


## THE IMPORTANCE OF AQUATIC PHYSICAL THERAPY IN THE PREVENTION OF GONARTHROSIS IN THE ELDERLY: A LITERATURE REVIEW

 <https://doi.org/10.56238/sevened2025.020-026>

**Jeisa Gnoatto Xavier<sup>1</sup>, Maria Eduarda de Souza Sorato<sup>2</sup>, Laura Bernardino Reynaldo<sup>3</sup>, Rayssa Cechella Fernandes<sup>4</sup>, Elaine Marques de Campos<sup>5</sup>, Heloísa Mendes dos Santos<sup>6</sup>, Luciane Taschetto<sup>7</sup> and Robson Pacheco<sup>8</sup>**

### ABSTRACT

This article addresses gonarthrosis in the elderly and highlights the importance of aquatic physical therapy in the management of this condition, especially in the context of primary health care. Gonarthrosis is a degenerative disease of the joints that mainly affects the elderly population, compromising their quality of life and functionality. This study is a narrative literature review, of an exploratory nature, with a qualitative approach. Articles published in the last eight years were analyzed. The review discusses the importance of aquatic physiotherapy in the treatment of gonarthrosis, emphasizing the promotion of mobility, pain relief, and prevention of complications in the elderly. The objective is to show how aquatic physiotherapy contributes to the comprehensive care of the elderly, highlighting the crucial role of physiotherapists in improving the quality of life of this population.

**Keywords:** Gonarthran. Elderly. Aquatic physiotherapy. Quality of life. Functionality, physiotherapists.

---

<sup>1</sup>Bachelor of Physiotherapy  
University of Southern Santa Catarina

<sup>2</sup>Bachelor of Physiotherapy  
University of Southern Santa Catarina

<sup>3</sup>Bachelor of Physiotherapy  
University of Southern Santa Catarina

<sup>4</sup>Bachelor of Physiotherapy  
University of Southern Santa Catarina

<sup>5</sup>Bachelor of Physiotherapy  
University of Southern Santa Catarina

<sup>6</sup>Bachelor of Physiotherapy  
University of Southern Santa Catarina

<sup>7</sup>Professor of the Bachelor's Degree in Physical Therapy  
University of Southern Santa Catarina de Criciúma

<sup>8</sup>Professor of the Bachelor's Degree in Physiotherapy  
University of Southern Santa Catarina

## INTRODUCTION

Aging is an intrinsic biological phenomenon that results in several structural and functional transformations in the human body. These changes, which manifest themselves from the third decade of life, include an increase in blood pressure, a decrease in muscle strength and range of motion, in addition to an increase in adipose tissue and the risk of chronic diseases (Candeloro & Caromano, 2007; Fibra et al., 2006). In this context, the promotion of active aging is fundamental, and the regular practice of physical exercise proves to be an effective strategy for preserving the functionality and independence of the elderly, in addition to facilitating socialization among peers (Ruoti, Morris & Cole, 2000).

Osteoarthritis, especially that affecting the knee, is one of the most prevalent conditions in the elderly population, causing pain, stiffness, and impaired mobility (Santos et al., 2020). The treatment of this pathology is essential, since gonarthrosis can lead to functional disability and reduced quality of life, and is recognized as one of the main causes of sickness benefit in Brazil. In this scenario, aquatic physical therapy stands out as a promising therapeutic approach. The physical properties of water, such as buoyancy and resistance, allow the performance of exercises that would be challenging or unfeasible on ground, providing pain relief, muscle strengthening, while minimizing the risk of injury (Facci, Marquetti & Coelho, 2007).

In addition, aquatic physical therapy not only improves joint function and reduces pain, but also contributes significantly to patients' self-confidence and psychological well-being (Souza et al., 2017). Studies show that this therapeutic modality is safe and effective in the rehabilitation of older adults with gonarthrosis, slowing the progression of the disease and promoting a better quality of life (Khruakhorn & Chiwarakranon, 2021). Therefore, aquatic rehabilitation becomes a crucial tool in the multidimensional approach to the treatment of gonarthrosis, recognizing the complexity and severity of this condition, which affects not only the physical health but also the social and emotional well-being of elderly individuals.

In view of the growing evidence on the benefits of aquatic physical therapy, it is essential to deepen research in this area, in order to consolidate its role in the management of gonarthrosis in the elderly and promote interventions that effectively improve the quality of life of this vulnerable population.

