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Filipa Alexandra Crespo dos Santos

Análise da qualidade de vida de doentes com Pseudo-Patela Baixa após Artroplastia Total do Joelho

Quality of life analysis in patients with Pseudo-Patella Baja after Total Knee Arthroplasty

MARÇO, 2022

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DESIGNAÇÃO DA ÁREA DO PROJECTO

Medicina Clínica

TÍTULO DISSERTAÇÃO/MONOGRAFIA (riscar o que não interessa)

Análise da qualidade de vida em doentes com Pseudo-Patela Baixa após Artroplastia Total do Joelho

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COORIENTADOR (se aplicável)

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É AUTORIZADA A REPRODUÇÃO INTEGRAL DESTE TRABALHO APENAS PARA EFEITOS DE INVESTIGAÇÃO, MEDIANTE DECLARAÇÃO ESCRITA DO INTERESSADO, QUE A TAL SE COMPROMETE.	☐
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DE ACORDO COM A LEGISLAÇÃO EM VIGOR, (INDICAR, CASO TAL SEJA NECESSÁRIO, Nº MÁXIMO DE PÁGINAS, ILUSTRAÇÕES, GRÁFICOS, ETC.) NÃO É PERMITIDA A REPRODUÇÃO DE QUALQUER PARTE DESTE TRABALHO.	☒

Faculdade de Medicina da Universidade do Porto, 20 / 03 / 2022

Assinatura conforme cartão de identificação: Filipa A. C. Santos

E como somos somente o somatório de todos os que nos marcam nesta vida, faço aqui referência aos que não podia de forma alguma esquecer.

Aos meus pais, que me ensinaram a ser resiliente, a dar sempre o meu máximo e que acreditaram em mim mesmo quando eu própria tinha dúvidas, fizeram de mim quem sou.

À minha madrinha e à minha avó que há quase 27 anos me apoiam incondicionalmente com todo o carinho e dedicação e a quem tanto devo.

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E por fim, mas não menos importante, obrigada ao Gonçalo que desde os primeiros momentos se prontificou amavelmente a ajudar sempre com boa disposição e a solidariedade de quem já passou pelo mesmo.

Quality of life analysis in patients with Pseudo-Patella Baja after Total Knee Arthroplasty

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ABSTRACT

Background: Anterior knee pain is one of the most common causes of persistent complaints after total knee arthroplasty (TKA), with pseudo-patella baja (PPB) being one of the possible etiologies. There are few studies evaluating the impact of PPB after TKA. The purpose of this study is to evaluate the effect of PPB in primary TKA outcomes, particularly on health-related quality of life (HRQoL).

Methods: Monocentric retrospective radiographic analysis of 612 knees submitted to TKA due to primary knee osteoarthritis, in patients >18 years old, with post-operative x-ray and minimal follow-up of 2 years. Primary analysis included evaluation of patellar height using modified Insall-Salvati and Blackburne-Peel ratios. Case group included 64 cases with PPB; control group was randomly assigned among patients with normal patellar height and Blackburne-Peel index ≥0.54. To assess HRQoL, the Short Form-12 questionnaire (SF-12) was applied. Anterior knee pain, Diabetes Mellitus Type 2 and the use of antidepressant medication after surgery were assessed.

Results: There were no statistical differences between the PPB and non-PPB groups in median physical component score-12 ($P = 0.2$). However, there was a significant difference between both groups regarding the median mental component score-12, depicting worse results among PPB patients ($P = 0.034$). Anterior knee pain and antidepressant medication after the surgery were significantly more prevalent in the PPB group ($P < 0.001$ and $P = 0.016$).

Conclusion: PPB appears to have a negative influence in clinical outcomes after TKA and it may condition an increased consumption of antidepressant medication after surgery.

Keywords: Pseudo-patella baja, Joint line elevation, Anterior knee pain, Total knee arthroplasty, Quality of life, Complications.

Abbreviations

TKA - Total knee arthroplasty
PPB - Pseudo-patella baja
HRQoL **-** Health-related quality of life
SF-12 - Short Form-12 questionnaire

INTRODUCTION

Degenerative joint disease is globally acknowledged as the leading cause of physical shortages amongst elderly people [1]. The pain and functional limitation originated by this condition, especially in lower limbs, correlate strongly with a reduced health-related quality of life (HRQoL) [2]. Management of knee arthritis may range from conservative to surgical treatment modalities. Total knee arthroplasty (TKA) is an established approach for degenerative knee arthropathy when conservative treatment fails and other treatment modalities (such as osteotomy or unicompartimental knee replacement) are contraindicated. As the projected incidence rate of primary TKAs is expected to increase (by around 43% in the next 30 years, mainly related with a higher utilization of TKA in younger patients) [3], some complications may become more and more frequent.

