BRAIN. Broad Research in Artificial Intelligence and Neuroscience
ISSN: 2068-0473 | e-ISSN: 2067-3957
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2024, Volume 15, Issue 2, pages: 414-426 | https://doi.org/10.18662/brain/15.2/583
Submitted: April 3th, 2024 | *Accepted for publication:* May 10th, 2024

Medical Rehabilitation as a Pillar of Quality of Life: A Bibliometric Mapping of Contemporary Research

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Abstract: *The present study aims to map the current field of research through a bibliometric analysis focusing on the concept of Quality of Life in Older People, taking Physical Medicine and Rehabilitation as a starting point. The methodology is based on the use of mathematical and statistical methods to analyze the scientific activity in the Scopus database over the period 2020-2023, identifying key publications, influential authors and thematic connections through keywords and co-citations. Filtering was performed by subject area, publication period and language of papers, resulting in 711 articles out of the original 2,272. The research focuses on identifying thematic clusters and the connections between them, with the main objective of decoding the relationships between various topics and their degree of centrality in the discussion on improving quality of life among older people. The results highlight areas of main interest as well as those niches less explored, opening perspectives for future research. This provides answers to the questions: which research themes are predominantly associated with quality of life through the lens of physical medicine and rehabilitation, and how these sub-themes interconnect in the research network.*

Keywords: *older people; medical rehabilitation; quality of life; physical medicine; bibliometric analysis.*

How to cite: Vancea, A., Aivaz, K.-A., & Spiru, L. (2024). Medical rehabilitation as a pillar of quality of life: a bibliometric mapping of contemporary research. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 15*(2), 414-426. https://doi.org/10.18662/brain/15.2/583

Introduction

Today, quality of life for older people is a barometer of human development and the effectiveness of health systems. Physical medicine and rehabilitation are emerging as vital areas in supporting this demographic segment, contributing significantly to improving well-being and promoting autonomy (Phraknoi et al., 2023). This study therefore brings to the fore a bibliometric analysis of contemporary research, providing a map of current trends and relationships between different areas of study. This investigation serves as an essential tool for health professionals, policy makers and researchers interested in optimizing intervention and support strategies for older people. Our study shows promise not only to assess the current state of research, but also to identify knowledge gaps and potential directions for future research, thereby helping to inform holistically integrated, age-centred approaches.

Bibliometric analysis is based on mathematical and statistical methods, in order to assess scientific activity in a certain area of study due to its ability to create and display bibliometric networks based on publications, researchers, keywords, references, co-citations, and connections between authors (Aivaz et al., 2024). Bibliometric programs facilitate the representation and advanced interpretation of data through a visual method, useful in creating keyword maps and examining clusters of these terms. Grouping terms emphasizes the thematic connections between them, showing us which words are often used together. Cluster analysis can also uncover sub-categories or specializations within a field, with the most frequent terms or those associated with frequently read works seen as being essential. Less explored areas can also be identified, suggesting possible avenues for further research.

This bibliometric analysis regarding the Quality of Life in Older Adults through Physical Medicine and Rehabilitation provides a broad perspective over a 3-year period (2020-2023), and it deals with published works on this topic selected according to 2 keywords: quality of life, physical medicine, and rehabilitation, recorded in the Scopus databas

Thus, the selected studies will provide an answer to the following questions:

Q1 - Which research topics are most closely related to Quality of Life in Older Adults through Physical Medicine and Rehabilitation?

Q2 - How are the secondary themes related to Quality of Life in Older Adults through Physical Medicine and Rehabilitation connected within the research networks?

The research also established certain limitations within the analysis: subject area (medicine, health professions, neuroscience, psychology, social science, pharmacology, immunology, arts, and humanities, multidisciplinary), publication period (2020-2023) and publication language (English). Thus, from 2,272 articles selected from the SCOPUS database, 711 articles resulted after applying the above-mentioned filters. Additionally, for the creation of graphic representations, we established, as a limiting factor, a minimum of 5 occurrences of a keyword. Thus, we obtained 1,556 co-occurrences, with only 96 keywords passing the occurrence number threshold.

Findings

To identify the links and clusters, we selected the first 30 keywords, words which had the strongest connections with the chosen topic. Links refer to the co-occurrence between one element (e.g. a keyword) and another, and the total strength of the link corresponds to the total number of references cited between one element and the others. Occurrences are also the number of articles in which the keyword was found. The keywords with the highest co-occurrences are presented in Table 1.