## METHODOLOGY

The methodology of this study consists of a literature review of the narrative type, with an exploratory focus and a qualitative approach. Data collection was carried out from

the following databases: Virtual Health Library (BIREME), PubMed, Lilacs and Scielo, using as keywords descriptors for aquatic physiotherapy and the prevention of gonarthrosis in the elderly.

The inclusion criteria were defined to encompass only articles that were available in full in the aforementioned databases and that were published in Brazilian Portuguese. For the analysis, a thematic approach was applied, allowing the identification, analysis and description of patterns, which made it possible to organize the information in a concise and comprehensive manner.

The selection of articles followed the keywords relevant to the theme, considering publications from the last 8 years. Studies that did not present a methodology aligned with the proposed focus or that were written in other languages were discarded from the review.

## RESULTS AND DISCUSSION

**Table 01:** Articles selected for literature review.

ARTICLE	YEAR	RESULT	MAGAZINE
<i>Aquatic Physiotherapy at Treatment of knee osteoarthritis in Elderly.</i>	2024	Aquatic physiotherapy is a safe and effective therapeutic option for the treatment of knee osteoarthritis in the elderly.	Science & Contemporaneity Journal Multidisciplinary Electronic Journal of Edufor College
<i>Aquatic Physical Therapy in Osteoarthritis of Elderly People: Literature Review.</i>	2023	Treatment participants showed improvements in gait speed, functionality, range of motion, muscle strength, and aerobic capacity, as well as reduced fat mass and pain.	Editora e-Publicar – Health Sciences: Innovation, research and popular demands, Volume 5.
<i>The benefit of Aquatic Physical Therapy in patients with knee osteoarthritis: Integrative Review.</i>	2022	It offers several benefits for the treatment of knee osteoarthritis, with improvement of pain in all cases studied, in addition to increased range of motion and improvement in quality of life.	Brazilian Journal of Health Review
<i>Benefits of Aquatic Physical Therapy in elderly people with knee osteoarthritis.</i>	2021	Aquatic Physical Therapy has demonstrated efficacy in treating and reducing patients' pain, enhancing rehabilitation by combining the physiological effects of water with movements and exercises.	Ibero-American Journal of Humanities, Sciences and Education. São Paulo, v.7.n.10.
<i>Influence of Aquatic Physical Therapy on the functional capacity of elderly women with knee osteoarthritis.</i>	2019	There was a significant improvement in their functional capacities.	Fisio Sale
<i>Comparison of conventional and aquatic physiotherapy approaches in knee osteoarthritis in pain and functionality.</i>	2018	Conventional physical therapy showed better results in pain perception and functionality.	UNIANDRADE Magazine

<i>Analysis of functional performance and balance in elderly patients with Gonarthrosis submitted to Aquatic Physical Therapy.</i>	2018	It has demonstrated efficacy in the treatment of gonarthrosis in the elderly, improving muscle performance, mobility and balance, although a long-term protocol may be necessary to achieve significant results in mobility.	CPAQV Magazine – Center for Advanced Research in Quality of Life
<i>Recovery of Functionality in the Elderly with Gonarthrosis and Coxoarthrosis, through Hydrokinesiotherapy: A Retrospective Study</i>	2016	Hydrokinesiotherapy is essential for the recovery, functionality and quality of life of elderly people with gonarthrosis and coxoarthrosis.	Multidisciplinary Scientific Journal Knowledge Center
<i>Aquatic Physiotherapy in the treatment of knee osteoarthrosis in the elderly.</i>	2016	Hydrotherapy is effective in the treatment of knee osteoarthritis, reducing pain and discomfort, improving gait balance, promoting quality of life, in addition to providing venous return, reducing edema and joint compression.	Luretano University Center of Palmas

Source: The authors.

In view of the reviewed studies, it was evident that Aquatic Physical Therapy is an effective therapeutic approach in the management of various musculoskeletal conditions, especially in elderly patients with gonarthrosis.

The studies analyzed highlight the multiple benefits of this modality, such as pain reduction, improved functionality, and increased quality of life for patients.

In this context, Mota, Silva and Medeiros (2024) carried out a descriptive and exploratory bibliographic study with the objective of investigating the effectiveness of Aquatic Physical Therapy in the treatment of Knee Osteoarthritis in the elderly. The literature review revealed that aquatic interventions, such as water cycling, land exercises combined with water activities, and high and low intensity programs, have been shown to be effective in treating this condition, providing substantial health benefits for elderly patients. Among the effects observed, the improvement in dynamic and static balance, the increase in muscle strength and flexibility, in addition to the significant improvement in the quality of life and functional capacity of the participants, stand out.

