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Review Article

The Canadian occupational performance measure for patients with stroke: a systematic review

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Abstract. [Purpose] This study investigated whether the Canadian Occupational Performance Measure is a suitable outcome measure for assessing patients with stroke in research and clinical settings. [Subjects and Methods] The study included into two parts: (1) an investigation of the reliability and validity of the Canadian Occupational Performance Measure for patients with stroke and (2) an exploration of Canadian Occupational Performance Measure results in randomized controlled trials of patients with stroke. For this review, the study searched the MEDLINE, PubMed, and CINAHL Plus with Full Text databases for articles published before September 2015. [Results] Finally, three eligible articles were collected in part 1, and ten randomized controlled trials studies were collected in part 2. The findings of part 1 revealed that the Canadian Occupational Performance Measure had efficient test–retest reliability, however, the Canadian Occupational Performance Measure revealed weak associations with other assessment tools such as Barthel Index used for patients with stroke. Six of the randomized controlled trials studies used the Canadian Occupational Performance Measure as a primary outcome and two as a secondary outcome, while the other two as a goal-setting instrument. [Conclusion] This review indicates that the Canadian Occupational Performance Measure is appropriate for clinicians, including physiotherapists, in assessing outcome for patients with stroke. The Canadian Occupational Performance Measure can assist patients in identifying their outcome performance and provide therapists with directions on interventions.
Key words: Canadian occupational performance measure, Stroke, Outcome measure

INTRODUCTION

Stroke is a common chronic disease to cause disabilities. However, patients with stroke may survive up to 10 or more years because of contemporary medical treatments[1]. Stroke can affect many aspects of individual functions in gross motor, fine motor, speech, cognition, perception, and limit the outcome performance of the patients. Even current medical can increase the life expectancy of patients with stroke, the activities of their daily lives could be limited by the sequels. For instance, hemiparesis, the most common sequela of stroke was reported to affect the vital daily tasks of patients very often[2]. Useful outcome measures such as the Frenchay Activities Index (FAI) and the Barthel Index (BI) have been widely used in recent years for patients with stroke to assess their activity in daily living[3]. However, using these assessment results for planning

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interventions has some limitations. For instance, structured questions in these measures often ignore individual differences, and these measures are not patient-centered assessments. These tools had certain difficulty to detect individual functional performance and performance components[4]. Furthermore, some functional performance levels cannot be examined by these structured assessments, and the results may not be useful for patients. Patient-centered therapy has been promoted for years in the rehabilitation field. The rehabilitation experts emphasized the benefits of adapting a patient-centered outcome measure for patient assessment[5]. The patient-centered outcome measure should be used across multidiscipline, including physiotherapists.

The Canadian Occupational Performance Measure (COPM) has a client-centered design and measures outcomes according to three occupational performance areas (self-care, productivity, and leisure), examining self-perceived changes in the occupational performance of patients through a semistructured interview[5]. Since 1991, the COPM has been translated into more than 20 languages in over 35 countries[6]. Furthermore, the COPM prompts discussion between interviewees and therapists on factors such as different areas of activity, their concerns, and problems to be resolved[7]. At the beginning, patients start by identifying their difficulties according to the three occupational performance areas. They subsequently use a 10-point Likert-type scale, ranging from not at all crucial (1) to extremely crucial (10), to identify the intensity of certain difficulties. For the top five problems or tasks selected by patients, the interviewer asks them to continue identifying their performance and satisfaction with their performance by using the same 10-point rating scale. Accordingly, therapists focus on these main problems or tasks and consider them to be the priority for treatment. In addition, scoring of the performance and satisfaction items can be repeatedly reassessed on follow-up tests.

McColl, Paterson, Davies, Doubt, and Law[8] reported that previous studies[9–11] examined the reliability of both the performance and satisfaction domains of the COPM, concluding that they both showed an acceptable range of reliability. Examining the test–retest reliability of the COPM for a 2-week interval, Pan, Chung, and Hsin-Hwei[12] and Kjeken et al.[13] used intraclass correlation coefficients for patients with mental illness and ankylosing spondylitis and obtained coefficients ranging from 0.73 to 0.93, depending on whether the interview method entailed a personal, telephone, or mail interview. Although these studies suggest a satisfactory reliability for the COPM, their results may not be generalized to patients with stroke because different types of patients have different concerns.