Table 1. The keywords with the highest co-occurrences

Create Map				Create Map			
Keywords	Selected	Occurrences	Total link strength	Keywords	Selected	Occurrences	Total link strength
cardiac rehabilitation	√	19	18	musculoskeletal disorders	√	17	34
clinical trials	√	16	26	osteoarthritis	√	12	23
complementary medicine	√	12	15	pain	√	19	24
covid-19	√	30	30	pain management	√	12	25
depression	√	16	18	physical activity	√	25	26
exercise	√	49	70	physical therapy	√	27	34
geriatric medicine	√	20	32	physical therapy modalities	√	16	22
knee	√	18	34	physiotherapy	√	20	29
musculoskeletal disorders	√	17	34	primary care	√	16	28
osteoarthritis	√	12	23	protocols & guidelines	√	10	22
pain	√	19	24	public health	√	25	43

pain management	√	12	25	pulmonary rehabilitation	√	16	17
physical activity	√	25	26	qualitative research	√	13	19
physical therapy	√	27	34	quality of life	√	72	85
physical therapy modalities	√	16	22	randomized controlled trail	√	10	17
physiotherapy	√	20	29	rehabilitation	√	125	124
primary care	√	16	28	rehabilitation medicine	√	178	202
protocols & guidelines	√	10	22	rheumatology	√	13	25
public health	√	25	43	sports medicine	√	26	36
pulmonary rehabilitation	√	16	17	stroke	√	29	30
qualitative research	√	13	19	systematic review	√	15	15
quality of life	√	72	85	telemedicine	√	16	27

As we can see in Figure 1, the co-occurrences of the keywords were also illustrated with the help of a network visualization. The 1,556 keywords which are related to quality of life, physical medicine and rehabilitation formed 4 clusters: group 1 (red), group 2 (green), group 3 (blue) and group 4 (yellow).

The importance of circles and texts in each group represents the strength of their co-occurrence with the other keywords, whereas the distance between the elements and the lines connecting them show the links and interdependencies of the keywords. In addition to this, the keywords in each group were examined in order to establish the thematic distinction of the group based on the distinctive topic of the respective keywords.

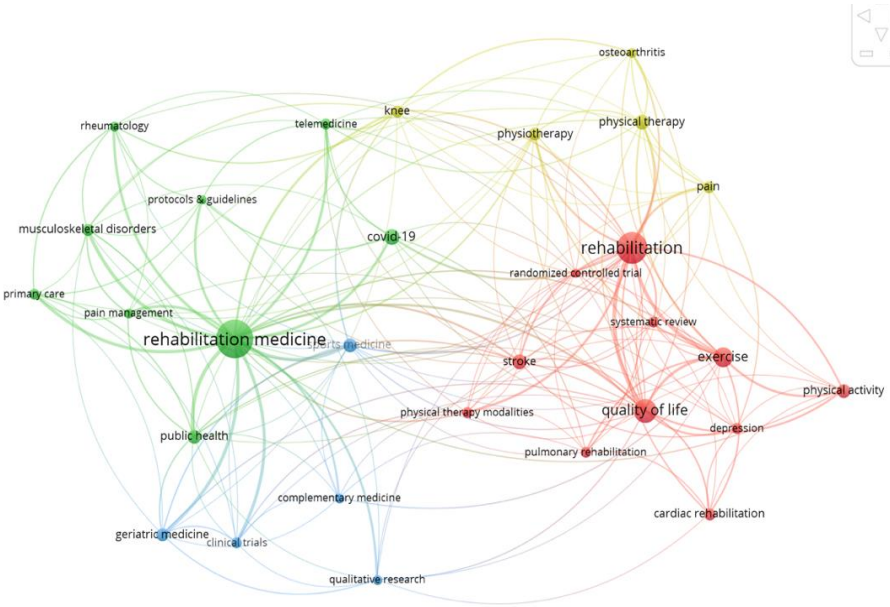

Figure 1. Co-occurrence of the keywords: quality of life, physical medicine and rehabilitation

Cluster 1 (red), shown in Figure 2, consists of the keywords: cardiac rehabilitation (18), depression (18), exercise (70), physical activity (26), physical therapy modalities (22), pulmonary rehabilitation (17), quality of life (85), randomized controlled trial (17), rehabilitation (124), stroke (30), systematic review (15).