Anterior knee pain is one of the most common causes of persistent complaints and patella baja is one of the possible etiologies. In this context, acquired and pseudo-patella may be differentiated. Acquired patella baja (PB), which comprises the shortening and scarring of the patellar tendon during surgery, creating a distal displacement of the patella, is a universally recognized complication of TKA, with a reported incidence between 34% and 37% [4]. On the other hand, pseudo-patella baja (PPB) represents an iatrogenic elevation in the level of the joint line after TKA, due to an imbalance between the femoral or tibial cuts or excessive soft tissue release (and not associated with shortening of the tendon as in PB), whose incidence and clinical repercussion are not yet fully established [5]. A recent study from our institution estimated a PPB incidence of 10.5% in 612 TKAs [4].

Recent studies have shown that satisfaction with TKA is contingent upon subjective factors, like overall functionality and fulfillment of patients' preoperative expectations [6]. This probably explains why patient-reported outcomes are being increasingly used in clinical practice [7], complementing the more objective evaluation usually performed by surgeons, encompassing joint stability, alignment and range of motion [2, 8].

Although there is an increasing interest on the impact of PPB after TKA, there are only few studies evaluating the impact of PPB after TKA. Therefore, the goal of this study is to evaluate the effect of PPB in outcomes after primary TKA, particularly on HRQoL. Hopefully, this analysis can contribute to a better understanding of the real psychosocial impact of this condition in patients' HRQoL and may help guiding appropriate management of PPB.

MATERIAL AND METHODS

A monocentric retrospective study was conducted encompassing 813 primary TKA procedures, at a tertiary hospital, between January 2016 and March 2019.

Flowchart on case selection is depicted in Figure 1. In a primary analysis, we included patients (1) over 18 years, (2) with primary knee osteoarthritis, (3) submitted to TKA, (4) with postoperative lateral radiographs at 30º flexion within 7 days after TKA and (5) minimum follow-up of 2 years.

Radiographic evaluation was performed. The modified Insall-Salvati Ratio (mISR) was used in order to detect and exclude patients with patella baja (mISR < 1.2) and patella alta (mISR ≥ 2.0). Afterwards, Blackburne-Peel Index (BPI) was applied to patients with normal patellar height to stratify

them into two groups: PPB group (BPI < 0.54) and non-PPB group (BPI ≥ 0.54). Patients diagnosed with PPB were included in the sample group (n=64). To have a similar and comparable number of knees in the non-PPB group, we used a computer to generate a random allocation list of numbers and shuffle patients' identification based on this random sequence, selecting the 64 patients for the control group.

Due to the restrictions of the COVID-19 pandemic, which limited the free movement of hospital patients, a telephone questionnaire was carried out to assess HRQoL. The questionnaire applied consisted of 12 questions that make up the Short Form-12 (SF-12), version 1, adapted for the Portuguese population. Furthermore, patients were asked about the presence or absence of anterior knee pain, Diabetes Mellitus Type 2 and the eventual use of antidepressant medication after surgery. The final calculation of the two SF-12 components, the MCS-12 (mental component) and the PCS-12 (physical component), was performed through the online calculator created and made available for version 1 by the authors (OrthoToolKit, 2022).

During the process, we excluded individuals with psychological or psychiatric disorders that would compromise their cognitive abilities, such as dementia; individuals with severe hearing deficits that make it impossible to carry out a telephone interview and individuals who refuse to participate in the study.

SF-12

Created in 1992 by RAND Corporation as a result of the Medical Outcomes Study (MOS), the SF-36 covers eight health facets: physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. There is also an item for perceived change in health.

The SF-12 is a twelve-item subset of the SF-36 that can be self-administered, administered by interview, by mail or by telephone [9]. Notwithstanding the reduction in the number of items, which compromises the reliability and validity for studies with a small number of patients, the SF-12 bears an accurate estimate of the SF-36 summary scores [7]. The SF-12 uses the same eight domains as the SF-36 and, in a parallel fashion, two summary scores are reported from the SF-12 – a mental component score (MCS-12) and a physical component score (PCS-12). The items are scored so that a higher score represents better health. For this study, we used SF-12 version 1.0, which is non-proprietary.