Previous studies have reported that the COPM was a satisfactory and valid measure of self-reported occupational performance[8, 12, 14–18]. Moreover, the COPM showed sensitivity for determining clinically significant improvements after interventions in the total self-rated performance of patients[7, 19, 20] and could identify unique problems not assessed by other standardized measurement instruments[14, 17].

Carswell et al. [6] reviewed 88 articles and conducted a systematic review to determine the effect of the COPM. Their results indicate that, although the COPM has a few limitations, the assessment is valid, reliable, and clinically useful; it is also acceptable as an outcome measure for clinical use. However, this review did not focus on using the COPM for adult patients with stroke. Clinicians may want to understand more clearly and evaluate whether the COPM is a suitable outcome measure for occupational therapy in patients with stroke.

The present study aimed to investigate whether the COPM is a suitable instrument for patients with stroke. Another aim was to explore using the COPM as an outcome measure in clinical settings. We reviewed previous studies on the psychometric properties and uses of the COPM. The findings can assist clinical physiotherapists in selecting appropriate assessment tools. We believe that if the physiotherapists well understand the COPM, they can have more information and insights to foster a better intervention for their clients with stroke.

SUBJECTS AND METHODS

The study was conducted into two parts. The first part included an investigation of the reliability and validity of the COPM for patients with stroke. The criteria for the correlation coefficients of the test–retest reliability were set as excellent ($r \geq 0.75$), adequate ($0.4 \leq r \leq 0.74$), and poor ($r < 0.40$) according to the previous report[21]. The second part included an exploration of the COPM results in randomized controlled trials (RCTs) of patients with stroke. RCT is regarded as a rigorous research design in the modern clinical research[22]. If one study adopts RCT design, the instruments of the study can be seen as feasible. For this review, we searched the MEDLINE, CINAHL Plus with Full Text, and PubMed databases for articles published before September 2015. An integrated search function on the EBSCOhost online database enabled finding MEDLINE and CINAHL Plus with Full Text articles.

In part 1, we used the following keywords (terms): "Canadian Occupational Performance Measure," "stroke," and "reliability" or "validity" and related terms. The study inclusion criteria were as follows: (1) more than 20% of the participants were stroke patients; (2) the COPM was included as an assessment; (3) the psychometric properties of the COPM were investigated; (4) the study was published in English; and (5) the study was not a review, a letter to the editor, or an editorial.

For part 2, we used the following keywords (terms): "Canadian Occupational Performance Measure," "stroke," and "randomized controlled trials" and associated terms. The inclusion criteria were as follows: (1) the study was an RCT; (2) the participants were diagnosed with stroke; (2) the RCTs used the COPM as an assessment or an outcome measure; and (4) the study was published in English. The exclusion criteria were as follows: (1) the participants were children (age<18 years) and (2) the study was a protocol.
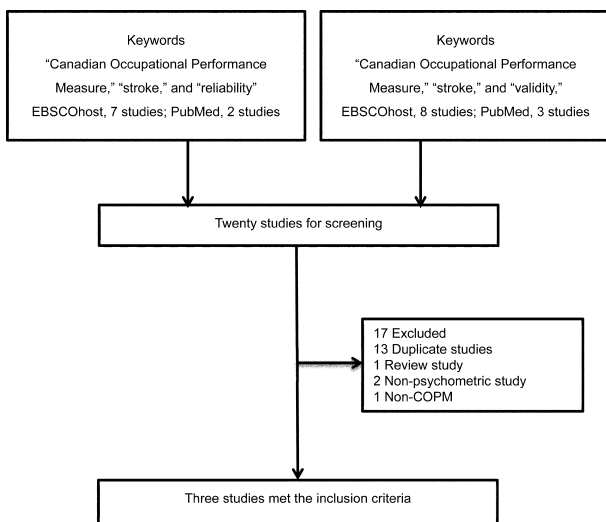
Keywords
"Canadian Occupational Performance Measure," "stroke," and "reliability"
EBSCOhost, 7 studies; PubMed, 2 studies

