

# An integrative review of interventions promoting health-related quality of life in patients with end-stage kidney disease undergoing continuous ambulatory peritoneal dialysis

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## ABSTRACT

**Introduction** Improving health-related quality of life (HRQoL) among patients with end-stage kidney disease (ESKD) undergoing continuous ambulatory peritoneal dialysis (CAPD) has an important outcome of nursing care, but the strategies for promoting HRQoL and tools have not been conclusive.

**Purpose** To examine the intervention strategies, instruments and outcomes in studies in order to improve HRQoL in patients with ESKD undergoing CAPD.

**Method** An integrative review following the guidelines of Whittemore and Knafelz (2005).

**Results** Five studies met the criteria used to determine the eligibility of studies to be used in this review. The intervention strategies were discharge plans, patient education, telephone follow-up, peer support, home visits, and cognitive behaviour therapy. The instruments for measuring HRQoL were SF-36 and KDQOL. All interventions could improve HRQoL.

**Conclusion** The promotion of HRQoL in patients with ESKD undergoing CAPD should combine more than one strategy in the intervention. The findings can be used as a reference for nurses to develop nursing interventions or care-giving protocols for ESKD patients undergoing CAPD to improve HRQoL.

## Introduction

A rapid incremental rise has occurred in the number of individuals with end-stage kidney disease (ESKD) all across the world. This is largely because of the increasing numbers of the elderly as well as pandemics of chronic non-communicable

disorders including hypertension and diabetes mellitus (Bujang et al., 2017).

In 2016, the highest prevalence of ESKD was recorded in Taiwan with approximately 3,392 cases per million people. Taiwan is followed closely by Japan and the United States where the prevalence rates are approximately 2,599 and

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2,196 cases per million people, respectively (USRDS, 2018). In Australia, 2,800 new ESKD cases were reported in 2016. This is indicative of eight new patients with ESKD being found every day, or an incidence rate of 11 cases per 100,000 population (Australian Institute of Health and Welfare, 2019). ESKD is also currently ranked 12th among the causes of death worldwide (Neuen et al., 2017). Patients with ESKD need some form of renal replacement therapy (RRT) to survive.

Kidney transplantation and dialysis are the treatments of choice for patients with ESKD (Patzner et al., 2016). However, few organ donors are available, so most patients have to be managed with dialysis to lengthen their lives. Thus, haemodialysis and peritoneal dialysis (PD) are common treatments for patients with ESKD (Rigoni et al., 2017). PD has two forms including automated peritoneal dialysis (APD) and continuous ambulatory peritoneal dialysis (CAPD) (Baillie et al., 2018).

For many years, CAPD has been used as a treatment for kidney failure. CAPD is a continuous treatment process that gives patients the freedom to continue with the activities of daily living (ADL). However, this therapy is a highly involved treatment modality in which patients must be aware of potential complications such as peritonitis (Li et al., 2016). Long-term CAPD can also affect the overall social, mental and physical well-being of patients, thereby imposing extreme burdens on patients and their families with consequential effects on overall health-related quality of life (HRQoL) (Griva et al., 2016).

A crucial facet of the health status of a patient is their HRQoL. This should be considered when assessing patients' outcomes. Moreover, HRQoL is used to measure the effects of diseases and treatment methods on the well-being of people. Hence the efficiency and quality of renal care strategies such as dialysis should also be included while considering the HRQoL. Owing to its complexity, there is no established agreed description of HRQoL. Still, a majority would accept its description as the opinion of a person about him/herself, and his/her personal values, position, beliefs and expectations (Aguiar et al., 2018). In the case of patients receiving dialysis, HRQoL is negatively affected by a number of factors such as difficulty in restrictions of fluids, as well as symptoms encountered due to the disease and those resulting from the dialysis such as constipation, muscle cramps and fatigue (Jankowska-Polańska et al., 2017). In this context, HRQoL becomes relevant not only due to the fact that it serves as a fundamental feature of health and is an inherent objective, but also due to the reason that HRQoL is linked with morbidity and mortality in individuals suffering from chronic disorders including ESKD (Broers et al., 2015; Aguiar et al., 2018).

Thus, the treatment for patients with ESKD undergoing CAPD focuses on enhancing HRQoL as well as reducing complications and hospital readmission rates. Therefore,

healthcare providers need to recognise how to develop suitable programs for ESKD patients who are undergoing CAPD through examination of interventions that improve HRQoL.