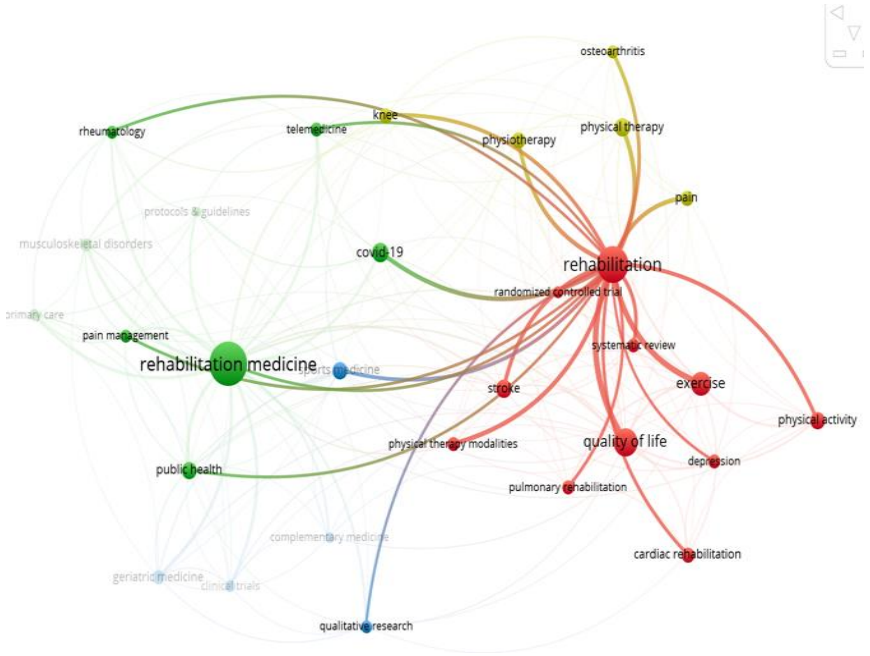

Figure 2 Cluster 1 (red)

Improving quality of life among the older people is a major priority in the field of medicine. At the center of our research lies the concept of *rehabilitation*, which includes cardiac rehabilitation and pulmonary rehabilitation. These types of rehabilitation are essential for people who have suffered events such as heart attacks or lung conditions, but also for those who have suffered a stroke (Bloom & Luca, 2016). After such an event, the patient may experience symptoms such as motor disorders (for example, paresis), coordination and balance disorders, depression, as well as cognitive disorders which can be alleviated through physical therapy and regular exercise (kinesiotherapy) (Pain et al., 1998; Piravej et al., 2014). Kinesiotherapy is an essential component of rehabilitation. By increasing mobility and strength, and by correcting the gait, they can help prevent falls and improve cognitive function. Furthermore, physical therapy modalities can be customized in order to fit the individual needs of each patient, thus providing a comprehensive and integrated treatment (Vanleerberghe et al., 2017; Borglin et al., 2005). Another important aspect tackled in our research is the use of randomized controlled trials and systematic reviews (de Groot et al., 2003; Lam, 2010). Through these methods, researchers can assess the effectiveness of different types of physical therapy and determine the best approaches for improving quality of life in older adults.

Cluster 2 (green), as shown in Figure 3, consists of the keywords: rehabilitation medicine, covid-19, musculoskeletal disorders, protocols guidelines, rheumatology, public health, rehabilitation medicine, pain management, primary care, telemedicine.

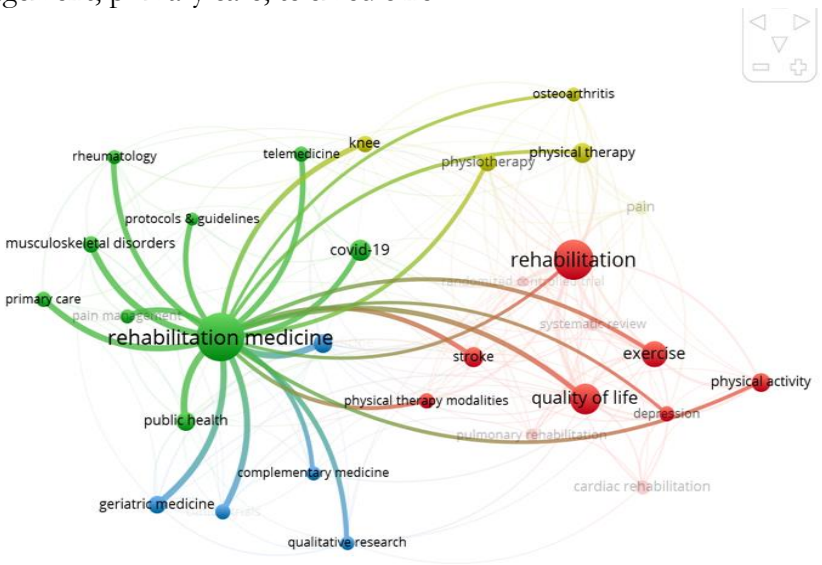

Figure 3 Cluster 2 (green)

