



## Quality of Life After Total Hip Arthroplasty (THA) in Postoperative Patients- Systematic Review

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### Abstract

**Objectives:** This systematic review studied current updates to the literature on patients with osteoarthritis (OA) who underwent total hip arthroplasty (THA) to improve their quality of life (QoL). We also looked into the reported interventions that could enhance postoperative recovery.

**Methodology:** PubMed, Web of Science, Science Direct, EBSCO, Wiley, and Cochrane Library were searched. Study articles were screened by title and abstract using Rayyan QCRI then a full-text assessment was implemented.

**Results:** A total of Twenty- nine studies with 74664 patients were included in this review. The follow-up duration ranged from 3 months to 96 months. All of the included studies reported improved QoL of OA patients following THA. One study reported that underweight, overweight, or obese (classes I to III) experienced more hip pain after THA. Two other studies reported that continuous nursing (CN) counted on the WeChat platform and IARA intervention significantly enhanced the QoL among patients.

**Conclusion:** enhancing patients' physical and mental health after THA is essential for improving recovery and patient QoL. Underweight, overweight, or obese experienced more hip pain after THA. Interventions such as CN counted on WeChat and IARA were found to greatly impact patients' recovery and well-being after discharge.

**Keywords:** Total Hip Arthroplasty; Quality of Life; Osteoarthritis; Systematic Review

### Introduction

THA has developed into a frequent operation for patients with advanced OA of the hip to restore function, relieve and enhance pain, and improve QoL, with over one million procedures performed annually globally [1]. In the near to mid-term future, it is anticipated that there will be an increase in the number of procedures performed each year due to the aging population in many industrialized countries [2-4].

The outcome of this surgery could be influenced by a number of variables, including the patient's personal information, prior operations, surgical methods, and implant kinds. Some of these still have to do with the surgeon's preoperative planning and his capacity to replicate his preoperative templates while doing surgery [5].

Patients with end-stage OA elect to get THA to do so with the intention that it will improve their QoL both functionally and generally afterward. The results of this study may be used to moderate patients' reasonable expectations for a short-term improvement in QoL. Superior mid- to long-term QoL following THA has been shown by follow-up studies and meta-analyses analyzing patient-reported outcome measures (PROMs), particularly in the physical well-being domains [6,7].

While the surgical and technical components of THA outcome assessment have previously received the majority of attention, there is a movement in outcome research to give patient-centered outcomes more attention [8]. PROMs are being used more and more in orthopedic research, although there is still no established

gold standard for these metrics [9]. The 36-Item Short Form Survey (SF-36) is a frequently used PROM to evaluate patients' health-related QoL (HRQoL) following THAs. It analyses the QoL across eight domains and yields two component summary scores: mental (MCS) and physical (PCS) well-being [10].

The average age of THA in affluent nations has remained at 70 years despite the aging population [11]. Increasing life expectancy will enable more patients to maintain their implants for longer, especially when combined with high long-term patient and prosthesis survival. Additionally, more young patients are having surgery, with 20% of procedures being performed on individuals under the age of 60 [12,13]. These elements highlight the requirement to examine HRQoL beyond the initial postoperative phase. Effective resource use also requires a thorough analysis of surgical outcomes [14].

This systematic review investigated the updates on recently published literature regarding the QoL following THA among patients with OA. We also studied the reported interventions that may improve postoperative QoL.

## Methodology

This systematic review was conducted in accordance with accepted standards (Preferred Reporting Items for Systematic Reviews and Meta-Analyses, PRISMA).

### Study Design

Systematic Review.

### Study duration

Between January 2022 to February 2023.

### Search strategy

A thorough search of six major databases, including PubMed, Web of Science, Science Direct, EBSCO, Wiley, and Cochrane Library, was done to find the relevant literature. We restricted our search to English and took into account the unique requirements of each database. The following keywords were converted into PubMed Mesh terms and used to find the relevant studies; "Total hip arthroplasty," "Quality of life," "Health-related quality of life," "Patient-reported outcome measures," and "Psychological and physical outcomes." The Boolean operators "OR" and "AND" were used to match the required keywords. Publications with full English text, available free articles, and human trials were among the search results.

## Selection criteria

We considered the following criteria for inclusion in this review.

- THA as a primary procedure.
- OA as a primary indication for the procedure.
- Postoperative outcomes regarding the patients' QoL.
- Adult patients older than 18 years.
- Recent study articles published between 2016 to 2022.
- English language.
- Free accessible articles.