Keywords
"Canadian Occupational Performance Measure," "stroke," and "validity,"
EBSCOhost, 8 studies; PubMed, 3 studies

Keywords
"Canadian Occupational Performance Measure," "stroke," and "randomized controlled trials"
EBSCOhost, 11 studies; PubMed, 13 studies
(n = 24)

Twenty studies for screening

Twenty-four studies for screening

17 Excluded
13 Duplicate studies
1 Review study
2 Non-psychometric study
1 Non-COPM

14 Excluded
7 Duplicate studies
1 Children stroke
2 Study protocol
2 Non-RCT
1 Non-COPM
1 Non-total stroke patients

Three studies met the inclusion criteria

Ten studies met the inclusion criteria

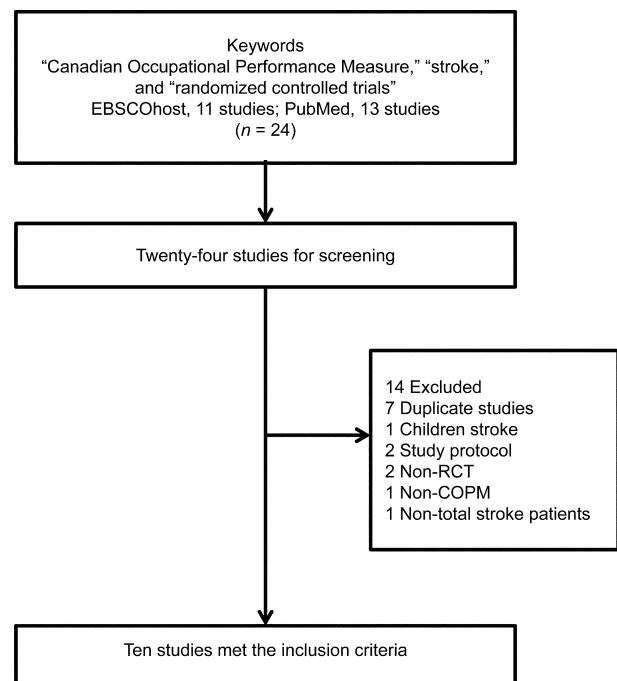**Fig. 1.** Process flow of part 1 and the results of the database search

Fig. 2. Process flow of part 2 and the results of the database search

In part 1 of the study, which involved a systematic article review, we observed that only a few articles investigated the psychometric properties of the COPM for patients with stroke. Thus, the first inclusion criteria did not restrict all patients diagnosed with stroke. In part 2, we excluded children with stroke because the study focused on adult patients with stroke.

RESULTS

In part 1 of the study, we shortlisted 20 studies on the basis of the keywords, and three of them met the inclusion criteria (Fig. 1). The findings are summarized in Table 1. In part 2, we included 24 studies on the basis of the keywords, and 10 of them met the inclusion criteria (Fig. 2). The 10 RCTs are categorized in Table 2.

Of the studies included in part 1, only one study explored the reliability of the COPM. Cup, op Reimer, Thijssen, and van Kuyk-Minis[3] examined the test–retest reliability of the COPM for patients with stroke. Each participant was interviewed twice by the same therapist after eight days of the first assessment. We identified 115 problems in the first-administered COPM, and only 64 (56%) problems were reidentified the second time. No significant differences were observed between the performance and satisfaction scores of the first and second tests. Moreover, the test–retest reliability was high (r=0.89 in performance and 0.88 in satisfaction). The findings revealed that, although the identified problems may change, the test–retest reliability of the same identified problems was good.

