Original Article

Factors Predictive of the Level Of Physical Activity (PA) in Patients with Gonarthrosis in Sub-Saharan Africa

Yirozounlomian Tiaho[1], Ismael Ayouba Tinni[2], Charles Sougue[3], Gouzé-Wend Louis Tougma[4], Fulgence Kabore[2], Salifou Gandema[5], Wendlassida Joelle Stéphanie Zabsonre/Tiendrebeogo[2], Dieu-Donné Ouedraogo[2]

[1]*Université Josep-KI ZERBO*
[2]*Department of Rheumatology, University Hospital Bogodogo*
[3]*Department of Rheumatology, University Hospital Souro Sanou*
[4]*Department of Physical and Rehabilitation Medicine, University Hospital Bogodogo*
[5]*Departement of Physical and Rehabilitation, University Hospital Souro Sanou*

Correspondent:
Yirozounlomian Tiaho, Université Joseph-KI ZERBO
Email: tiahorx@gmail.com

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ABSTRACT

Background : Gonarthrosis is a major cause of pain and locomotor disability worldwide. Regular exercise is recommended in gonarthrosis. There may be factors influencing the level of physical activity in gonarthrosis patients.

Objective: Our aim was to determine the predictive factors of the level of physical activity (PA) in patients with gonarthrosis in the city of Ouagadougou (Burkina Faso).This study will serve as a starting point for offering adapted PA to gonarthrosis patients.

Methods : This was a cross-sectional, descriptive and analytical study based on clinical records, conducted from January 9 to 27, 2023. Using the International Physical Activity Scale (IPAS), we assessed the level of PA in patients followed at CHU-Bogodogo for gonarthrosis. The PA level was assessed once during the first consultation for gonarthrosis rehabilitation, before the start of the physiotherapy sessions. The significance threshold $p<0.05$ was retained.

Results: Sixty-seven patients were included. Fifty-six were women (83.58%). The mean age was 59.87± 12.53 years. Gonarthrosis patients had a moderate level of PA, with a mean IPAS score equal to 635.24±135 MET-minutes/week.

In bivariate analysis, low PA was associated with age over 65 [OR=5.62, (CI=1.45-21.73), $p<0.001$], hypertension [OR=2.83, (CI=1.27-6.31), $p<0.001$], diabetes [OR=2.14, (CI=1.13-5.89), $p<0.031$], and overweight [OR=2.43, (CI=1.17-6.12), $p<0.026$]. Moderate PA was associated with age under 65 [OR=1.71, (CI=1.25-2.34), $p<0.005$] and absence of hypertension [OR=1.86, (CI=1.19-2.89), $p<0.012$].

Conclusion : Gonarthrosis patients have a moderate level of PA. Factors associated with low PA were advanced age and sedentary comorbidities.

Keywords: *Gonarthrosis, physical activity, predictive factors, Sub-saharan Africa*

INTRODUCTION

Gonarthrosis is a major cause of pain, locomotor disability, and reduced quality of life worldwide.[1–3] In Sub-Saharan Africa, gonarthrosis accounts for between 8% and 16% of rheumatology consultations. Patients suffering from gonarthrosis most often report difficulties in performing activities of daily living (ADL), with a decrease in physical activity (PA) and a significant deterioration in quality of life.[4,5] The management of gonarthrosis is based on pharmacological and non-pharmacological treatments. The latest OARSI (3,6) recommendations for the appropriate management of gonarthrosis with or without co-morbidities call for interventions based on physical exercise in land or water. Physical activity (PA), in particular muscle-strengthening exercises and education programs have, been shown to be effective in this management. Regular physical activity improves joint stability, reduces pain symptoms, activity limitations, and participation restrictions.[7,8] The authors of a recent qualitative study on the obstacles and motivations to regular physical activity in a population with gonarthrosis.[9] noted that their study population had a good understanding of the importance of PA in the management of gonarthrosis. The motivational factors they found in this study population were physical (well-being, pain reduction, self-image), personal (lifestyle, psychological well-being), societal (relationships, opinion of others) and environmental (living environment); and the disincentives were psychological (fear of pain, lack of motivation), physical (knee pain, asthenia) and related to life events (depression, hospitalization).Maintaining an appropriate level of physical activity during gonarthrosis is essential to slow down the clinical manifestations, but they can be a hindrance in themselves if they are not correctly identified and managed. Although the clinical manifestations of gonarthrosis are well known and described in the literature, their implications for the maintenance of physical activity in gonarthrosis patients seem to have been little addressed, particularly in Sub-Saharan Africa. Apart from these motivational factors, there are other clinical and