## Exclusion criteria

Studies were excluded according to the following items:

- Poor qualified studies according to critical appraisal skills program (CASP) forms.
- Case series, case report and meta-analysis.
- Any study conducted before 2016.
- The study done in patients less than 18 years old.

## Data extraction

In order to find duplicates in the search strategy's output, we used Rayyan (QCRI) [15]. To assess the appropriateness of the titles and abstracts, the researchers narrowed the combined search results based on a set of inclusion/exclusion criteria. Poorly qualified studies were excluded by using critical appraisal skills program forms. The reviewers read each of the papers that satisfied the requirements for inclusion in-depth. The authors discussed methods for settling disputes. A data extraction form was created, and it was used to upload the approved study. The authors extracted data about the study titles, authors, study year, study designs, country, QoL measure, follow-up duration, and main outcomes.

## Strategy for data synthesis

Utilizing the information gathered from the pertinent studies, summary tables were made to provide a qualitative analysis of the outcomes and study components included. The most effective method for utilizing the data from the included study articles was selected after data for the systematic review had been extracted. Studies that met the full-text inclusion criteria but did not provide data on postoperative QoL following THA were excluded.

## Risk of bias assessment

The ROBINS-I risk of bias assessment method for non-randomized trials of treatments was used to assess the quality of the included studies [16]. The seven topics that were assessed included

confounding, participant selection for the study, classification of interventions, deviations from intended interventions, missing data, assessment of outcomes, and selection of the reported result.

**Ethical considerations**

- We make sure that all papers included in this study take the informed consent form of all participants and it was clear to them and indicated the purpose of the research and given the right of the participant to withdraw at any time without any obligation towards the study team.
- No incentives or rewards will be given to any participants.
- There is no conflict of interest in this study.
- We are getting IRB approval.

**Results**

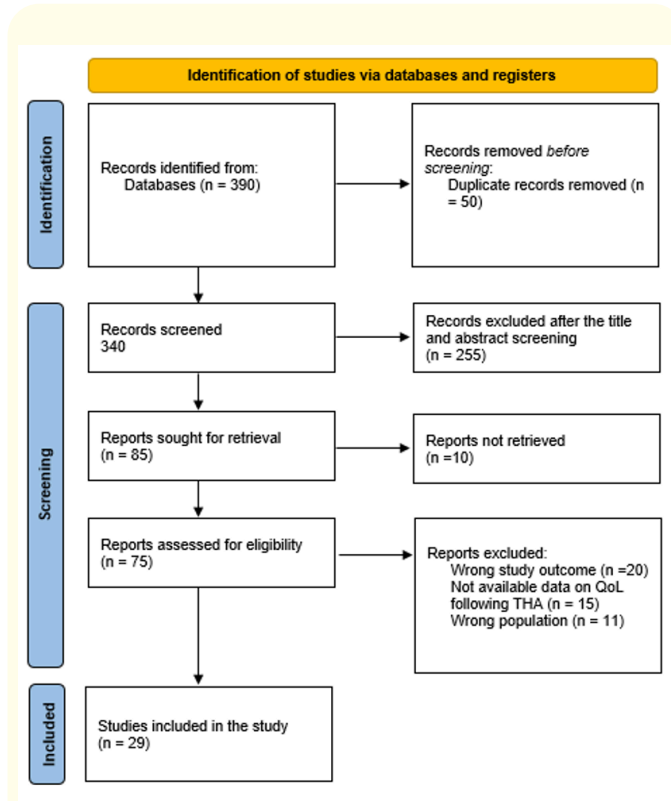
**Search results**

A total of 390 study articles resulted from the systematic search, and 50 duplicates were deleted. Title and abstract screening were conducted on 340 studies, and 255 studies were excluded. Eighty-five reports were sought for retrieval, and only 10 articles were not retrieved. Finally, 75 studies were screened for full-text assessment; 20 were excluded for wrong study outcomes, 15 for unavailable data on QoL following THA, and 11 for the wrong population type. Twenty nine eligible study articles were included in this systematic review. A summary of the study selection process is presented in figure 1.