Statistical analysis

The SF-12 questionnaire responses, the MCS-12 and PCS-12 scores, as well as the presence of anterior knee pain, diabetes and the use of antidepressant medication were compared between the PPB group and the control group using Pearson's Chi-squared test, Fisher's exact test and Wilcoxon rank-sum test, as appropriate. The level of significance for all hypothesis tests (P-value) was set at 0.05. The normality of the distribution of continuous variables was evaluated by visually inspecting the quantile-quantile (QQ) plots. Continuous variables are presented as median and 25-75% quartiles (IQR). Categorical variables are presented as absolute (n) and relative (%) frequencies. Statistical analysis was performed with R (Team, 2021).

Ethics

Approval from the local Ethics Committee was obtained.

RESULTS

After performing radiological evaluation, a total of 64 cases with PPB criteria following TKA were included (Fig. A.1). Of the 64 cases, 2 were excluded because the patients suffered from advanced medical conditions that compromised their cognitive and hearing abilities. From the selected control group (n=62), 61 responses were obtained (95% response rate).

The demographic data of both groups is presented in Table A.1. Regarding the gender of the patients, there were significantly more women in both groups ($P = 0.009$), specifically in the PPB group (84%). The median age at the time of the study was 71 years (IQR 66,77).

A statistically significant difference was found regarding the median MCS-12, depicting worse results in the PPB group ($P = 0.034$) (Table A.1). Question number 9 of the SF-12 (Table A.2) evidences this aspect, with a lower number of patients from the PPB group experiencing feelings of calmness and peacefulness on a regular basis, when compared to the control group ($P = 0.040$).

On the contrary, there were no statistical differences between the PPB and non-PPB groups in median PCS-12 scores ($P = 0.2$), as it can be seen in Table A.1. Nevertheless, patients with PPB appear to report more limitation for moderate physical activities, as noted by the responses to question number 2 (Table A.2) of the SF-12 ($P = 0.050$). 58% of the patients in the PPB group indicate a serious limitation for moderate activities, when compared to 36% in the control group.

Question number 12 of the questionnaire reveals that patients with PPB have a statistically significant higher interference of physical health or emotional problems with the patient's social activities ($P = 0.046$).

As for the 3 extra clinically relevant questions included in this study, both the presence of post-surgical anterior knee pain as well as the use of antidepressant medication after the surgery were significantly higher in the PPB group ($P < 0.001$ and $P = 0.016$, respectively), as seen in Table A.3. Regarding the presence of Diabetes Mellitus Type 2, there were no statistical differences amongst both groups ($P = 0.2$).

DISCUSSION

In our study, no statistical differences were found between the two groups in median PCS-12 scores, even though there was a statistical difference in terms of the reported moderate limitations regarding patient's physical function (as evidenced by answer to question 2 of the SF-12). Moreover, the PPB group has shown a significantly worse median MCS-12 score. This is an interesting finding as these results are divergent with similar studies encompassing different patient-reported outcome measures [10, 11]. For instance, a prospective study from Aguirre-Pastor *et al.* [12] utilized SF-12 to

investigate the clinical consequences of PPB in a large series of patients with a two-year follow-up and found no significant differences in terms of clinical outcomes. These findings rise the thought-provoking idea that a limiting medical condition can have marked psychological repercussions on the patient even if the physical impact is not as evident. The fact that a significant lower number of patients from the PPB group reports feelings of calmness and peacefulness regularly, as evidenced by our results, also supports this argument. Furthermore, the results of the last question of the SF-12 clearly emphasize the impact that physical health or emotional problems can have on the patient's social life, specifically in the case of PPB. On a different perspective, Behrend *et al.* [13] suggests that a possible reason for not finding clinical relevance of joint line elevation might lie in the amount of elevation found, less than 4 mm. Porteous *et al.* [14] corroborates these findings for a limit of 5 mm. In future studies, it would be of extreme relevance to perform the radiological measurements of joint-line position variations before and after TKA and to relate the findings to patient reported outcomes on HRQoL.