In an era marked by the challenges brought by the COVID-19 pandemic, medicine and public health have been at the center of global attention (Nhu et al., 2023). In this context, elderly care has become an essential concern, considering the vulnerability of this category of people. For this reason, our research brings to the fore the specific needs of this category of population. Musculoskeletal disorders are a major source of pain and discomfort for the elderly, drawing attention to the need for effective pain management (Maccarone, 2024). Within rheumatology, the study of inflammatory diseases affecting joints and soft tissues is essential to provide appropriate treatment and rehabilitation. Moreover, primary care and rehabilitation medicine deal with the diagnosis, treatment, and prevention of complications associated with these conditions. Guidelines and treatment protocols have been adapted to meet the needs of the patients during these difficult times. In the context of the restrictions brought by COVID-19, telemedicine has provided a safe and effective alternative to medical consultations, allowing patients to benefit from the necessary care without exposing themselves to the risks associated with physical travel. In addition to this, the focus on preventing falls and tackling cognitive frailty are

particularly important for the elderly. Interdisciplinary approaches, which combine expertise in the fields of rheumatology, rehabilitation medicine and primary care, are essential to ensure a high standard of care and to improve quality of life (Kozicka et al., 2022).

Cluster 3 (blue), as shown in Figure 4, consists of the keywords: clinical trials, complementary medicine, geriatric medicine, qualitative research, sports medicine.

Considering the increase in life expectancy and the complexity of the needs associated with the third age, the care of the elderly has become a priority, our research emphasizing the methods of treatment and rehabilitation which can contribute to a better life for the senior citizens. Clinical studies are the basis of any innovation in medicine (Kang et al., 2010). They test the effectiveness and safety of new treatments and therapies. Through them, it was possible to assess the effectiveness of various rehabilitation methods in geriatrics, the specialty which deals with the prevention, diagnosis, and treatment of diseases specific to the third age. Complementary medicine supports conventional medicine, offering additional therapeutic solutions to support the patient's recovery and well-being. Within qualitative research, the aim is to understand the patients' perceptions and experiences, thus contributing to the personalization of therapeutic approaches and their adaptation to the individual needs of each person. In addition to this, sports medicine can offer valuable solutions for the elderly, because regular physical activity, adapted to each person's capabilities, is essential for maintaining mobility, muscle strength and balance. A personalized exercise regimen can prevent falls and boost cognitive function (Shevelkova, 2023).

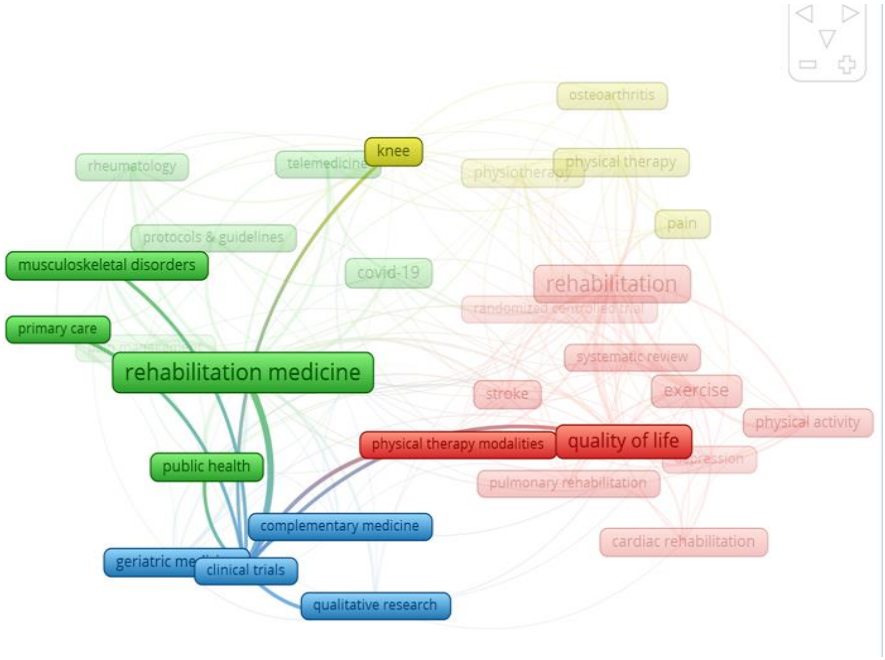

Figure 4. Cluster 3 (blue)

Cluster 4 (yellow), as shown in Figure 5, consists of the keywords: knee, osteoarthritis, pain, physical therapy, psychotherapy.