antrhopometrical factors predictive of PA levels in gonarthrosis patients. Determining these factors would enable us to take different phenotypes into account in our PA therapeutic education programs for gonarthrosis patients. With this in mind, we conducted this study to determine the level of PA in a population of gonarthrosis patients followed in hospital in the city of Ouagadougou, Burkina Faso; and to determine the factors associated with different levels of PA in these patients.

METHODS

This was a cross-sectional, descriptive and analytical study conducted from January 9 to 27, 2023. This study included all gonarthrosis patients followed up in the Rheumatology and Physical Medicine and Rehabilitation (PRM) departments of the hospital center of Bogodogo (Ouagadougou) during the study period. We obtained informed consent from all patients included in the study.We included in the study all gonarthrosis patients over 18 years of age, regardless of gender, from whom we obtained informed consent to participate in the study. We did not include in our study gonarthrosis patients with neurological disorders (motor deficit, sensory deficit and cognitive disorders). We carried out an exhaustive recruitment of all gonarthrosis patients seen at CHU-Bogodogo for gonarthrosis and in whom the radiological diagnosis had been confirmed. Data were collected from clinical records and by administering the French version of the International Physical Activity Scale (IPAS).[10] PA level was assessed only once during initial or follow-up consultations of gonarthrosis patients seen at CHU-Bogodogo. The data were collected by adapted physical activity referents, a PRM doctor,rheumatologist and a physiotherapist. The study variables were socio-demographic (age, sex, marital status and profession), clinical (clinical history, body mass index (BMI), site of gonarthrosis, pain assessed using the visual analog scale (VAS), duration of evolution of gonarthrosis-related gonalgia in months, defined as the time between the first manifestations and the time of our assessment); the use of painkillers (analgesics or anti-inflammatories); the number of rehabilitation sessions; the level

of physical activity assessed using the IPAS. The IPAS is a tool that collects information on physical exercise in the following three situations (or areas) and on sedentary behaviour: activity at work, moving from one place to another, leisure activities

Metabolic equivalents (METs), commonly used to express the intensity of physical activity, are used to analyze the questionnaire data. MET expresses the ratio between metabolic rate during physical activity and metabolic rate at rest. 1 MET corresponds to the energy expended by a person sitting still, and is equivalent to a consumption of 1 kcal/kg/hour.

The IPAS thus defines a PA level score corresponding to three categorical levels (low, moderate and high). Low PA corresponds to no postponed activity, or postponed activity with a score of less than 600 MET-minutes/week; moderate PA corresponds to a score of at least 600 MET minutes/week, but less than 3000 MET-minutes/week; and high PA corresponds to an IPAS score of at least 3000 MET-minutes/week.[10] Patients who had already benefited from rehabilitation sessions had a program that included; analgesic physiotherapy to combat pain; muscle strengthening combined with gentle joint mobilization and proprioceptive work in the event of knee instability. Self-rehabilitation was initiated for all patients on a personalized basis, taking into account the number of sessions to be performed, as well as their duration and number of repetitions. Data were entered using Kobocollecte software version 4.4, and analyzed using SPSS 21 and Office 2016. The chi-square test was used to find correlations between categorical variables, and a bivariate analysis to determine the factors associated with the level of PA.The significance threshold was set at a p value < 0.05.

Theory

Determining the clinical factors associated with the level of physical activity will enable us to set up rehabilitation programs adapted to the clinical profiles of gonarthrosis patients.

RESULTS

We included a total of 67 patients in our study. There were 56 women (83.58%) and 11 men (16.42%). The meanage of the

patients was 59.87± 12.53 years. The professions of the patients were represented by housewives (35,82%), pensioners (28,35%), civil servant (19,40%), shopkeepers (8 ,95%) and other (**Table I**).