Three studies, which investigated the validity of the COPM, met our inclusion criteria for part 1. Martini, Rios, Polatajko, Wolf, and McEwen[23] compared the psychometric properties of two scoring systems in the Performance Quality Rating Scale (PQRS), namely the PQRS-OD and PQRS-G, in examining six patients with stroke and six children with a developmental coordination disorder. These two scoring systems were inconsistent regarding the convergent validity of the COPM. The correlation coefficients between the PQRS and COPM performance scores were −0.08 to 0.44 on the PQRS-G and −0.37 to 0.53 on the PQRS-OD, whereas the correlation coefficients between the PQRS and COPM satisfaction scores were −0.13 to 0.16 on the PQRS-G and −0.23 to 0.29 on the PQRS-OD. Furthermore, Cup et al.[3] examined the discriminant validity of the COPM for patients with stroke. For the individual problems identified in the COPM, 25% or less were also identified in the other five standard assessments: the BI, FAI, Stroke-Adapted Sickness Effect Profile-30 (SA-SIP30), EuroQOL (EQ-5D), and Rankin Scale (RS) five-dimension questionnaire. The correlations between the performance scores of the COPM and the other five standard assessments were nonsignificant. However, the five assessment tools were significantly correlated (p<0.05).

Chan and Lee[24] assessed the validity of the COPM, and three other assessment tools, namely the Klein-Bell ADL (KB-ADL) Scale, Satisfaction with Performance Scale Questionnaire (SPSQ), and Functional Independence Measure (FIM), in 39 adults with orthopedic disabilities (n=30) and stroke (n=9). The results revealed that the COPM content and processes

Table 1. Reliability and validity of the COPM for patients with stroke

Authors	Population	Reliability		Validity				
		Test–retest		Content-related validity	Convergent validity		Divergent validity/discriminatory validity	
		COPM (performance)	COPM (satisfaction)		COPM (performance)	COPM (satisfaction)	COPM (performance)	COPM (satisfaction)
Martini et al. (2014)[23]	Patients with stroke, 6; Children with developmental coordination disorder, 8							
Cup et al. (2003)[3]	Patients with stroke, 26	0.89	0.88		PQRS-G (r=−0.08– 0.44) PQRS-OD (r=−0.37–0.53)	PQRS-G (r=−0.13–0.16) PQRS-OD (r=−0.23–0.29)	BI: r=−0.225 FAI: r=−0.115 SA-SIP30: r=0.102 EQ-5D: r=0.143 Rankin Scale: r=0.209	
Chan and Lee (1997)[24]	Orthopedic patients, 30; Patients with stroke, 9			1. To evaluate whether the occupational performance was "good." 2. Accuracy and adequacy of the assessment format were criticized. 3. Being able to assess the performance components of patients as "fair." 4. The representativeness of the test content was "fair."	Klein–Bell ADL Scale: Dressing: r=0.08 Mobility: r=−0.10 Bathing: r=0.18 Eating: r=0.20 Elimination: r=0.04 SPSQ: Home management: r=0.18 Social community problem solving: r=0.02 FIM: Motor: r=0.03 Cognitive: r=−0.17	Klein–Bell ADL Scale: Dressing: r=−0.15 Mobility: r=0.18 Bathing: r=−0.32 Eating: r=0.12 Elimination: r=0.03 SPSQ: Home management: r=−0.12 Social community problem solving: r=0.13 FIM: Motor: r=0.14 Cognitive: r=−0.16	Klein–Bell ADL Scale: Dressing: r=0.21 Mobility: r=0.16 Bathing: r=−0.05 Eating: r=0.03 Elimination: r=0.33 SPSQ: Home management: r=0.31 Social community problem solving: r=0.39 FIM: Motor: r=0.32 Cognitive: r=0.20	Klein–Bell ADL Scale: Dressing: r = 0.13 Mobility: r = 0.14 Bathing: r=−0.05 Eating: r = −0.07 Elimination: r = 0.26 SPSQ: Home management: r = 0.22 Social community problem solving: r = 0.36 FIM: Motor: r = 0.26 Cognitive: r = 0.14

R: Correlation coefficient; PQRS-OD: Performance Quality Rating Scale-Operational Definitions rating system; PQRS-G: Performance Quality Rating Scale-Generic rating system; BI: Barthel Index; FAI: Frenchay Activities Index; SA-SIP30: Stroke-Adapted Sickness Impact Profile-30; EQ-5D: EuroQOL five-dimension questionnaire; SPSQ: Satisfaction with Performance Scaled Questionnaire; FIM: Functional Independence Measure