Osteoarthritis, a degenerative joint disease, is one of the main causes of pain and immobility in the elderly, with a significant impact on the quality of life. One of the most affected joints is the knee, where pain and stiffness can limit movement and contribute to the risk of falling.

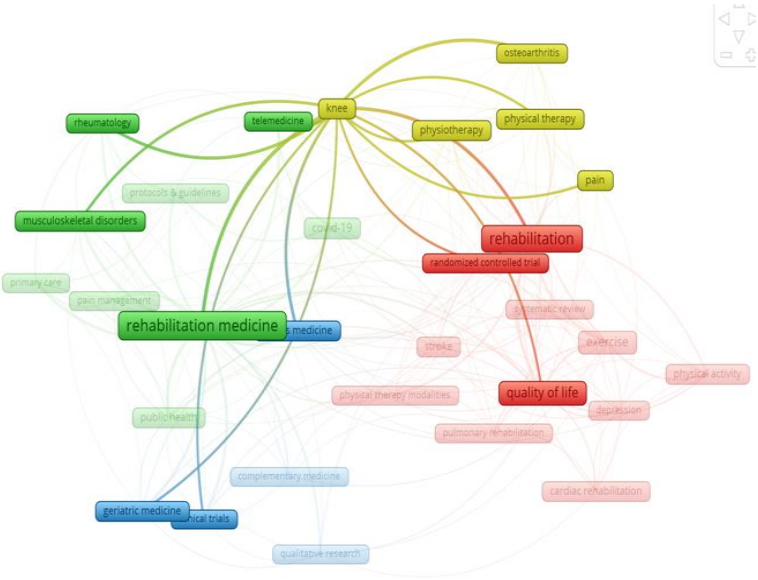

Figure 5. Cluster 4 (yellow)

Physical therapy plays an essential role in the treatment of knee osteoarthritis. Through specialized exercises and mobilization techniques, physical therapy aims to alleviate pain, increase mobility, and tone the muscles which are providing support to the joint, thus reducing pressure on the joint and reducing the risk of falling. Furthermore, chronic pain, such as the one caused by the osteoarthritis of the knee, can have profound effects on the emotional and psychological state of the patients (Bloom, 2022). Thus, integrating psychotherapy into the treatment plan can provide support and tools for managing pain and its associated emotional impact. Psychotherapy helps patients understand the connection between body and mind, recognize and express their emotions, and develop effective coping strategies. Therefore, the integrated approach, combining physical therapy with psychotherapy, can provide an effective solution for relieving the symptoms of knee osteoarthritis, promoting an active life and a good quality of life for the elderly (Nhu et al., 2023). This holistic approach contributes not only to the recovery of the functionality of the joint, but also to the increase in psychological resilience in the face of challenges associated with age.

Conclusions

Our research findings highlight the complex interdependence between different aspects of medical rehabilitation and quality of life in older people. Through analysis of the four clusters, the study identified central and

secondary themes, highlighting the importance of multidisciplinary and personalized approaches.

In the red cluster, the relevance of cardiac and pulmonary rehabilitation therapies, in the context of cardiovascular and respiratory events, is shown, with a strong focus on kinesiotherapy and the adaptability of therapeutic protocols to improve functionality and psychological status. Also, the use of randomized controlled trials and systematic reviews emphasizes the ongoing effort to evaluate and optimize rehabilitation interventions.

The Green Cluster opens a perspective on the challenges posed by the COVID-19 pandemic, highlighting the role of rehabilitation medicine and public health in the management of musculoskeletal conditions and pain, as well as the adaptation of health services through telemedicine. The importance of falls prevention and interdisciplinary approaches is highlighted, reflecting the need for a high standard of care.

The blue cluster illustrates the vitality of clinical trials and complementary medicine in geriatrics, as well as the role of qualitative research and sports medicine in maintaining mobility and balance, highlighting the importance of regular personalized physical activity.

Finally, the yellow cluster highlights the impact of osteoarthritis on mobility and quality of life, highlighting the role of physical therapy and psychotherapy in treating symptoms and increasing psychological resilience.