Table I: Socio-demographic characteristics of patients.

Variables	Item(s)	Effectives	Fréquency %
Age	< 65 ans	25	37,31
	≥ 65 ans	42	**62,69**
Gender	Female	56	**83,58**
	Male	11	16,42
Marital status	Married	44	**65,67**
	Widowed	16	23,88
	Single	7	10,45
Profession	Retired	19	**28,35**
	Housewife	24	35,82
	Civil servant	13	19,40
	Shopkeeper	6	8 ,95
	Other	5	7,48

Gonarthrosis had a bilateral location in 49 cases (73.13%) and was bi-compartmental in 24 cases (43.28%). 45 patients (67.20%) had a Body Mass Index (BMI) greater than 25Kg/m_2 and the mean BMI was 28.70kg/m_2± 6.73. In 34 patients (50.75%) there was a history of arterial hypertension (AH) and in 16 patients (23.88%) a history of diabetes (**Table II).** Gonarthrosis-related gonalgia had been present for more than 6 months in 49 (73.1%) patients and the mean duration of progression of gonarthrosis since first diagnosis was 40.52 ± 36.5 months, with extremes of 2 and 40 months. Pain was present in all our patients, with a mean VAS score of 4.60±1.96, and 65 patients (91.01%) were taking painkillers.

Table II: Patients' clinical characteristics

Variables	Item(s)	Effectives	Fréquency %
Location of gonarthrosis	Unilatéral	18	26,87
	Bilatéral	49	**73,13**
Site of gonarthrosis	Uni-compartimental	14	20,90
	Bi-compartimental	29	**43,28**
	Tri-compartimental	24	35,82
BMI	[18-25] kg/m2	22	32,80
	>25 kg/m2	45	**67,20**
clinical history	HTA	34	**50,75**
	Diabète	16	**23,88**
	Autre	17	25,87

In our study, 50 patients (74.63%) had benefited from rehabilitation sessions with an average number equal to 11.88±5.77 sessions.The other patients who had not benefited from rehabilitation were awaiting the start of their adapted and individualized rehabilitation programs. The mean IPAS score was 635.24±135 MET-minutes/week. Low physical activity (PA) was found in 45 patients (67.16%) and moderate PA in 19 patients (28.36%). Walking was found as a physical activity in 39 patients (58.21%).

In bivariate analysis, low PA was associated with age over 65 [OR=5.62, (CI=1.45-21.73), p<0.001], a history of hypertension [OR=2.83, (CI=1.27-6, 31), p<0.001], history of diabetes [OR=2.14, (CI=1.13-5.89), p<0.031], and BMI class >25 kg/m2 [OR=2.43, (CI=1.17-6.12), p<0.026] (**Table III**). Moderate PA was associated with age under 65 years [OR=1.71, (CI=1.25-2.34), p<0.005] and absence of hypertension [OR=1.86, (CI=1.19-2.89), p<0.012].

Table III : Factors predictive of PA level in gonarthrosis patients

PA level	Predictive factors	OR(CI)	p-value
Low PA	Âge ≥ 65 ans	5,62 (CI=1,45-21,73)	0,001
	History of hypertension	2,83 (CI=1,27-6,31)	0,001
	History of diabetes	2,14 (CI=1,13-5,89)	0,031
	BMI >25 kg/m$_2$	2,43 (CI=1,17-6,12)	0,026
Moderate PA	Age < 65 ans	1,71(CI=1,25-2,34)	0,005
	No history of hypertension	1,86 (CI=1,19-2,89)	0,012

Duration of progression of gonarthrosis-related gononalgia (p=0.94), pain (p=0.67), location of pain (p=0.59), and use of painkillers (p=0.44) were not associated with PA level in our patients.