An integrative review takes into consideration the essential methods to find evidence-based practices from the current knowledge. However, integrative reviews about strategies to enhance HRQoL have been limited. Therefore, this review is aimed to analyse the strategies, instruments and outcomes of interventions for promoting HRQoL in patients with ESKD undergoing CAPD.

## Methods

This review utilises the five processes that were developed by Whittemore and Knafl (2005) to improve quality. The five processes use an optimised approach that employs either theoretical or empirical methodologies in every stage of the review. Unlike other approaches, it employs the optimised approach in the analysis stage, which is the least developed aspect during the process.

### Identifying issues

This integrative review focuses on interventions that improved the HRQoL of patients with ESKD undergoing CAPD. Thus, the research questions in this review are as follows:

- What strategies and instruments have been used to improve the HRQoL of patients with ESKD undergoing CAPD?
- What are the HRQoL outcomes for patients with ESKD undergoing CAPD?

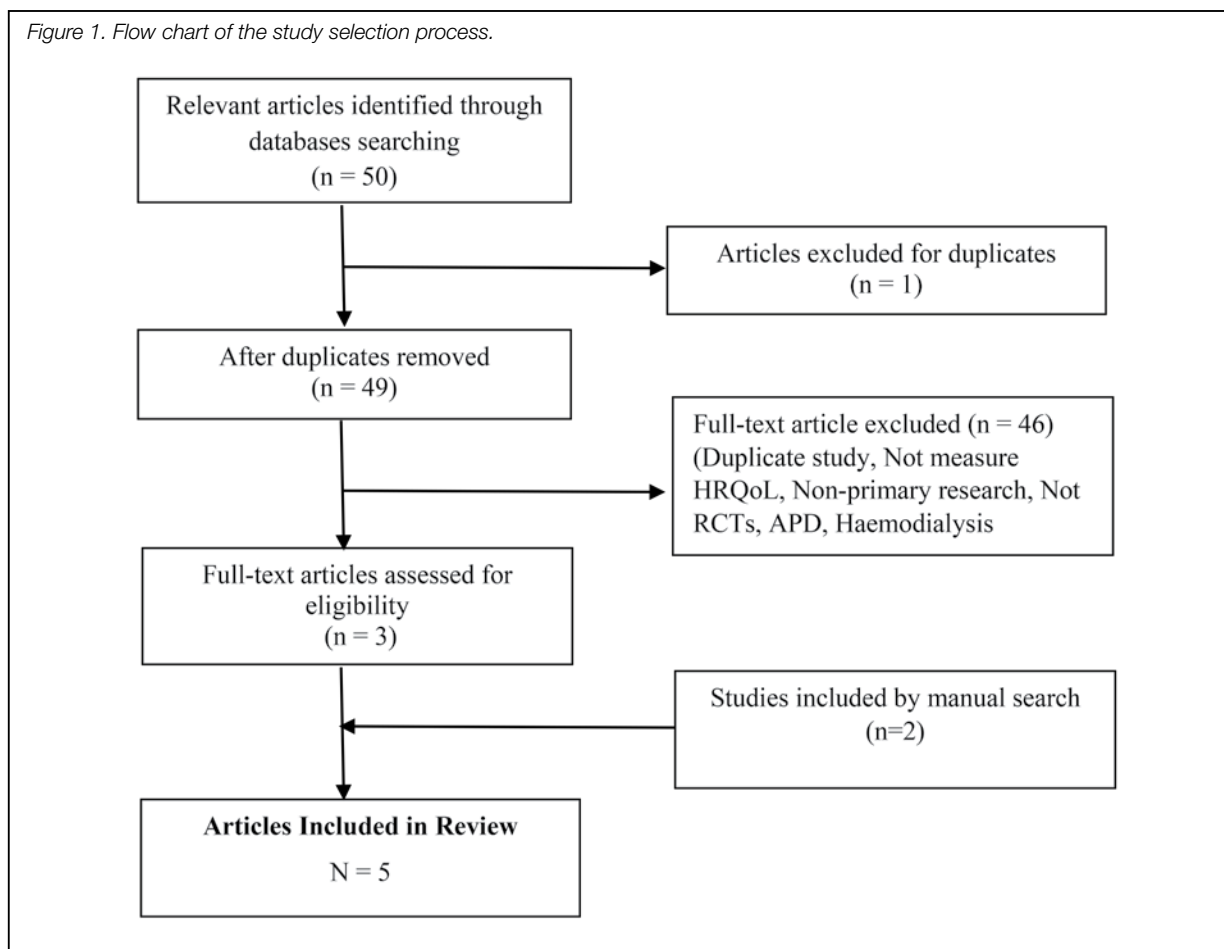
### Data search

A search of the literature utilised five electronic databases: CINAHL, MEDLINE, PsycINFO, Academic Search Premium, and Thai Library Integrated System (Thailis). The articles reviewed were published between January 2009 and January 2019. The search keywords were end-stage kidney disease, end-stage renal disease, continuous ambulatory peritoneal dialysis, health-related quality of life, quality of life, intervention, and programme. An additional manual search was conducted on reference lists from retrieved articles and journals. The inclusion criteria were as follows: 1) Population: adults with ESKD undergoing CAPD; 2) Languages: Thai and English; 3) Randomised controlled trial (RCT) consideration; 4) Reported measures of HRQoL. The searches identified 50 articles that were subsequently reviewed by two reviewers based on the criteria. The selection process is described in Figure 1. Five articles were included in this review.

### Data assessment

The data assessment in this review used the JBI Critical Appraisal Checklist for Randomized Control Trials (The Joanna Briggs Institute, 2017). The articles which were included in this study met at least 60% of the data evaluation criteria from two reviewers.

Figure 1. Flow chart of the study selection process.