Considering the presence of Diabetes Mellitus Type 2, our study found no statistically significant differences between both groups. This was a relevant issue as the presence of diabetes could be a potential confounder for the results, overvaluing the impact of PPB on the patient's HRQoL. In fact, several authors have linked the presence of diabetes to worse outcomes in various types of orthopedic surgeries, such as TKA [15-17], anterior cruciate ligament reconstruction [18], lumbar fusion [19, 20] and total shoulder replacement [21]. In a study utilizing the SF-36 score to evaluate the quality of life after arthroscopic rotator cuff repair, Chung SW *et al.* established that diabetes had a significant negative effect on postoperative physical HRQoL [22].

A rather predictable result of the present research was the significantly higher presence of anterior knee pain in the PPB group, which can be expected as it is a characteristic symptom of this condition [4, 5].

The substantial difference regarding the use of antidepressant medication, which is shown to be higher in the PPB group, was a very interesting finding of our investigation. In his article of 2013, Peterson *et al.* [23] describes what he calls a "vicious cycle" where unfulfilled preoperative expectations regarding pain relief may be a cause of fear and uncertainty, factors that may affect the processing of pain and even increase it, for example. We should, however, interpret these findings carefully, as there can be a bias towards patients who may have had a worse clinical outcome because of depression and not necessarily the pain resulting from the PPB condition.

One of the strengths of our study is that, to the best of our knowledge, it was the first in the Iberian Peninsula to analyze patient reported outcomes on HRQoL in subjects with PPB after TKA. It also offers an important contribute globally because so far very few studies have been conducted regarding HRQoL in PPB following TKA and its clinical relevance. Also, no other study has evaluated the use of antidepressant medication in patients diagnosed with PPB.

In terms of the applied score, we favored the analysis of the MCS and PCS partial components instead of the total value of the SF-12 due to the limitations inherent to its interpretation. Regarding the SF-36, it is established that the PCS and MCS partial scoring is extremely relevant, specifically in orthopedics, seeing as many patients score very low on the physical health domains because of their musculoskeletal condition, leading to a higher MCS than that implied by the final score [7].

The present study has several limitations. Firstly, the fact that it was a retrospective study is in

itself a limitation. Future studies should focus on a prospective design where scores can be evaluated before and after the procedure and where concomitant comorbidities can be assessed in order to have a more reliable evaluation. Secondly, the relatively small size of both groups may limit the interpretation of the results, even though we believe it is a valid sample for comparison. Thirdly, due to the COVID-19 pandemic, we had to perform a questionnaire via telephone, rather than applying it in person, which would be the ideal situation. This factor can also influence our results. However, nowadays, teleconsultation is becoming more widely used as a complement to medical practice, allowing us to have real feedback on the patient's status. Additionally, as we already mentioned, the SF-36 and its versions can be applied over telephone call. Lastly, we should also acknowledge that the variability inherent to different surgical teams and techniques, as well as different types of prosthesis used may also play a role on the obtained results.

CONCLUSION

PPB after TKA, as measured by BPI, is a relatively common finding and our study shows a significant negative influence in terms of clinical outcomes, as compared with patients with post-operative normal patellar height. In addition, our results suggest that the occurrence of PPB following TKA may be associated with an increased consumption of antidepressant medication.

DECLARATION OF COMPETING INTEREST

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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APPENDICES

Figure A.1 - Flow chart of case selection.