DISCUSSION

In our setting, the mean age of patients suffering from gonarthrosis was 59.87± 12.53 years, a finding already made by Ouédraogo et al. in Burkina Faso.As gonarthrosis is a degenerative process characterised by wear and tear of the cartilage, it progressively sets in with age.[11] We noted a predominance of women (83,58%); The high prevalence of gonarthrosis in women could be explained by the fact that, after a certain age, it is more common in women than in men, suggesting that, at the menopause, oestrogen deficiency is accompanied by an acceleration of cellular processes leading to degradation of the cartilage matrix. Comorbidities were dominated by arterial hypertension (50.75%) and diabetes (23.88%). To date, there are few pathophysiological explanations, and they focus solely on the subchondral bone: the role of ischaemia of the subchondral bone under the effect of high blood pressure is not known. On the other hand, self-medication with non-steroidal anti-inflammatory drugs to combat the pain of gonarthrosis over a long period could lead to high blood pressure.[12] More than half our patients were overweight (67.20%). In fact, in sub-Saharan Africa, it would seem that being overweight is still well perceived as a sign of well-being and social comfort. Being overweight, which is

more common in women, is a reason for society to value their husbands. In the literature, gonarthrosis is frequent with age, which is itself implicated in the onset of comorbidities such as arterial hypertension, diabetes and obesity.[11,13,14] The majority of our patients (91.01%) were taking analgesic and/or anti-inflammatory painkillers, but their pain had not completely disappeared; all patients had persistent pain at the time of our assessment, with a mean VAS score of 4.60±1.96/10. This may be related to the chronic nature of gonarthrosis pain manifestations in our patients; 49 (73.1%) patients had pain manifestations that had been evolving for more than 6 months already. The psychosomatic components of chronic pain are often at the root of failures to treat chronic pain with the usual analgesics and anti-inflammatories.[15] Although we might be led to believe that pain could be an enormous brake on PA in gonarthrosis, in our study we found that pain did not influence PA levels (p=0.59). This could be explained by the mean score found (4.60±1.96/10), which corresponds to a moderate intensity.[16] that would only slightly hinder the practice of PA in goanarthrosis patients; the same is true for the duration of evolution and the topography of the gonarthrosis. The absence of an association between PA level and the presence of pain could also be explained by gonarthrosis patients' understanding of the benefits of PA on knee mobility and pain. Indeed, during the therapeutic education of gonarthrosis patients, practitioners teach patients about the benefits of adapted PA on the evolution of gonarthrosis and the reduction of pain symptomatology.[17] Taken together, these factors may explain why gonarthrosis patients in our series had a moderate level of physical activity, with a mean IPAS score = 635.24±135 MET-minutes/week. Walking was found as a physical activity in 39 patients (58.21%).The other patients with gonarthrosis did not take up walking as a physical activity because of the pain it caused after walking.Several qualitative studies have noted motivational factors such as well-being, pain reduction, self-image and, as obstacles, knee pain, asthenia and lack of motivation.[9,18] In our study, age ≥ 65 years was a 5-fold risk factor

for low PA level. This could be explained by the increase in comorbidities at this age(11); it should challenge practitioners, particularly in PRM, to set up specific rehabilitation programs for gonarthrosis patients aged ≥ 65 years. These specific programs could be carried out in groups and in an aquatic environment (balneotherapy) to enable this category of patients to have a moderate level of physical activity and thus help reduce other comorbidities.[3] In sub-Saharan Africa, rehabilitation is still in its infancy, particularly in Burkina Faso. There are around sixty rehabilitation centres, more than half of which are in the capital Ouagadougou.

For all of these centres in the city of Ouagadougou, there is no Balneotherapy treatment available, as recommended in the new recommendations. In addition, group therapy remains difficult to set up because of the accessibility of these centers in terms of finance, geography and qualified human resources. The average cost of a re-education session is approximately 5953.12 +/- 1899.25Fcfa (about 9 euros) for the private sector and 3377.60 +/- 564.22 (about 5.5 euros) for the public sector. 2656.25 +/- 1574.53 Fcfa (about 4 euros) for personal transport and 3343.75 +/- 491.13 (about 5 euros) for public transport. +/- 491.13 (about 5 euros) for public transport.[19] Gonarthrosis patients with a history of arterial hypertension had almost 3 times the risk of low PA, and those who were overweight (BMI >25 kg/m$_2$) or had a history of diabetes had 2 times the risk of low PA. These results show us that also as management objectives, the control of these comorbidities and this should be a priority in rehabilitation programs for gonarthrosis patients.once again, co-morbidities such as arterial hypertension or diabetes in gonarthrosis patients put them at two or even three times the risk of having a low level of activity; and necessitates early collaboration between rehabilitation and other clinical services in Sub-Saharan Africa. As soon as these pathologies (hypertension, diabetes and overweight) are detected, rehabilitation services could be called upon to reduce their negative effects on the progression of gonarthrosis. In other words, in addition to the motivational factors already identified in