The integration of these perspectives, as demonstrated in this study, significantly enhances the comprehensive and holistic approach to medical rehabilitation, highlighting an optimized way forward to support quality of life in older people. This suggests a clear direction for future research and practice in the field, with a focus on innovative and collaborative approaches aimed at improving the well-being of older people.

References

Aivaz, K. A., Florea, I. O., & Munteanu, I. (2024). Economic fraud and associated risks: An integrated bibliometric analysis approach. Risks, 12(5), 74. https://doi.org/10.3390/risks12050074

Bloom, D. (November 15th, 2022). Healthy ageing for a healthy economy. VOXEU. https://cepr.org/voxeu/columns/healthy-ageing-healthy-economy

Bloom, D. E., & Luca, D. L. (2016). The global demography of aging: facts, explanations, future. In J., Piggott, A., Woodland (eds.). Handbook of the economics of population aging (Vol. 1, pp. 3-56). North-Holland.https://doi.org/10.1016/bs.hespa.2016.06.002

Borglin, G., Edberg, A.-K. and Rahm Hallberg, I. (2005) The experience of quality of life among older people. Journal of Aging Studies, 19, 201-220. https://doi.org/10.1016/j.jaging.2004.04.001

de Groot, V., Beckerman, H., Lankhorst, G. J., & Bouter, L. M. (2003). How to measure comorbidity. a critical review of available methods. Journal of clinical epidemiology, 56(3), 221–229. https://doi.org/10.1016/s0895-4356(02)00585-1

Kang, J. H., Chen, Y. H., & Lin, H. C. (2010). Comorbidity profiles among patients with ankylosing spondylitis: a nationwide population-based study. Annals of the rheumatic diseases, 69(6), 1165–1168. https://doi.org/10.1136/ard.2009.116178

Kozicka, I., Guligowska, A., Chrobak-Bień, J., Czyżewska, K., Doroba, N., Ignaczak, A., Machała, A., Spałka, E., Kostka, T., & Borowiak, E. (2022). Factors Determining the Occurrence of Frailty Syndrome in Hospitalized Older Patients. International journal of environmental research and public health, 19(19), 12769. https://doi.org/10.3390/ijerph191912769

Lam, C.L.K. (2010). Subjective Quality of Life Measures – General Principles and Concepts. In V.R., Preedy, R.R. , Watson (eds) Handbook of Disease Burdens and Quality of Life Measures. (pp: 381–399).Springer, https://doi.org/10.1007/978-0-387-78665-0_21

Maccarone, M. C., Coraci, D., Regazzo, G., Sarandria, N., Scanu, A., & Masiero, S. (2024). Evolution of musculoskeletal symptoms in Long COVID syndrome: a lexical analysis to approach requirements for an interdisciplinary management. Joint bone spine, 91(1), 105623. https://doi.org/10.1016/j.jbspin.2023.105623

Nhu, N. T., Kang, J. H., Yeh, T. S., Wu, C. C., Tsai, C. Y., Piravej, K., & Lam, C. (2023). Prediction of posttraumatic functional recovery in middle-aged and older patients through dynamic ensemble selection modeling. Frontiers in public health, 11, 1164820. https://doi.org/10.3389/fpubh.2023.1164820

Pain, K., Dunn, M., Anderson, G., Darrah, J., & Kratochvil, M. (1998). Quality of Life: What Does it Mean in Rehabilitation? The Journal of Rehabilitation, 64(2), 5–11.

Phraknoi, N., Sutanto, J., Hu, Y., Goh, Y. S., & Lee, C. E. (2023). Older People's Needs in Urban Disaster Response: A Systematic Literature Review. International Journal of Disaster Risk Reduction, 96, Article 103809. https://doi.org/10.1016/j.ijdrr.2023.103809

Piravej, K., Konjen, N., Cowintaveewat, V., Kuptniratsaikul, V., & Kuptniratsaikul, P. S. A. (2014). Early interdisciplinary intensive rehabilitation significantly improves the quality of life of stroke survivors: a multi-center study. Asian Biomedicine, 8(1), 87-95.

Shevelkova, V., Mattocks, C., Lafortune, L. (2023). Efforts to address the Sustainable Development Goals in older populations: a scoping review. BMC Public Health 23, 456 https://doi.org/10.1186/s12889-023-15308-4

Vanleerberghe, P., De Witte, N., Claes, C., Schalock, R. L., & Verté, D. (2017). The quality of life of older people aging in place: a literature review. Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation, 26(11), 2899–2907. https://doi.org/10.1007/s11136-017-1651-0