Interest: No conflicts of interest were revealed by the authors.

Source of Funding: No source of external funding for the study.

References

Akinpelu, A., Maduagwu, S., Odele, A., & Alonge, T. (2011). Prevalence and pattern of knee osteoarthritis in a North Eastern Nigerian rural community. *East African Orthopaedic Journal, 5*(1).

Akinpelu, A. O., Alonge, T. O., Adekanla, B. A., & Odole, A. C. (2009). Prevalence and pattern of symptomatic knee osteoarthritis in Nigeria: A community-based study. *Internet Journal of Allied Health Sciences and Practice, 7*(3), 10.

Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., . . . Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc, 35*(8), 1381-1395. doi:10.1249/01.Mss.0000078924.61453.Fb

Cross, M., Smith, E., Hoy, D., Nolte, S., Ackerman, I., Fransen, M., . . . March, L. (2014). The global burden of hip and knee osteoarthritis: estimates from the global burden of disease 2010 study. *Ann Rheum Dis, 73*(7), 1323-1330. doi:10.1136/annrheumdis-2013-204763

de Loes, M., Dahlstedt, L.J., & Thomee, R., (2000). A 7-year study on risks and costs of knee. Scandinavian Journal of Medicine & Science*;* 10: 90-97.

Emily, J., Shreela, P., Roland S. (2017). Predictors of steoarthritis pain: the importance of resilience. ***Current Rheumatoid Report;*** 19: 57 – 62

Felson, D., Chaisson, C., Hill, C., Totterman, S., Gale, M., Skinner K., *et al* (2001). The association of bone marrow lesions with pain in knee osteoarthritis. ***Annals of internal medicine***; 134: 541-549.

Ibeachu, C., J., Chris J., Paola, D. (2019). Knee problems are common in young

adults and associated with physical activity and not obesity: the findings of a cross-sectional survey in a university cohort. ***BMC Mucloskelatal disorders;*** 7: 131 – 138.

Ingram. J., Fields, S., Yard, E., Comstock, R. (2008). Epidemiology of knee injuries in male and female youth participants in 12 sports. Scandinavian Journal of Medicine & Science; 19: 190-197.

Jackson, A. (2001). Anterior Knee Pain. ***Journal of Bone and Joint Surgery British***; 83: 937-48.

Jinks, C. (2007). Osteoarthritis as a public health problem: the impact of developing knee pain on physical function in adults living in the community: (KNEST 3)', ***Rheumatology;*** 46: 877–881.

Kim, S., Bosque, J., Meehan, J.P., Jamali, A., & Marde, R. (2011). 'Increase in outpatient knee arthroscopy in the United States: a comparison of National Surveys of Ambulatory Surgery, 1996 and 2006. ***Journal of Bone & Joint Surgery;*** 93(11):994–1000.

Korff, M., Ormel, J., Keefe, F., Dworkin S. (1992). Grading the severity of chronic pain. ***Pain***; 50:133–149.

Kuikka, P., H K Pihlajamäki, H, Ville, M. (2013). Knee injuries related to sports in young adult males during military service - Incidence and risk factors. ***Scandinavian Journal of Medicine and Science in Sports***; 23: 281-287

Louw, Q., Manilall, J., Grimmer, K. (2008). Epidemiology of knee injuries among adolescents: a systematic review. ***British Journal of Sports Medicine;*** 42: 2-10

McCarthy, C., Mills, R., Pullen, C., Roberts, A., Silman, J., Oldham, A. (2004). Supplementing a home exercise program with a class-based exercise program is more effective than home exercise alone in the treatment of knee osteoarthritis. ***Rheumatology***; 43:880–886.

Majewski M, Susanne H, Klaus S. (2006). Epidemiology of athletic knee injuries: a 10-year study. ***Knee***; 13: 184–188.

Prigg, S., Jones D.D., Kolonel N.L., Warfe P., Colgrave N. (2000). Developing injury prevention strategies for the Australian Defence Force. ***Health;*** 19:237 – 239.

Shamliyan T., Wang S., Olson-Kellogg, B., Kane, R., (2016). Physical Therapy Interventions for Knee Pain Secondary to Osteoarthritis. ***AHRQ***; 12(13): EHC115EF.

Rosendal L, Langberg H, Skov-Jensen A, & Kjaer M (2003). Incidence of injury and physical performance adaptations during military training. ***Clinical Journal of Sports Medicine***; 13: 157–163, 2003.