**Characteristics of the included studies**

Table 1 includes the sociodemographic characteristics. A total of Twenty- nine studies with 74664 patients were included. Six studies were conducted in Japan [17,21,22,26,27,44], three in the UK [23,24,35], two in China [18,34], two in Iran [20,40], two in India [33,45], one in Brazil [25], two in Turkey [28,37], one in Switzerland [19], two in Denmark [38,42], two in the USA [39,43], one in Germany [29], one in Sweden [30], one in Singapore [31], one in Italy [36], and one in South Korea [41]. Eleven studies were prospective studies [17,20-24,27,28,31,39,42], five were retrospective studies [19,32-43,45], five were cohort studies [26,30,38,43,44], four were case-control studies [28,36,40,41], one was a cross-sectional study [25], and one was a randomized control trial [35].

Table 2 presents the characteristics of the included studies. The follow-up duration ranged from 3 months [22] to 96 months [24,30]. All of the included studies reported improved QoL of OA patients following THA. The following factors; younger age, greater Oxford hip score (OHS), and stronger SF-8 mental component scores (MCS) [17,20,44] were associated with better QoL after THA. Interestingly, one study reported that HRQoL outcomes improved more for older patients [38]. All patients required physiotherapy



**Figure 1:** PRISMA flowchart summarizes the study selection process.

following the operation. One study reported that underweight, overweight, or obese (classes I to III) experienced more hip pain after THA [21]. BMI class is independently linked to poorer HRQoL scores. Obese patients experienced greater improvements in their EQ-5D index scores following THA while having lower absolute scores than non-obese patients. However, McLawhorn., *et al.* reported that BMI class is independently linked to poorer HRQoL scores. Obese patients experienced greater improvements in their EQ-5D index scores following THA while having lower absolute scores than non-obese patients [43]. One study reported the incidence of kinesiophobia following long-term follow-up after THA [30]. Liu., *et al.* reported that CN counted on the WeChat platform significantly enhanced the QoL among patients [18]. Another intervention to enhance patients’ QoL was brought by Padovan., *et al.* implemented three meetings for the intervention process (IARA), each of which is distinguished by a focus on the patient, on his or her wants and worries, and on raising awareness of the complete care journey. IARA was an efficient model in enhancing pain and QoL indices and maintaining low levels of kinesiophobia.

**Discussion**

This systematic review demonstrated that physical and mental well-being following the THA is a main factor in improving patients’ QoL and enhancing recovery. This was consistent with previous systematic reviews and meta-analyses that confirmed the

Study	Country	Study design	Participants (n)	Mean age	Males (%)	Females (%)
Matsunaga-Myoji, <i>et al.</i> 2020 [17]	Japan	Prospective	153	61.4 ± 8.1	13.7	86.3
Liu, <i>et al.</i> 2021 [18]	China	Case-control	124	73.9 ± 6.1	65.5	34.5
Leiss, <i>et al.</i> 2021 [19]	Switzerland	Retrospective	109	62.1 (± 10.5)	64.2	35.8
Moarrefzadeh, <i>et al.</i> 2022 [20]	Iran	Prospective cohort	161	69.1 ± 8.55	26.1	73.9
Mukka, <i>et al.</i> 2020 [21]	Japan	Prospective cohort	64055	69	43	57
Sasaki, <i>et al.</i> 2022 [22]	Japan	Prospective	47	63 ± 7.5	2.1	97.9
Clement, <i>et al.</i> 2022 [23]	UK	Prospective	200	69.9 ± 9.5	42.5	57.5
Clement, <i>et al.</i> 2022 [24]	UK	Prospective cohort	717	66.6 ± 12.9	44.6	55.4
Santos, <i>et al.</i> 2021 [25]	Brazil	Cross-sectional	33	55 ± 15	19.2	80.8
Kuroda, <i>et al.</i> 2020 [26]	Japan	Cohort	51	65.7 ± 8.9	21.6	78.4
Matsunaga-Myoji, <i>et al.</i> 2020 [27]	Japan	Prospective cohort	153	61.4 ± 8.1	13.7	86.3
Koken, <i>et al.</i> 2020 [28]	Turkey	Prospective cohort	38	37.6 ± 5.8	13.2	86.8
Greimel, <i>et al.</i> 2021 [29]	Germany	Retrospective	109	62.1 ± 10.5	64.2	35.8
Al-Amiry, <i>et al.</i> 2022 [30]	Sweden	Cohort	161	66.3 ± 9.9	48.4	51.6
Goh, <i>et al.</i> 2020 [31]	Singapore	Prospective cohort	1384	61.8 ± 12.3	30.3	69.7
Świtoń, <i>et al.</i> 2017 [32]	Poland	Retrospective	189	62.9	36.5	63.5
Sharma, <i>et al.</i> 2019 [33]	India	Retrospective	47	48.6	87.2	12.8
Luo, <i>et al.</i> 2019 [34]	China	Retrospective	101	52.3	50.5	49.6
Costa, <i>et al.</i> 2018 [35]	UK	RCT	62	56.7 ± 7.0	56.5	43.5
Padovan, <i>et al.</i> 2018 [36]	Italy	Case-control	60	68.53 ± 8.91	58.3	41.7
Balik, <i>et al.</i> 2017 [37]	Turkey	NM	150	58.3 ± 11.9	28.7	71.3
Aalund, <i>et al.</i> 2017 [38]	Denmark	Cohort	1610	68.9 ± 10.15	52.2	47.8
Elmallah, <i>et al.</i> 2017 [39]	USA	Prospective cohort	188	69	32	68
Bahardoust, <i>et al.</i> 2019 [40]	Iran	Case-control	127	58.2 ± 16.1	32.3	67.7
Kim, <i>et al.</i> 2017 [41]	South Korea	Case-control	123	43.3	57.7	42.3
Glassou, <i>et al.</i> 2018 [42]	Denmark	Prospective cohort	1582	70 ± 9	52	48
McLawnhorn, <i>et al.</i> 2017 [43]	USA	Cohort	2733	65.5 ± 0.2	45.8	54.2
Umehara, <i>et al.</i> 2016 [44]	Japan	Cohort	125	63	8	92
Kumar, <i>et al.</i> 2016 [45]	India	Retrospective	32	40.08	87.5	12.5