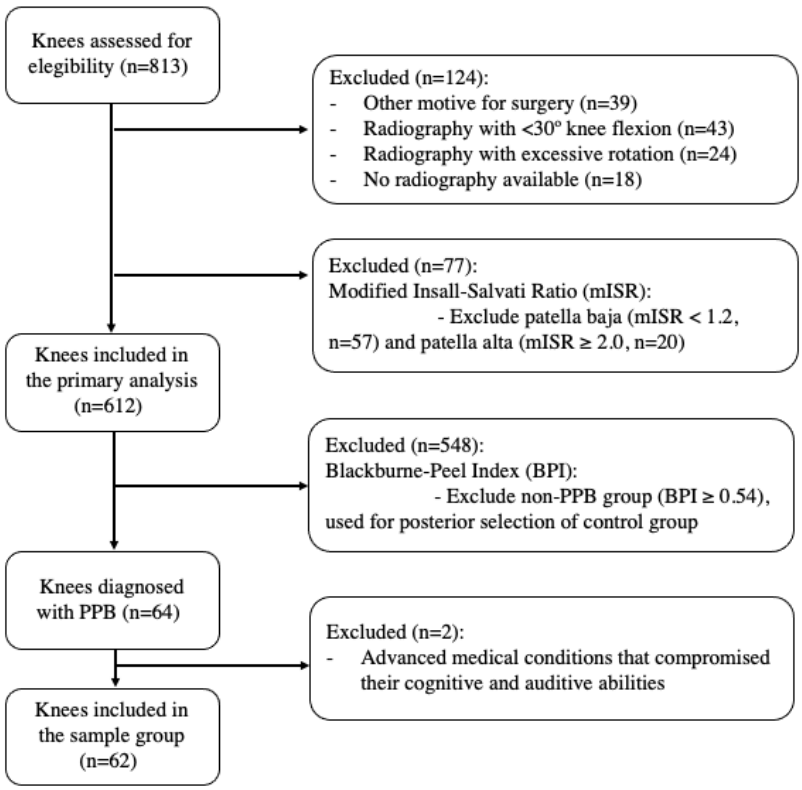

Table A.1 - Comparison between PPB group and non-PPB group regarding PCS-12 and MCS-12 scores and demographic characteristics.

Characteristic	N	Overall, N = 128[1]	PPB: No, N = 64[1]	PPB: Yes, N = 64[1]	p-value[2]
Age	128	71 (66, 77)	71 (66, 76)	72 (66, 77)	0.7
Sex	128				0.009
Male		33 (26%)	23 (36%)	10 (16%)	
Female		95 (74%)	41 (64%)	54 (84%)	
PCS-12	123	28 (23, 38)	31 (23, 39)	26 (23, 36)	0.2
MCS-12	123	53 (40, 58)	54 (43, 59)	50 (36, 56)	0.034

[1]n (%); Median (IQR)

[2]Fisher's Exact Test for Count Data with simulated p-value (based on 2000 replicates); Pearson's Chi-squared test; Wilcoxon rank sum test

Table A.2 - SF-12 score responses in PPB and non-PPB groups.

Characteristic	N	Overall, N = 128[1]	PPB: No, N = 64[1]	PPB: Yes, N = 64[1]	p-value[2]
1 – In general, would you say your health is:	123				0.5
Excellent		1 (0.8%)	1 (1.6%)	0 (0%)	
Very Good		3 (2.4%)	2 (3.3%)	1 (1.6%)	
Good		19 (15%)	12 (20%)	7 (11%)	
Fair		60 (49%)	29 (48%)	31 (50%)	
Poor		40 (33%)	17 (28%)	23 (37%)	
2 – Limitation for moderate activities:	123				0.050
Yes, limited a lot		58 (47%)	22 (36%)	36 (58%)	
Yes, limited a little		48 (39%)	29 (48%)	19 (31%)	
No, not limited at all		17 (14%)	10 (16%)	7 (11%)	
3 – Limitation for climbing several flights of stairs:	123				0.14
Yes, limited a lot		69 (56%)	30 (49%)	39 (63%)	
Yes, limited a little		42 (34%)	26 (43%)	16 (26%)	
No, not limited at all		12 (9.8%)	5 (8.2%)	7 (11%)	
4 - Accomplished less than you would like:	123				0.8
Yes		82 (67%)	40 (66%)	42 (68%)	
No		41 (33%)	21 (34%)	20 (32%)	
5 - Were limited in the kind of work or other activities:	123				0.8
Yes		94 (76%)	46 (75%)	48 (77%)	
No		29 (24%)	15 (25%)	14 (23%)	
6 - Limitation Mental Health - accomplished less than you would like:	123				0.4
Yes		41 (33%)	18 (30%)	23 (37%)	
No		82 (67%)	43 (70%)	39 (63%)	

Characteristic	N	Overall, N = 128[1]	PPB: No, N = 64[1]	PPB: Yes, N = 64[1]	p-value[2]
7 – Did work or activities less carefully than usual:	123				0.6
Yes		35 (28%)	16 (26%)	19 (31%)	
No		88 (72%)	45 (74%)	43 (69%)	
8 - How much did pain interfere with your normal work:	123				0.3
Not at all		19 (15%)	13 (21%)	6 (9.7%)	
A little bit		23 (19%)	13 (21%)	10 (16%)	
Moderately		27 (22%)	12 (20%)	15 (24%)	
Quite a bit		35 (28%)	14 (23%)	21 (34%)	
Extremely		19 (15%)	9 (15%)	10 (16%)	
9 – How much of the time have you felt calm & peaceful:	123				0.040
All of the time		14 (11%)	10 (16%)	4 (6.5%)	
Most of the time		38 (31%)	23 (38%)	15 (24%)	
A good bit of the time		15 (12%)	9 (15%)	6 (9.7%)	
Some of the time		28 (23%)	10 (16%)	18 (29%)	
A little of the time		18 (15%)	7 (11%)	11 (18%)	
None of the time		10 (8.1%)	2 (3.3%)	8 (13%)	
10 - How much of the time did you have a lot of energy:	123				0.4
All of the time		10 (8.1%)	3 (4.9%)	7 (11%)	
Most of the time		17 (14%)	11 (18%)	6 (9.7%)	
A good bit of the time		12 (9.8%)	8 (13%)	4 (6.5%)	
Some of the time		30 (24%)	13 (21%)	17 (27%)	
A little of the time		37 (30%)	18 (30%)	19 (31%)	
None of the time		17 (14%)	8 (13%)	9 (15%)	
11 – How much of the time have you felt down-hearted and blue:	123				0.12