## Data analysis and review presentation

The method chosen for analysing the data of Whittimore and Knafl (2005) in their integrative reviews involved four steps. The first step involved the extraction of data from each study. The data extracted in this step were recorded in tables. The second step involved converting and combining the collected data. The data were primarily converted and combined to allow the researchers to observe similarities and differences across studies. The third step involved the examination of the data from different points of view. The final step involved analysis and cross-examination against the data earlier extracted. The studies included in this review are presented in Table 1.

## Results

### Sample description

The participants were recruited from out-patient nephrology units, and the studies were conducted in Hong Kong (Chow & Wong, 2010; Wong *et al.*, 2010), China (Li *et al.*, 2014; Jiao *et al.*, 2017), and the United Kingdom (Hare *et al.*, 2013). The sample sizes in the studies reviewed ranged from 15 to 135 participants. The mean age of the participants ranged from 56.3 to 62.4 years. The mean number of years on CAPD ranged from 0.3 to 13 years. No study reported sample size calculations prior to implementation; however, all studies

reported statistically sufficient response from the current work that could be used to calculate sample sizes in further studies.

### Theory-based intervention

Theory-based intervention is an essential tool used by researchers to measure changes and then give a detailed account of how change occurs. It can also inform when not to expect change. Data from both unsuccessful research attempts and successful findings are relevant as they inform future research. It is, however, critical to ensure that theories fully support all interventions and testing. In this review, three of the five studies employed theory-based interventions, including the cognitive behaviour theory (CBT) (Hare *et al.*, 2014), continuity of care (Jiao *et al.*, 2017), and disease management models (Wong *et al.*, 2010). Two studies did not report using a theory-based intervention (Chow & Wong, 2010, Li *et al.*, 2014); however, the results showed that significant increases in HRQoL were achieved.

### Intervention strategies

The review found that various strategies were utilised for promoting HRQoL in patients with ESKD undergoing CAPD. Discharge planning and patients' education were employed in all five studies (Wong *et al.*, 2010; Chow & Wong, 2010; Li *et al.*, 2014; Hare *et al.*, 2014; Jiao *et al.*, 2017). Four of the five studies used telephone follow-up strategies in the interventions

Table 1. Summary of studies reviewed.