**Table 1:** Sociodemographic characteristics of the included participants.

Study	QoL measure	Follow-up (months)	Key findings and implications	P- Value	ROBIN-I
Matsunaga-Myoji, <i>et al.</i> 2020 [17]	SF-8	36	The subjects' step counts and MVPA dramatically increased, with a functional improvement. Additionally, younger age, greater OHS, and stronger SF-8 mental component scores were predictors of alterations in MVPA.	P <0.001	Moderate
Liu, <i>et al.</i> 2021 [18]	SF-36	6	Intervention: CN counted on the WeChat platform. CN via the WeChat platform can enhance patients' QoL after THA by enhancing hip joint function, lowering problems and the post-operative readmission rate, and reducing complications.	P <0.001	Moderate
Leiss, <i>et al.</i> 2021 [19]	EQ-5D-5L and Hospital Anxiety and Depression Scale (HADS)	12	The concept of accelerated recovery in cementless THA increases the QoL and early clinical function. A 12-month follow-up after surgery revealed a consistent improvement in patient-related outcome measures (PROMs).	P <0.001	Moderate
Moarrefzadeh, <i>et al.</i> 2022 [20]	(PCS) and (MCS)	12	Improvements in HRQoL in the first 6 months following THA are associated with enhancement of the physical aspect (PCS score), and in the latter 6 months following THA is related to promotion in the psychological aspect (MCS score).	P= 0.048	Moderate
Mukka, <i>et al.</i> 2020 [21]	EQ-5D-3-Level	12	One year after THA, HRQoL significantly improved for all BMI classes. Compared to patients of normal weight, those underweight, overweight, or obese (classes I to III) experienced more hip pain.	P < 0.05	Moderate
Sasaki, <i>et al.</i> 2022 [22]	EQ-5D-5l	3	Improvement in postoperative QOL was seen 3 months after THA, regardless of central sensitization.	P= 0.206	Moderate
Clement, <i>et al.</i> 2022 [23]	EQ-5D & SF-36	60	Age did not affect the HRQoL or specific hip postoperative outcome after THA. Even though they had improved significantly, older patients had lower postoperative activity levels than younger patients, which could simply be a physical side effect of aging.	P < 0.001	High
Clement, <i>et al.</i> 2022 [24]	EQ-5D-3L	96	A higher risk of postoperative mortality was associated with worse preoperative HRQoL and joint-specific function. Longer waiting periods before THA surgery cause both HRQoL and joint-specific function to decline, which may lead to a higher postoperative mortality risk than would have been anticipated if surgery had been performed sooner.	P= 0.003	Moderate
Santos, <i>et al.</i> 2021 [25]	EQ-5D	6	Comparing those who had THA to those still waiting for the procedure, those who had it showed higher HRQOL scores across the board, with pain relief being the factor most strongly linked to the patients' improved QoL.	P <.0001	High
Kuroda, <i>et al.</i> 2020 [26]	EQ-5D	24	After revision THA for aseptic loosening, a greater BMI decreased walking capacity, and a more severe acetabular bone defect are indicators of worse QOL. In particular, the only independent variable was walking ability.	P= 0.0103	Moderate
Matsunaga-Myoji, <i>et al.</i> 2020 [27]	SF-8	60	Following THA, participants' step counts and MVPA considerably increased, and their functional abilities improved.	P <.0001	Moderate
Koken, <i>et al.</i> 2020 [28]	SF-36	6	They demonstrated rising QOL, sleep quality, and daytime sleepiness levels following surgery in all study areas.	P <.0001	Moderate
Greimel, <i>et al.</i> 2021 [29]	EQ-5D-5L	12	THA improves early clinical function and QoL with the idea of a better recovery. After surgery, PROMs continued to show improvement.	P <.0001	High
Al-Amiry, <i>et al.</i> 2022 [30]	EQ-5D	72-96	Kinesiophobia is common 6–8 years after surgery; thus, addressing it soon after THA could positively impact the prognosis.	P <.0001	Moderate
Goh, <i>et al.</i> 2020 [31]	SF-36	12	In the short term, patients who were psychologically upset had lower QoL than patients who were not. In each group, a comparable percentage of patients had clinically significant improvements, were satisfied, and met their expectations.	P= .724	Moderate