Characteristic	N	Overall, N = 128[1]	PPB: No, N = 64[1]	PPB: Yes, N = 64[1]	p-value[2]
All of the time		10 (8.1%)	3 (4.9%)	7 (11%)	
Most of the time		12 (9.8%)	2 (3.3%)	10 (16%)	
A good bit of the time		20 (16%)	12 (20%)	8 (13%)	
Some of the time		35 (28%)	18 (30%)	17 (27%)	
A little of the time		31 (25%)	18 (30%)	13 (21%)	
None of the time		15 (12%)	8 (13%)	7 (11%)	
12 – How much of the time has your physical or mental health interfered with your social activities:	123				0.046
All of the time		13 (11%)	5 (8.2%)	8 (13%)	
Most of the time		11 (8.9%)	2 (3.3%)	9 (15%)	
Some of the time		9 (7.3%)	5 (8.2%)	4 (6.5%)	
A little of the time		20 (16%)	7 (11%)	13 (21%)	
None of the time		70 (57%)	42 (69%)	28 (45%)	

[1]n (%); Median (IQR)

[2]Fisher's Exact Test for Count Data with simulated p-value

(based on 2000 replicates); Pearson's Chi-squared test; Wilcoxon rank sum test

Table A.3 - Presence of post-surgical anterior knee pain, Diabetes Mellitus Type 2, and the use of antidepressant medication after surgery in PPB and non-PPB groups.

Characteristic	N	Overall, N = 128[1]	PPB: No, N = 64[1]	PPB: Yes, N = 64[1]	p-value[2]
13 – After the surgery, did you start to have anterior knee pain?	123				<0.001
Yes		35 (28%)	5 (8.2%)	30 (48%)	
No		88 (72%)	56 (92%)	32 (52%)	
14 – Are you diabetic?	123				0.13
Yes		38 (31%)	15 (25%)	23 (37%)	
No		85 (69%)	46 (75%)	39 (63%)	

Characteristic	N	Overall, N = 128[1]	PPB: No, N = 64[1]	PPB: Yes, N = 64[1]	p-value[2]
15 – Are / were you on antidepressant medication, initiated after the surgery?	123				0.016
Yes, I am		37 (30%)	12 (20%)	25 (40%)	
Yes, I was		3 (2.4%)	1 (1.6%)	2 (3.2%)	
No		83 (67%)	48 (79%)	35 (56%)	

[1]n (%); Median (IQR)

[2]Fisher's Exact Test for Count Data with simulated p-value
(based on 2000 replicates); Pearson's Chi-squared test; Wilcoxon rank sum test