The reviewed studies indicate that by promoting these improvements, aquatic physical therapy facilitates the independence of older adults, allowing them to carry out their daily activities more efficiently. Given its safe and widely effective character, with strong scientific evidence in support of its positive impact on functional outcomes and mobility in the elderly, aquatic physical therapy is an essential therapeutic intervention and

should be considered a recommended approach in the management of knee osteoarthritis in the elderly (Mota, Silva & Medeiros, 2024).

Additionally, the review by Quirino, Silva, Ataide, Sousa, Bezerra, Bonaldo, Alves, Carvalho, and Santos (2023) corroborates the previously presented results, highlighting the efficacy of aquatic physiotherapy in the treatment of gonarthrosis. The authors observed significant improvements in several clinical parameters, such as functional capacity, pain reduction, increased range of motion, decreased fat mass, and improved gait speed and aerobic capacity.

However, underscore the shortage from studies than investigate further the application of aquatic physical therapy in elderly patients with knee osteoarthritis, representing an important gap in the literature. These results reinforce the evidence that aquatic physical therapy not only provides symptomatic relief, but also contributes substantially to the improvement of the physical and functional condition of the elderly with gonarthrosis, establishing itself as an essential therapeutic intervention in the management of the disease and in the promotion of a higher quality of life (Quirino, Silva, Ataide, Sousa, Bezerra, Bonaldo, Alves, Carvalho and Santos, 2023). In line with the review by Quirino, Silva, Ataide, Sousa, Bezerra, Bonaldo, Alves, Carvalho, and Santos (2023), the authors Pereira, Silva, Silva, Macena, Correa, Cavalcante, and Rodrigues (2022) observed, in their analysis of the reviewed studies, that osteoarthritis predominantly affects women in the age group of 30 to 79 years, with manifestations that can be unilateral or bilateral. The review included quantitative, randomized, and exploratory articles that addressed specific cases of the pathology. The authors highlighted that aquatic physical therapy offers several benefits in the treatment of knee osteoarthritis, evidencing a significant reduction in pain in all cases investigated. In addition, the results indicated an increase in range of motion and a general improvement in the quality of life of patients undergoing this therapeutic intervention (Pereira, Silva, Silva, Macena, Correa, Cavalcante and Rodrigues, 2022).

As pointed out by Pereira, Silva, Silva, Macena, Correa, Cavalcante, and Rodrigues (2022), aquatic physiotherapy has demonstrated efficacy in the treatment of knee osteoarthritis, improving the functionality of patients.

In this context, Modesto and Vieira (2021) also reinforce the effectiveness of the therapeutic approach in the treatment of knee osteoarthritis, with an emphasis on pain reduction and stress relief. According to the authors, the physical properties of water, such as buoyancy and resistance, play a key role in relieving tension and reducing anxiety for patients. This contributes to a greater sense of independence during aquatic exercises, as

well as promoting the renewal of self-esteem. By associating the physiological effects of water with therapeutic movements, the rehabilitation process is enhanced, providing not only physical relief but also psychological benefits. In this way, aquatic physiotherapy proves to be a complete therapeutic approach, with positive impacts on both functional recovery and the emotional well-being of elderly patients (Modesto and Vieira, 2021).

The results obtained by Silva Marques and Brito (2019) reinforce the evidence on the benefits of aquatic physiotherapy in the treatment of knee osteoarthritis, especially in the elderly. The study involved a group of women aged between

60 and 80 years old, all diagnosed with knee osteoarthritis, and observed a substantial improvement in the functional capacities of the participants after 10 sessions of aquatic physiotherapy.

For inclusion, restrictive criteria were adopted, such as the exclusion of women who had undergone surgical procedures on the lower limbs, who used mobility aids, or who had undergone physical therapy in the last three months. In addition, those with neurological dysfunctions that interfere with cognitive abilities or with contraindications to the practice of hydrotherapy were excluded. Initially, 15 women were evaluated, but only 6 met the inclusion criteria (Silva Marques and Brito, 2019).

Functional assessment was performed using specific tests, such as the 6-Minute Walk Test (6MWT), the Chair Lift Test (TUG) and the Berg Scale for balance. The results showed a significant improvement: the average distance covered in the 6MWT increased from  $294.83 \pm 74.16$  meters to  $372.33$

$\pm 82.73$  meters ( $p = 0.017$ ), the mean time of the TUG Test was reduced from  $11.66 \pm 2.88$  seconds to  $9.16 \pm 1.83$  seconds ( $p = 0.014$ ), and the mean score of the Berg Scale increased from  $45.66 \pm 6.77$  points to  $52.66 \pm 3.88$  points ( $p = 0.026$ ), (Silva Marques and Brito, 2019).