Table 2. Summary of 10 randomized controlled trials using the Canadian Occupational Performance Measure (COPM) in patients with stroke

Authors	Country	Patients	Recruitment	Intervention	Target domain	COPM as
Page, Hill, and White (2013)[33]	USA	Patients with chronic stroke, 16	Local stroke support groups Outpatient rehabilitation clinics	E: Repetitive task, specific practice with wearing a portable robotic device C: Repetitive task, specific practice with manual regimen	Upper extremity dysfunction	Secondary outcome measure
Nilsen, Gillen, DiRusso, and Gordon (2012)[34]	USA	Patients with chronic stroke, 16	Stroke support groups	E: Mental training and practice by using either an internal or external perspective C: Relaxation imagery training	Upper extremity dysfunction	Secondary outcome measure
Polatajko, McEwen, Ryan, and Baum (2012)[35]	Canada	Patients with chronic stroke, 8	Using the Cognitive Rehabilitation Research Group database Rehabilitation Institute	E: Cognitive orientation to a daily occupational performance intervention C: Standard occupational therapy	Occupational performance	Primary outcome measure
Taylor et al. (2012)[36]	New Zealand	Patients with acute stroke, 38	Inpatient rehabilitation services	E: Using the COPM for goal setting C: Nonstructured goal setting	Structured approach to goal setting	Goal setting
Almhdawi (2011)[37]	USA	Patients with chronic stroke, 20	Local medical facilities Local community organizations	E: Occupational therapy, task-oriented approach for first 6 weeks and no treatment for the final 6 weeks C: Reverse order of E	Upper extremity dysfunction	Primary outcome measure
Shaw et al. (2010)[32]	U.K.	Patients with stroke, 332 (at least 1 month); 181, within 1 year; and 151, after 1 year	Stroke units Clinics Day hospitals Community rehabilitation teams Stroke clubs Day centers	E: Botulinum toxin type A injection(s) plus upper limb therapy C: Upper limb therapy program alone	Upper limb spasticity	Goal-setting/Secondary outcome measure
Hayner, Gibson, and Giles (2010)[38]	USA	Patients with chronic stroke, 12	Local stroke support groups Clinics	E: Constraint-induced movement therapy C: Bilateral treatment	Upper extremity dysfunction	Primary outcome measure
Mew (2010)[39]	U.K.	Patients with acute to subacute stroke, 4	Acute stroke rehabilitation unit	E: Normal movement approach C: Functional approach	Lower limb dressing	Primary outcome measure
Gilmore and Spaulding (2007)[40]	Canada	Patients with acute stroke, 10	Inpatient rehabilitation organization	E: Videotape feedback with occupational therapy C: Occupational therapy	Donning socks and shoes	Primary outcome measure
Corr, Phillips, and Walker (2004)[41]		Patients with stroke, 25 (follow-up, 12 months)	The Cardiff Day Service	E: Treatment for the first 6 months and no treatment for the final 6 months C: Reverse order of E	Overall performance	Primary outcome measure

Acute stroke: within 3 months
Subacute stroke: 3–6 months
Chronic stroke: more than 6 months
E: experimental group; C: control group

presented the occupational performance of the patients. Furthermore, the convergent and discriminant validity of the COPM and the KB-ADL Scale were significantly different, although the correlation coefficients in some items were zero or negative. Similarly, the COPM was not strongly correlated with the SPSQ or the FIM. These results could show that, although the COPM efficiently measured occupational performance, it did not assess the same factor in the KB-ADL, SPSQ, or FIM. From these three studies, we conclude that the COPM is weakly associated with other assessment tools used for assessing patients with stroke. The COPM thus measured the independent perspective of the client's outcome.