STROBE Statement—Checklist of items that should be included in reports of ***case-control studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 2 – "Monocentric retrospective radiographic analysis of 612 knees submitted to TKA (…)" "Case group included 64 cases with PPB; control group was randomly assigned (…)"
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 2 – "Methods: Monocentric retrospective radiographic analysis of 612 knees submitted to TKA (…)" "Case group included 64 cases with PPB; control group was randomly assigned (…)" "Results: (…) depicting worse results among PPB patients ($P = 0.034$). Anterior knee pain and antidepressant medication after the surgery were significantly more prevalent in the PPB group ($P < 0.001$ and $P = 0.016$)."
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 3 – "Anterior knee pain is one of the most common causes of persistent complaints and patella baja is one of the possible etiologies." "(…) pseudo-patella baja (PPB) represents an iatrogenic elevation in the level of the joint line after TKA (…) whose incidence and clinical repercussion are not yet fully established."
Objectives	3	State specific objectives, including any prespecified hypotheses	Page 3 – "the goal of this study is to evaluate the effect of PPB in outcomes after primary TKA, particularly on HRQoL (…) contribute to a better understanding of the real psychosocial impact of this condition in patients' HRQoL and may help guiding appropriate management of PPB."
Methods			
Study design	4	Present key elements of study design early in the paper	Page 3 – "In a primary analysis, we included patients (1) over 18 years, (2) with primary knee osteoarthritis, (3) submitted to TKA, (4) with postoperative lateral radiographs at 30º flexion within 7 days after TKA and (5) minimum follow-up of 2 years. Radiographic evaluation was performed." "(…) a telephone questionnaire was carried out to assess HRQoL."
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 3 – "(…) encompassing 813 primary TKA procedures, at a tertiary hospital, between January 2016 and March 2019." "Due to the restrictions of the COVID-19 pandemic, which limited the free movement of hospital patients, a telephone questionnaire was carried out to assess HRQoL."
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for	Page 4 – "Patients diagnosed with PPB were included in the sample group (n=64). To have a similar and comparable number of knees in the non-PPB group, we used a computer to generate a random allocation list of numbers and shuffle patients' identification based on this random sequence, selecting the 64 patients for the control group."

		the choice of cases and controls	
		(*b*) For matched studies, give matching criteria and the number of controls per case	Not applicable, since this was not a matched study.
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Page 4 – "(…) a telephone questionnaire was carried out to assess HRQoL." **"(…)** patients were asked about the presence or absence of anterior knee pain, Diabetes Mellitus Type 2 and the eventual use of antidepressant medication after surgery. The final calculation of the two SF-12 components, the MCS-12 (mental component) and the PCS-12 (physical component), was performed through the online calculator created and made available for version 1 by the authors."
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Page 4 – "(…) a telephone questionnaire was carried out to assess HRQoL. The questionnaire applied consisted of 12 questions that make up the Short Form-12 (SF-12), version 1, adapted for the Portuguese population." **"(…)** patients were asked about the presence or absence of anterior knee pain, Diabetes Mellitus Type 2 and the eventual use of antidepressant medication after surgery. The final calculation of the two SF-12 components, the MCS-12 (mental component) and the PCS-12 (physical component), was performed through the online calculator created and made available for version 1 by the authors."
Bias	9	Describe any efforts to address potential sources of bias	Page 4 – "To have a similar and comparable number of knees in the non-PPB group, we used a computer to generate a random allocation list of numbers and shuffle patients' identification based on this random sequence, selecting the 64 patients for the control group."
Study size	10	Explain how the study size was arrived at	Page 4 – "Patients diagnosed with PPB were included in the sample group (n=64). To have a similar and comparable number of knees in the non-PPB group, we used a computer to generate a random allocation list of numbers and shuffle patients' identification based on this random sequence, selecting the 64 patients for the control group."
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 4 – "The questionnaire applied consisted of 12 questions that make up the Short Form-12 (SF-12), version 1, adapted for the Portuguese population." "The final calculation of the two SF-12 components, the MCS-12 (mental component) and the PCS-12 (physical component), was performed through the online calculator created and made available for version 1 by the authors." "The normality of the distribution of continuous variables was evaluated by visually inspecting the quantile-quantile (QQ) plots. Continuous variables are presented as median and 25-75% quartiles (IQR). Categorical variables are presented as absolute (n) and relative (%) frequencies."
Statistical methods	12	(*a*) Describe all statistical methods, including those used to	Page 4 – "To have a similar and comparable number of knees in the non-PPB group, we used a computer to generate a random allocation list of numbers and shuffle patients' identification based on this random sequence, selecting the 64