Author / Setting	Purpose	Sample	Intervention / Timing of measures	Tools / HRQoL outcomes	Strengths / Limitations
Chow and Wong (2010) <b>Setting:</b> Hong Kong	To evaluate the efficacy of a nurse-led case management program in enhancing the HRQoL of patients undergoing PD.	<ul style="list-style-type: none"> <li>n=85 (43 in the study group and 42 in the control group)</li> <li>Age: 23–78 years</li> <li>Mean age = 56.9 years</li> <li>On CAPD: 0.3–12 years</li> </ul>	<p><b>Intervention:</b> Comprehensive discharge planning protocol and a standardised 6-week nurse-initiated telephone follow-up.</p> <p><b>Timing of measures:</b></p> <ul style="list-style-type: none"> <li>On discharge</li> <li>6 weeks post-discharge</li> <li>12 weeks post-discharge</li> </ul>	<p><b>Tools:</b> KDQOL</p> <p><b>Outcomes:</b> The impact of the intervention was statistically significant (<math>p &lt; 0.05</math>) between groups. Statistically significant (<math>p &lt; 0.05</math>) impacts on problems/symptoms, social and emotional function; impacts of kidney disease, role-physical and sleep.</p>	<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>Participants were randomised</li> </ul> <p><b>Limitations:</b></p> <ul style="list-style-type: none"> <li>No identified theory based on intervention</li> <li>Self-reported</li> </ul>
Jiao et al. (2017) <b>Setting:</b> China	To examine how medical complications and outcomes and general QoL of patients undergoing PD are impacted by continuity of care.	<ul style="list-style-type: none"> <li>n=118 (58 in the study group and 60 in the control group)</li> <li>Age: &gt;18 years</li> <li>Mean age = 58.9 years (intervention) and 57.1 years (control)</li> <li>On CAPD: &gt;3 months</li> </ul>	<p><b>Intervention:</b> Psychological intervention and routine post-discharge follow-up.</p> <p><b>Timing of measures:</b></p> <ul style="list-style-type: none"> <li>On discharge</li> <li>6 weeks post-discharge</li> <li>12 weeks post-discharge</li> </ul>	<p><b>Tools:</b> KDQOL</p> <p><b>Outcomes:</b> Significant improvement in the general and overall health perception; compared to the control group, the scores of satisfactions of patients (<math>p = 0.044</math>), symptoms (<math>p = 0.048</math>), and staff motivation in the intervention group was extremely high (<math>p = 0.037</math>).</p>	<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>Used theory-based intervention</li> </ul> <p><b>Limitations:</b></p> <ul style="list-style-type: none"> <li>No blind design</li> <li>single-centre</li> <li>Small sample size</li> <li>Short intervention period</li> </ul>
Hare et al. (2014) <b>Setting:</b> United Kingdom	To find out whether QoL or psychological well-being is influenced by the Liquid Intake Program (LIP).	<ul style="list-style-type: none"> <li>n=15 (8 in the study group and 7 in the control group)</li> <li>Mean age = 60 years (intervention) and 60.1 years (control)</li> <li>On CAPD: mean = 16.63 months (intervention) and 20 months (control)</li> </ul>	<p><b>Intervention:</b> Liquid Intake Program (LIP).</p> <p><b>Timing of measures:</b></p> <ul style="list-style-type: none"> <li>Baseline assessment</li> <li>1 week follow-up</li> <li>6 weeks follow-up</li> </ul>	<p><b>Tools:</b> SF-36</p> <p><b>Outcomes:</b> Considerable variations were witnessed in the preferred direction for measures of beliefs on health, QoL, as well as psychological well-being; areas in other studies were associated with improved fluid intake.</p>	<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>Participants were randomised</li> <li>Used theory based intervention</li> <li>Control group received intervention after follow-up measures were taken</li> </ul> <p><b>Limitations:</b></p> <ul style="list-style-type: none"> <li>Small sample</li> <li>Self-reported</li> </ul>
Li et al. (2014) <b>Setting:</b> China	To test the effectiveness of post discharge nurse-led telephone support on patients undergoing PD.	<ul style="list-style-type: none"> <li>n=180 (90 in the study group and 90 in the control group)</li> <li>Age: 22–76 years</li> <li>On CAPD: mean 2.3 years, ranging from 0.5–13 years</li> </ul>	<p><b>Intervention:</b> Comprehensive discharge planning and standardised post-discharge nurse-led telephone support.</p> <p><b>Timing of measures:</b></p> <ul style="list-style-type: none"> <li>Baseline before discharge</li> <li>6 weeks post-discharge</li> <li>12 weeks post-discharge</li> </ul>	<p><b>Tools:</b> KDQOL</p> <p><b>Outcomes:</b> No significant variation between the control and intervention groups in KDQOL, complication control, readmission rates, and blood composition. However, statistically significant impacts were observed in patient satisfaction (<math>p = 0.01</math>), symptoms (<math>p = 0.01</math>), staff motivation (<math>p = 0.01</math>), and working conditions (<math>p = 0.02</math>), which indicates more improvement in the intervention group compared to the control group.</p>	<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>Participants were randomised</li> </ul> <p><b>Limitations:</b></p> <ul style="list-style-type: none"> <li>No identified theory based on intervention</li> <li>Self-reported</li> </ul>
Wong et al. (2010) <b>Setting:</b> Hong Kong	To evaluate whether an illness management strategy used to manage a chronic kidney disease group would improve health outcomes similar to other disease groups by focusing on CAPD patients.	<ul style="list-style-type: none"> <li>n=94 (47 in the study group and 47 in the control group)</li> <li>Mean age = 62.4 years</li> <li>On CAPD: mean 3.5 years</li> </ul>	<p><b>Intervention:</b> Disease management program and routine care.</p> <p><b>Timing of measures:</b></p> <ul style="list-style-type: none"> <li>At discharge</li> <li>7 weeks post-discharge</li> <li>13 weeks post-discharge</li> </ul>	<p><b>Tools:</b> KDQOL</p> <p><b>Outcomes:</b> Significant variation between the intervention group and control groups (<math>p &lt; 0.05</math>) at 7 weeks on various aspects including lack of adherence to diet, staff motivation, symptoms, sleep, patient satisfaction and general health. At 13 weeks, there were sustained impacts in various measures including kidney disease effects, level of non-adherence to CAPD, symptoms and sleep. However, apart from sleep, no significant variation was witnessed in the fundamental aspects.</p>	<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>Participants were randomised</li> <li>Used theory based intervention</li> </ul> <p><b>Limitations:</b></p> <ul style="list-style-type: none"> <li>Small sample</li> <li>Short duration of follow-up</li> </ul>