These findings indicate not only an increase in the mobility and locomotion capacity of the participants, but also an improvement in postural balance, which is essential for the prevention of falls. The research thus highlights the effectiveness of aquatic physiotherapy in the rehabilitation of elderly women with knee osteoarthritis, promoting significant functional gains. However, the authors emphasize that the small sample limits the generalization of the results, suggesting the need for further studies with larger samples to confirm and expand the conclusions obtained (Silva Marques & Brito, 2019).

Regarding the comparison between conventional and aquatic physiotherapy in the treatment of gonarthrosis, Trem, Matias, Malafaia, Kalil Filho and Kuretzki (2018) conducted a randomized, prospective, and covert study with 25 patients of both sexes, with



primary knee osteoarthritis and a mean age of 67.5 years, focusing on pain control and improved functionality.

The evaluation was performed using the visual analog pain scale (VAS) and the Lysholm questionnaire. The study demonstrated that the isolated application of kinesiotherapy in the conventional physiotherapy group did not result in a significant reduction in pain, but provided important improvements in functional quality, range of motion, and muscle strengthening (Trem, Matias, Malafaia, Kalil Filho, and Kuretzki, 2018).

In addition, the study showed that the combination of kinesiotherapy with gallium arsenide laser (AsGa) and manual therapy associated with pulsatile ultrasound had a positive impact on functional autonomy and relief of pain (Trem, Matias, Malafaia, Kalil Filho and Kuretzki, 2018).

In the post-intervention results, a significant reduction in pain perception was observed in the conventional physiotherapy group, with 35% of patients reporting moderate pain (VAS 3) and 30% with mild pain (VAS 4). In the aquatic physiotherapy group, it was observed that 40% of the patients had moderate pain (VAS 5), while 30% reported mild pain (VAS 6), also showing a significant improvement (Trem, Matias, Malafaia, Kalil Filho and Kuretzki, 2018).

Regarding functionality, in the Lysholm questionnaire, the conventional physiotherapy group showed a substantial improvement, before the intervention 9 patients were in the poor classification and after the intervention none patient remained in this classification. In the aquatic physiotherapy group, 75% of the patients were classified as regular, 15% good and 10% classified as poor, also showing gains in functionality. When compared, the results indicate that conventional physical therapy was more effective than aquatic physical therapy, especially with regard to pain reduction and improved functionality, according to the evaluations carried out by VAS and the Lysholm questionnaire (Trem, Matias, Malafaia, Kalil Filho & Kuretzki, 2018).

On the other hand, the study by Lemos, Pantoja, Brito, França, Cardoso & Dias (2018) focused on the application of aquatic physiotherapy in elderly people with gonarthrosis, analyzing aspects such as muscle performance, mobility and balance. The results of muscle performance, assessed using the timed sit-and-stand test (TSL), revealed a substantial increase in the mean number of repetitions performed in 30 seconds, which went from 6.9 repetitions in the initial assessment to 11.4 repetitions after the intervention, with a statistically significant difference ( $p < 0.0001$ ). This finding suggests that aquatic physical therapy may be an important factor in improving the muscular functional capacity of the elderly, allowing greater endurance during the execution of motor tasks.

Regarding mobility, measured by the Timed Up and Go (TUG) test, a reduction in the mean execution time from 15.5 to 13.8 seconds after treatment was observed; however, this change points to the need for a longer or more intense protocol to obtain more significant results in this variable (Lemos, Pantoja, Brito, França, Cardoso & Dias, 2018).

Regarding balance, the participants initially presented a moderate risk of falls, with an average of 20.8 points, but at the end of the program, there was a significant increase in the average to 25 points, resulting in a low risk of falls (Lemos, Pantoja, Brito, França, Cardoso & Dias, 2018).

The study sample had a mean age of 65.4 years, with a predominance of females, which raises questions about the hormonal effects in relation to the disease, given that the literature indicates that estrogen replacement can both contribute to the progression of osteoarthritis and exert a protective effect, depending on the context (Lemos, Pantoja, Brito, França, Cardoso & Dias, 2018).