		control for confounding	patients for the control group." "The SF-12 questionnaire responses, the MCS-12 and PCS-12 scores, as well as the presence of anterior knee pain, diabetes and the use of antidepressant medication were compared between the PPB group and the control group using Pearson's Chi-squared test, Fisher's exact test and Wilcoxon rank-sum test, as appropriate. The level of significance for all hypothesis tests (P-value) was set at 0.05."
		(*b*) Describe any methods used to examine subgroups and interactions	"Not applicable, since it was not performed."
		(*c*) Explain how missing data were addressed	Not applicable, since there was not any missing data.
		(*d*) If applicable, explain how matching of cases and controls was addressed	Not applicable, since it was not performed.
		(*e*) Describe any sensitivity analyses	Not applicable, since it was not performed.
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Page 3 – "A monocentric retrospective study was conducted encompassing 813 primary TKA procedures (…)." Page 5 – "After performing radiological evaluation, a total of 64 cases with PPB criteria following TKA were included (Fig. A.1). Of the 64 cases, 2 were excluded because the patients suffered from advanced medical conditions that compromised their cognitive and hearing abilities. From the selected control group (n=62), 61 responses were obtained (95% response rate)."
		(b) Give reasons for non-participation at each stage	Page 3 – "Flowchart on case selection is depicted in Figure 1."
		(c) Consider use of a flow diagram	Page 3 – "Flowchart on case selection is depicted in Figure 1."
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Page 5 – "The demographic data of both groups is presented in Table A.1. Regarding the gender of the patients, there were significantly more women in both groups ($P = 0.009$), specifically in the PPB group (84%). The median age at the time of the study was 71 years (IQR 66,77)."
		(b) Indicate number of participants with missing data for each variable of interest	Not applicable, since there were none.

Outcome data	15*	Report numbers in each exposure category, or summary measures of exposure	Pages 9 to 13 – *Table A.1, Table A.2 and Table A.3*.
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Pages 9 to 13 – *Table A.1, Table A.2 and Table A.3*.
		(*b*) Report category boundaries when continuous variables were categorized	Not applicable.
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not applicable.
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Not applicable, since it was not performed.
Discussion			
Key results	18	Summarise key results with reference to study objectives	Page 5 – "(…) no statistical differences were found between the two groups in median PCS-12 scores (…) the PPB group has shown a significantly worse median MCS-12 score." Page 7 – "(…) our study shows a significant negative influence in terms of clinical outcomes, as compared with patients with post-operative normal patellar height. In addition, our results suggest that the occurrence of PPB following TKA may be associated with an increased consumption of antidepressant medication."
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Page 6 – " In future studies, it would be of extreme relevance to perform the radiological measurements of joint-line position variations before and after TKA and to relate the findings to patient reported outcomes on HRQoL." "We should, however, interpret these findings carefully, as there can be a bias towards patients who may have had a worse clinical outcome because of depression and not necessarily the pain resulting from the PPB condition." Pages 6 and 7 – "The present study has several limitations. Firstly, the fact that it was a retrospective study is in itself a

			limitation. (…) Secondly, the relatively small size of both groups may limit the interpretation of the results, even though we believe it is a valid sample for comparison. Thirdly, due to the COVID-19 pandemic, we had to perform a questionnaire via telephone, rather than applying it in person (…) we should also acknowledge that the variability inherent to different surgical teams and techniques, as well as different types of prosthesis used may also play a role on the obtained results."
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 5 – "This is an interesting finding as these results are divergent with similar studies encompassing different patient-reported outcome measures (…)" Page 6 – "A rather predictable result of the present research was the significantly higher presence of anterior knee pain in the PPB group, which can be expected as it is a characteristic symptom of this condition."
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 6 – "(…) we favored the analysis of the MCS and PCS partial components instead of the total value of the SF-12 due to the limitations inherent to its interpretation. Regarding the SF-36, it is established that the PCS and MCS partial scoring is extremely relevant, specifically in orthopedics, seeing as many patients score very low on the physical health domains because of their musculoskeletal condition, leading to a higher MCS (…)"
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Not applicable, since this study was not funded.

*Give information separately for cases and controls.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org.

JOURNAL OF ARTHROPLASTY

Official Journal of the American Association of Hip and Knee Surgeons

AUTHOR INFORMATION PACK

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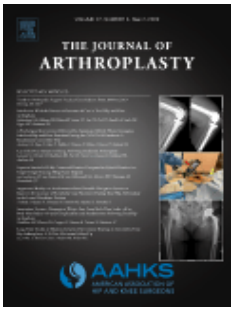

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The follow-up report should summarize the original study published in The Journal of Arthroplasty including patient population,type of reconstruction and type of series i.e., selected, unselected, consecutive. It is anticipated that the same assessment format would be utilized as in the previous report using generally accepted clinical grading systems for the knee and hip. Survivorship analysis is helpful and appropriate.

The follow-up report should include evolution of the population since the original study particularly in regard to patients lost for various reasons. At a minimum, the number and percentage of revisions should be included as well as additional complications. If survivorship analysis is utilized the follow-up report shouldi nclude revisions for aseptic loosening, revisions for any cause, and radiographic loosening.

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