(Chow & Wong, 2010; Wong et al., 2010; Li et al., 2014; Jiao et al., 2017). Peer support was a strategy employed in the study of Jiao et al. (2017). Moreover, Hare et al. (2014) utilised a CBT strategy in their study to help patients adhere to the treatment process and promote HRQoL.

### Health-related quality of life instrument and outcome

Common tools used in measuring HRQoL include SF-36 and KDQOL-SF. The reliability of these tools was explored in only two studies (Chow & Wong, 2010; Wong et al., 2010). All the studies included a follow-up period or post-intervention outcome. A non-statistically significant difference in the group impact of intervention was reported by Chow and Wong (2010), but statistically significant impacts were reported for problems or symptoms and the effects on kidney disease, sleep, the physical, social and emotional roles, and pain at 6 weeks after patients in the group had been discharged from hospitals. In addition, significant impacts on sleep, motivation from staff, fatigue/energy, and patient satisfaction were reported by various studies (Wong et al., 2010; Li et al., 2014; Jiao et al., 2017), with a clear indication that the improvement of those factors in the control group was lower than that of the study group.

### Discussion

Maintaining a good HRQoL in patients has become an important component of ESKD treatment (Naik et al., 2012). The intention of this integrative review was to synthesise the body of evidence regarding intervention strategies to improve HRQoL, instruments and outcomes of the interventions in adults with ESKD undergoing CAPD. In this integrative review, all five studies were RCTs which are known to be effective in assessing the efficiency of various interventions (Bothwell et al., 2016).

The strategies that are employed in the intervention to improve the HRQoL of patients include discharge plans, patient education, telephone follow-up, peer support, home visits and CBT. Moreover, in the interventions, more than one strategy was used. Discharge planning and patient education were utilised in all the studies (Chow & Wong, 2010; Wong et al., 2010; Li et al., 2014; Hare et al., 2014; Jiao et al., 2017). There was a close relationship between discharge planning and patient education. Appropriate planning for discharge can fill the gap between hospital and community (Gonçalves-Bradley et al., 2016). Furthermore, the patient education approach helps patients actively take part in treatment and conduct self-management (Schaepe & Bergjan, 2015). Using telephone follow-up was the most effective and least costly means of carrying out further interventions after the patients had been discharged from hospital (Jayakody et al., 2016). Moreover, telephone follow-up could identify and strengthen

the behaviours of patients in realising the treatment goals, discovering new problems and needs, and preserving ongoing relationships with the patients. Peer support has also been proven to have various positive impacts such as enhanced health behaviours and HRQoL, enhanced control of chronic illnesses, and a lower chance of hospitalisation (Wood, 2014). Home visits are one of the best approaches to minimising technique failures in patients undergoing CAPD and reducing readmission rates in this population (Sayed et al., 2013; Martino et al., 2014).