After menopause, there is a reduction in estrogen levels, which contributes to the loss of approximately 1% of bone mass per year, with a decrease of about 25% in muscle strength over five years, thus characterizing menopause as a risk factor for osteoarthritis and also for osteoporosis (Lemos, Pantoja, Brito, França, Cardoso & Dias, 2018).

The research points out that hydrokinesiotherapy has proven to be effective in promoting the recovery of muscle performance and balance, due to the benefits of aquatic practice, which minimizes joint impacts, facilitates blood circulation and allows exercises to be performed with greater intensity without overloading the joints. However, the authors suggest that, in order to observe significant improvements in mobility, a longer protocol may be necessary (Lemos, Pantoja, Brito, França, Cardoso & Dias, 2018).

The retrospective analysis through a literature review by Rodrigues, Almeida, Custódio, Farias, Carvalho and Oliveira (2016) complements this view by highlighting the efficacy of hydrokinesiotherapy in the treatment of elderly people with gonarthrosis and coxoarthrosis, conditions that compromise the functionality and QoL of the elderly.

The reviewed articles show that hydrokinesiotherapy has established itself as one of the most effective therapeutic approaches to relieve the symptoms of these joint diseases, promoting substantial improvements in mobility, muscle strengthening, and pain reduction (Rodrigues, Almeida, Custódio, Farias, Carvalho, and Oliveira, 2016).

In addition, the technique contributes to the maintenance or recovery of functional independence, one of the main objectives in the treatment of the elderly. Although the literature is mostly favorable, some studies point to the need for more detailed and



controlled protocols to optimize their application (Rodrigues, Almeida, Custódio, Farias, Carvalho and Oliveira, 2016).

Therefore, it is concluded that hydrokinesiotherapy, when applied appropriately and if necessary, associated with other therapeutic approaches, is highly effective in the treatment of elderly patients with gonarthrosis and coxoarthrosis, providing significant improvements in the functionality and QoL of these patients.

The results reinforce the importance of the technique, which, if well directed, can result in lasting and sustainable benefits for the health and well-being of the elderly (Rodrigues, Almeida, Custódio, Farias, Carvalho and Oliveira, 2016).

In this context, Neves and Gonçalves (2016) corroborate these findings, pointing out that hydrotherapy is effective in the treatment of knee osteoarthritis, promoting benefits such as reduced pain and discomfort, as well as improved balance and gait, factors that positively impact the quality of life of individuals affected by the pathology.

The authors also point out that the properties of water, associated with kinesiotherapy, favor the increase of venous return, contributing to the reduction of edema and the elimination of substances such as lactate, in addition to reducing compression in the joints (Neves and Gonçalves, 2016).

In addition, hydrotherapy provides improvements in flexibility, overall motor coordination, gait and standing facilitation, and muscle strengthening. Neves and Gonçalves (2016) emphasize that the effects of hydrotherapy are not restricted to rehabilitation, but also include the prevention of atrophies and deformities, delay the progression of the disease, stimulate balance and proprioception, and reduce muscle spasms, thus being a valuable resource to promote the functional independence of patients and facilitate the performance of daily activities, especially the march (Neves and Gonçalves, 2016).

In summary, the reviewed studies indicate that aquatic physical therapy is an effective approach in the treatment of gonarthrosis, promoting significant benefits in motor functionality and improving the quality of life of elderly patients. Despite the consistency of the results found, the limitation of studies with larger samples and the lack of direct comparisons with other therapeutic modalities reinforce the need for further research to consolidate the evidence on its effectiveness.

## FINAL CONSIDERATIONS

The reviewed studies confirm the effectiveness of aquatic physical therapy in the treatment of knee osteoarthritis, especially in the elderly. The results demonstrate that this therapeutic modality contributes significantly to pain reduction, improved mobility, increased balance and muscle strengthening, in addition to promoting a positive impact on the quality of life of patients. The characteristics of water, such as buoyancy and resistance, offer a safe and low-impact environment, allowing the elderly to perform exercises with greater comfort and safety, which facilitates adherence and continuity of treatment.

The analysis of the studies also highlights the importance of aquatic physical therapy in promoting functional independence in the elderly, providing them with greater autonomy in daily activities and reducing the risk of falls. The combination of physical benefits with psychological effects, such as reduced anxiety and increased self-esteem, makes aquatic physical therapy a comprehensive therapeutic intervention, which favors both physical recovery and emotional well-being of patients.