the literature, the management of gonarthrosis patients should take into account all comorbidities, such as arterial hypertension, diabetes and overweight, which can be obstacles to the practice of physical activity.It is with this in mind that, in sub-Saharan Africa, collaboration between the various specialists, particularly PRM doctors, cardiologists, diabetologists, nutritionists and rheumatologists, should be an absolute priority in patient care. This collaboration should make it possible to set up suitable physical activity programs as early as possible, thereby slowing the progression of gonarthrosis and, at the same time, controlling comorbidities. Although pain is well known to trigger kinesiophobia in patients,[20] we must remember that this pain could take second place to these comorbidities (arterial hypertension, diabetes and overweight), for which a sedentary lifestyle is a non-negligible factor in their onset or pathophysiology. In 2008, the World Health Organization (WHO) reported that almost 31% of adults aged 15 and over lacked physical activity. This lack of PA is thought to be due to our increasingly sedentary lifestyles, as a result of reliance on motorized transport and increased use of screens for work, education and leisure.[21] It is in this context that rehabilitation professionals should make proposals, in agreement with the Ministries of Health and Sport, for health paths that encourage physical activity in the population. This should include the development of spaces dedicated to adapted individual or group physical activity; the setting up of multidisciplinary teams for the practice of physical activities for the benefit of communities and associations of people living with arterial hypertension, diabetes and other co-morbidities. The gononalgia associated with gonarthrosis and the sedentary lifestyle with its corollary comorbidities (hypertension, diabetes and overweight) will keep gonarthrosis patients in a vicious circle of lack of PA. This lack of physical activity gradually leads to loss of flexibility, reduced muscular performance and muscle wasting, resulting in a reduction in social and physical activities, which in turn maintains and worsens disability: this is the physical deconditioning syndrome.[11] To

achieve a gain in PA in gonarthrosis patients, it would be worthwhile for rehabilitation programs to focus on preventing this physical deconditioning syndrome by carrying out an educational diagnosis on comorbidities such as arterial hypertension, diabetes and overweight. Controlling these comorbidities will make it possible to propose PA programs adapted to each group of gonarthrosis patients, while taking into account patients who are ≥ 65 years of age. In addition to adapted physical activity programmes, a study of individual motivational factors for maintaining physical activity in line with WHO recommendations should be carried out. We should also look at the environmental and social factors that could act as barriers to physical activity among gonarthrosis patients in sub-Saharan Africa.Among these factors, which can already be identified in our context, is the lack of facilities for practising sport, and of suitable settings for walking, for example. On a social level, poverty and the lack of knowledge about the health benefits of physical activity can be identified. Multicentre, population-based studies will help to better define these environmental and social factors in sub-Saharan Africa.

CONCLUSION

The level of physical activity in gonarthrosis patients is moderate and is not influenced by pain. In addition to motivational factors and disincentives to PA in gonarthrosis patients, our study identified other associated factors. In gonarthrosis patients, advanced age is a factor associated with a low level of PA. Arterial hypertension, diabetes and overweight are other comorbidities associated with low PA. The question of rehabilitation programs for gonarthrosis should be discussed in the rehabilitation department before proposing self-programs that would be adapted to the Sub-Saharan Africa context.Health policies should focus not only on education about the health benefits of physical activity, but also on creating a favorable environment for physical activity among sub-Saharan populations.

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Conflict of interest

None

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Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used Zotero in order to build references. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

MANDATORY HIGHLIGHTS

- Patients with knee osteoarthritis have a moderate level of physical activity (mean IPAQ score equal to 635.24±135 MET-minutes/week).
- Age over 65, arterial hypertension, diabetes and obesity are the factors associated with a low level of physical activity in patients with knee osteoarthritis.

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