Moreover, organised strategies are utilised by CBT for promoting behavioural adjustments and reorganisation of mood status and negative thoughts (Ma & Li, 2016). In general, individuals with kidney disease face difficulties while changing their lifestyle to adjust to their condition. For instance, they need to experience stringent diet plans, limitations relating to fluid consumption, and difficulties in management of spare time. Such challenges faced by these individuals can influence their view regarding their condition. They may also develop feelings of despair and stress which can affect their HRQoL leading to non-compliance with the medication and other procedures of treatment (Javed et al., 2019). In comparison to utilisation of educational or behavioural interventions only, interventions that also make use of CBT procedures have been found to positively affect the long-term behavioural changes and bring improvement in life quality (Chilcot et al., 2016).

For patients with ESKD, HRQoL is the crucial predictor of clinical outcomes. Poor HRQoL could, for instance, indicate that patients undergoing dialysis are at risk of hospitalisation or even death (Yang et al., 2018). In this review, we found that the SF-36 and KDQOL are key instruments commonly used to measure HRQoL. While the SF-36 is normally used in the study of chronic diseases (Revicki et al., 2011), the KDQOL is normally used in patients with kidney diseases who are undergoing dialysis (Chen et al., 2016). The most extensively utilised technique in medical outcome surveys is the SF-36. It comprises a multi-item scale made up of thirty-six items. A generic questionnaire, SF-36 serves to be the basis for KDQOL. It also contains multi-item scales that target the specific concerns of patients suffering from severe kidney disease and those on dialysis. These concerns include symptoms of the disease, burden of the disease, impact on routine activities, work status, cognitive function, sleep, quality of social activities, and sexual function. However, the SF-36 and KDQOL instruments are self-reported surveys. The disadvantage of using these self-reported survey tools is that the participants cannot accurately judge their individual behaviours as they can conceal true behaviours.

The outcomes of all the studies show that HRQoL was lower in the control group compared to the intervention group. It was

confirmed that social and physical functions, symptoms, sleep, and overall health perception were statistically significant in five studies. However, individuals receiving dialysis treatment become more and more burdened by their condition and associated complications with the passage of time. It is anticipated that these individuals would become intolerant to the negative effects of the treatment on their lives and to the dialysis time. It is therefore possible that these factors have participated in the noticed reduction in HRQoL in individuals receiving dialysis (Martínez-Sanchis et al., 2015; Aguiar et al., 2018).

In this review, we found that there was a significant difference in the duration of CAPD between 0.3–13 years. However, many previous research studies on HRQoL of patients undergoing PD have shown that there was no statistically significant connection between dialysis and HRQoL scores in terms of duration (Ginieri-Coccosis et al., 2008; Al Wakeel et al., 2009).

### Implications for nursing practice

The development of various innovative interventions for promoting HRQoL of individuals suffering from ESKD and those receiving CAPD may benefit from the data collected during this integrative review relating to different approaches for the improvement of HRQoL. In this review, correlation was identified between HRQoL and CBT, home visits, peer support, telephone follow-up, patient education, and discharge planning. The information gathered during this review may facilitate the execution of interventional studies in the future to improve the HRQoL of individuals subjected to CAPD.

### Conclusion

This integrative review of research uniquely contributes to the current state of types of interventions used to promote HRQoL among patients with ESKD receiving CAPD. The reviewed five studies were RCTs. These studies attempted to promote HRQoL in ESKD patients undergoing CAPD. In the intervention, more than one strategy must be used for promoting HRQoL, such as combining discharge planning and patient education into a single intervention. Moreover, CBT is a technique that makes patients adhere to their treatment and thus affects HRQoL. The knowledge from this review will be useful as baseline data for further research related to patients with ESKD undergoing CAPD and can be aimed at improving HRQoL.

### Limitations

In this integrative review, we focused on ways to improve the quality of life of patients with ESKD receiving CAPD. Although the study of Hare *et al.* (2013) was specifically directed at managing fluid intake with HRQoL as a secondary outcome measure, non-adherence to restrictions in fluid intake can adversely impact the HRQoL of patients receiving dialysis. Thus, we decided to include this study in our review. Moreover,

this review has limitations. Firstly, the literature included in this review included publications published during the period of 10 years only. Moreover, only those publications which were in the Thai or English languages were included. Secondly, the database used for searching was also limited. It can therefore be stated that limited literature has been used for this review. Thirdly, four out of five studies in this review examined Asian countries (Hong Kong and mainland China) that may differ in the cultural context from other countries. Fourthly, although PD has two types of modality, including CAPD and APD, the strategies for promoting HRQoL for patients receiving CAPD may not be suitable for patients receiving APD.

### Disclosures

The authors have no financial conflicts of interest to declare.

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