Świtoń, <i>et al.</i> 2017 [32]	Harris Hip Score (HHS) questionnaire	14	Patients' subjective clinical evaluations after complete hip replacement surgery revealed an improvement in QoL. Following a THA, both the operated side and the unoperated side require physiotherapy. After THA, individuals who had pain and activity impairment were significantly more likely to be female.	P <0.01	Moderate
Sharma, <i>et al.</i> 2019 [33]	HHS, Short musculoskeletal function assessment score (SMFA), SF-12, and WHOQOL	24	The precision of the THA done is a requirement for the short-term radiological, functional, and QoL metrics; the kind of fracture, the course of initial treatment, and the results of that treatment have little bearing on these parameters.	P <0.05	Moderate
Luo, <i>et al.</i> 2019 [34]	HHS and SF-12	73.2	Patients who have had a hip infection for more than ten years in a dormant state can be successfully treated with a cementless THA, with favorable functional outcomes and fewer comorbidities. Following THA, the risk of infection recurrence in these patients appears to be exceedingly low.	P <0.05	High
Costa, <i>et al.</i> 2018 [35]	EQ-5D	60	In the five years after a THA versus resurfacing arthroplasty, there was no evidence of a change in hip function or HRQoL.	P= 0.003	Moderate
Padovan, <i>et al.</i> 2018 [36]	Tampa Scale Kinesiophobia (TSK) questionnaire	NM	Three meetings made up the intervention process (IARA), each of which is distinguished by a focus on the patient, on his or her wants and worries, and on raising awareness of the complete care journey. IARA was an efficient model in enhancing pain and QoL indices and maintaining low levels of kinesiophobia in patients underwent THA.	P < 0.01	High
Balik, <i>et al.</i> 2017 [37]	SF-36, Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI)	6	Primary coxarthrosis can be accompanied by mental symptoms and has a considerable detrimental impact on the patient's QoL. Significant improvements in QoL, depression and pain scores were seen following THA.	P < 0.05	Moderate
Aalund, <i>et al.</i> 2017 [38]	EQ-5D	3 - 6	After THA, HRQoL outcomes improved more for older patients. A high preoperative HRQoL appears to prevent gains in HRQoL following THA.	P < 0.01	Moderate
Elmallah, <i>et al.</i> 2017 [39]	SF-6D	60	Clinical relevance and correlation with functional outcomes of SF-6D scores following THA are shown by their effect size.	P < 0.05	Moderate
Bahardoust, <i>et al.</i> 2019 [40]	SF-36	27 ± 18	Even though THA is regarded as one of the most successful orthopedic procedures, as compared to the reference population, it is associated with noticeably lower HRQoL.	P = 0.001	High
Kim, <i>et al.</i> 2017 [41]	EQ-5D	60.2	In patients with bilateral osteonecrosis of the femoral head, simultaneous bilateral THA (BTHA) has been demonstrated to be superior to phased BTHA in terms of surgical accuracy, functional result, and QoL.	P < 0.001	Moderate
Glassou, <i>et al.</i> 2018 [42]	EQ-5D	12	Comorbidity burden does not prevent an improvement in HRQoL with THA. After three months of follow-up, THA patients with a significant comorbidity burden may achieve the same level of HRQoL as THA patients without a comorbidity burden.	P < 0.09	Moderate
McLawnhorn, <i>et al.</i> 2017 [43]	EQ-5D	24	Two years after primary THA, BMI class is independently linked to poorer HRQoL scores. Obese patients experienced greater improvements in their EQ-5D index scores following THA while having lower absolute scores than non-obese patients.	P < 0.05	Moderate
Umehara, <i>et al.</i> 2016 [44]	SF-36	12	In the younger patient group, the age-based comparison frequently showed significant increases in subscale scores. Additionally, younger patients had better THA treatment outcomes, and obesity had no effect on them.	P < 0.05	Moderate
Kumar, <i>et al.</i> 2016 [45]	SMFA and SF-12	36	The functional outcome of THA and QoL in patients with acetabular fractures who underwent initial open reduction and internal fixation is suggested to be favorable.	P = 0.001	High