However, despite the promising results, there are still important limitations in the studies reviewed, such as the small sample size and the lack of direct comparisons with other therapeutic approaches, such as conventional physiotherapy. Such gaps reinforce the need for more controlled research with larger sample sizes to more robustly assess the benefits of aquatic physical therapy compared to other modalities. Conducting more in-depth studies with more rigorous protocols will strengthen the evidence on the efficacy and best ways to apply this therapeutic intervention.

Therefore, aquatic physical therapy is consolidated as a promising therapeutic strategy for the treatment of knee osteoarthritis in the elderly, offering not only symptomatic relief, but also functional and psychological improvements. However, continued research is essential to improve interventions, optimize treatment protocols, and ensure that aquatic physical therapy is used even more effectively in the care of this population.

## REFERENCES

1. Lemos, J. do S. de P., Pantoja, S. L., Brito, A. J. C., França, I. C. O., Cardoso, B. A., & Dias, G. A. da S. (2018). Análise do desempenho funcional e equilíbrio em idosos com gonartrose submetidos a fisioterapia aquática. *Revista CPAQV – Centro de Pesquisas Avançadas em Qualidade de Vida*, 10(2). <https://revista.cpaqv.org/index.php/CPAQV/article/view/264>
2. Modesto, B. dos S., & Vieira, K. V. S. (2021). Benefícios da fisioterapia aquática em idosos com osteoartrose de joelho. *Revista Ibero-Americana de Humanidades, Ciências e Educação*, 7(10), 1593–1603. <https://doi.org/10.51891/rease.v7i10.2612>
3. Mota, K. R., Silva, R. A., & Medeiros, T. C. F. (2024). Fisioterapia aquática no tratamento da osteoartrose de joelho em idosos. *Revista Ciência & Contemporaneidade: Revista Eletrônica Multidisciplinar da Faculdade Edufor*, 1(1). <https://saoluis.edufor.edu.br/uploads/artigos/2024/06/fisioterapia-aquatica-no-tratamento-da-osteorartrose-de-joelho-em-idosos.pdf>
4. Neves, F. da S., & Gonçalves, L. F. (2016). Fisioterapia aquática no tratamento da osteoartrose de joelho em idosos [Trabalho acadêmico, Centro Universitário Luterano de Palmas].
5. Pereira, L. R. da S., Silva, M. K. S. da, Macena, P., Correa, C. dos S., Cavalcante, V. F., & Rodrigues, J. S. (2022). O benefício da fisioterapia aquática em pacientes com osteoartrose do joelho: Revisão integrativa. *Brazilian Journal of Health Review*, 5(6), 22537–22549. <https://doi.org/10.22533/at.ed.772256221109>
6. Quirino, I. C. A., Silva, C. A. da, Ataiades, V. de M., Sousa, I. B. P., Bezerra, A. R., Bonaldo, G. L., Carvalho, C. L., & Santos, L. O. dos. (2023). Fisioterapia aquática na osteoartrite de pessoas idosas: Revisão da literatura. *Ciências da Saúde: Inovação, Pesquisa e Demandas Populares*, 5, 1–10. <https://editorapublicar.com.br/ojs/index.php/publicacoes/article/view/456>
7. Rodrigues, W. C. C., Almeida, F. R. da C. de, Custódio, T. O. M. P., Farias, L. S. F. de F., Carvalho, A. de L., & Oliveira, E. de. (2016). Recuperação da funcionalidade do idoso com gonartrose e coxoartrose, por meio da hidrocinestoterapia: Um estudo retrospectivo. *Revista Científica Multidisciplinar Núcleo do Conhecimento*. <https://d1wqtxts1xzle7.cloudfront.net/90305675/idoso-com-gonartrose-e-coxoartrose-libre.pdf>
8. Silva, D. M. da, Silva Marques, M. C. da, & Brito, M. A. P. (2019). Influência da fisioterapia aquática na capacidade funcional de idosas com osteoartrose de joelho. *Fisio Sale*. <https://fisiosale.com.br/wp/wp-content/uploads/2019/02/Influ%C3%Aancia-da-fisioterapia-aqu%C3%A1tica-na-capacidade-funcional-de-idosas-com-osteoartrose-de-joelho.pdf>
9. Trem, C. J., Matias, J. E. F., Malafaia, O., Kalil Filho, F. A., & Kuretzki, C. H. (2018). Comparação das abordagens da fisioterapia convencional e aquática na osteoartrite de joelho na dor e funcionalidade. *Revista UNIANDRADE*, 19(2), 115–126. <https://revistahom.uniandrade.br/index.php/revistauniandrade/article/view/938>