**Table 2:** Characteristics and outcomes of the included studies.

significance of physical and mental health as important factors for patients' QoL assessment [6,47]. After analyzing the mental health following THA, Nguyen, *et al.* [48] found that there had been a considerable improvement one year after surgery and that there was a correlation between mental health and the improvement of pain and function. However, our review lacks the statistical significance and quantitative assessment of our included literature.

Our study also reported that younger age, greater OHS, and stronger SF-8 and MCS [17,20] were associated with better QoL after THA. The Short Form-36 Health Survey (SF-36), the associated 12-item Short Form Health Survey (SF-12), and the EuroQol 5 Dimension Health Outcome Survey (EQ-5D) are three of the various measures that are frequently used to assess the general QoL [49]. Due to the challenging cross-study comparison of results, the wide variety of patient-reported outcome measures currently utilized in orthopedic research is problematic. Four of the major orthopedic publications from 2004 to 2016 were examined by Siljander, *et al.* [50], who discovered a total of 42 distinct PROM instruments in use. Interestingly, one study reported that HRQoL outcomes improved more for older patients [38]. This could be due to their small sample size and the surgical approach involving myototomy may be useful for elderly.

One study reported that underweight, overweight, or obese (classes I to III) experienced more hip pain after THA [21]. The relationship between BMI and HRQoL has received increased attention in recent years, and numerous studies have examined the negative effects of obesity on the body and mind, as well as various treatment options. The MCS score was only decreased in class-III obesity, whereas an increase in BMI appeared to primarily worsen the physical domain of HRQoL scores, such as the PCS score of the SF-36, in a dose-dependent manner [51]. However, inconsistent associations between weight loss and improved HRQoL have been shown in reviews based on randomized trials, particularly among patients who underwent dietary, medical, and lifestyle treatments as opposed to bariatric surgery [52].

One study reported the incidence of kinesiophobia following long-term follow-up after THA [30]. After anterior cruciate ligament reconstruction, a high percentage of patients don't return to sports, which appears to be strongly influenced by kinesiophobia. According to Flanigan, *et al.* [53], a sizable subset of those patients might find it challenging to fully resume their pre-injury activity levels due to lingering fear of re-injury. Identification of patients who exhibit risk factors for kinesiophobia and pain catastrophizing, such as anxiety, depression, and exaggerated pain experiences, is, therefore, a crucial component of preoperative care. Implementing psychotherapeutic strategies like cognitive behavioral therapy, adequate analgesia, and physical therapy may help recovery after surgery [30,53].

Liu, *et al.* reported that CN counted on the WeChat platform significantly enhanced the QoL among patients [18]. Previous research has shown that CN for THA patients after discharge may help patients' hip joint function and compliance, which is helpful for the patient's recovery after discharge [54]. THA is a traumatic procedure, and complications afterward are frequently brought on by inadequate postoperative care or a lack of effective hip joint functional exercises. Professional nursing is helpful in preventing complications and improving the prognosis for patients with surgery and chronic diseases who require CN after discharge, according to studies [55]. According to earlier research, CN may be able to cut the readmission rate after THA by 48% when compared to general nursing [56].

## Conclusion

This systematic review revealed that enhancing patients' physical and mental health after THA is essential for improving recovery and patient QoL. Underweight, overweight, or obese experienced more hip pain after THA. Interventions such as CN counted on WeChat and IARA were found to after discharge has a great impact on patients' recovery and well-being.

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