The findings of the 10 RCTs, which met our part 2 criteria, are summarized in Table 2. These RCTs were published between 2004 and 2014. From the publication years, we observed the trend that researchers recently intended to select the COPM as an outcome measure assessment or goal-setting instrument for patients with stroke: Eight RCTs were published after 2009, whereas only two RCTs were published before 2009. All the included RCTs were conducted in Western or English-speaking countries (four in the United States, three in the United Kingdom, two in Canada, and one in New Zealand). In addition, three RCTs enrolled patients with acute or subacute stroke (<6 months); five RCTs enrolled patients with chronic stroke (>6 months); one RCT enrolled patients with acute to chronic stroke; and one RCT enrolled patients with stroke at referral and followed them for 12 months. Furthermore, the main target domains included upper extremity dysfunction in four RCTs, lower limb dressing in two RCTs, and various goals (eg, upper limb spasticity, occupational performance, overall performance) in one RCT. In addition, six RCTs used the COPM as a primary outcome, two as a secondary outcome, and two as a goal-setting instrument.

DISCUSSION

This review assessed whether the COPM is a suitable instrument for patients with stroke. Our findings of the psychometric properties and clinical utility of the COPM matched our expectations regarding its applicability as a clinical assessment tool. As shown in Table 1, the COPM showed satisfactory test–retest reliability (0.88–0.89) in the stroke population. On the basis of previous studies[10, 12], the COPM was considered reliable for different diagnostic populations. However, only[3] examined the test–retest reliability of the COPM for 26 patients with stroke. Although they enrolled the same interviewers, the reliability of the COPM items remained unclear. Therefore, we might require more evidence for supporting the reliability of the COPM. Further research investigating the problems of patients with stroke is recommended, particularly regarding stroke types and different sequels.

Regarding the validity of the COPM, all three studies (Table 1) indicated that the COPM was weakly associated with the other outcome measures: the BI, FIM, FAI, PQRS, RS, KB-ADL, SPSQ, SA-SIP30, and EQ-5D. This weak association was attributed to the patient-centered design of the COPM: a semistructured interview in which patients self-report their unique problems[3]. Consequently, the COPM explores the special needs of patients, which cannot be determined using fixed-item assessment pools. Partly explaining this hypothesis[25], indicated that score changes on a self-reported instrument assessing satisfaction with daily living performance was significantly associated with changes in scores on the COPM.

Our findings on RCTs revealed that most practitioners generally used other standard assessments in addition to the COPM to complete whole perspectives of outcome measure. Parker and Sykes[26] conducted a systematic review and reported that the COPM was often effective with other instruments, such as the BI, FIM, Reintegration to Normal Living Index, and Disability of Arm, Shoulder, Hand, and Health Assessment Questionnaire. This result may imply that using standard assessments alone is inefficient for comprehensively understanding a patient's condition. The COPM adapt semistructured interview to understand its clients from different perspectives.

The study showed that the number of RCTs using the COPM as an outcome measure assessment or goal-setting instrument for patients has progressively increased in recent years, and more than half of the RCTs used the COPM as a primary outcome measure. This phenomenon can explain why the COPM is considered a reliable, valid, and acceptable tool for research-ers or clinical practitioners. None of the 10 RCTs were conducted in Eastern or non-English-speaking countries, possibly because therapists from these countries did not widely use the COPM for assessment during the study period or because they published fewer related articles in English. Attempting to investigate the use of the COPM in Eastern countries by assessing Taiwan and Mainland China as examples, we conducted searches by entering the phrase "Canadian Occupational Performance Measure" in the Chinese Electronic Periodical Service database for articles published before November 25, 2015. The findings revealed only seven studies (two from Taiwan and five from Mainland China). Moreover, we searched the search terms "Canadian Occupational Performance Measure" and "Taiwan" in PubMed and MEDLINE for articles published before November 25, 2015; however, we found only four Taiwanese studies. Nevertheless, we reviewed the six studies from Taiwan and observed that two studies[12, 27] explored the reliability or validity of the COPM in Taiwanese patients with psychiatric disorders; the findings revealed that the COPM can be reliably used and validated for these patients. Three other studies[28–30] used the COPM for assessing goal achievement and quality of life in their patients and compared the results with those of other assessment tools[25] reported their experiences of using the COPM with participating therapists and patients in a neurorehabilitation unit.

We hypothesized some barriers to using the COPM in Eastern countries. The first barrier addressed the passive attitude of patients: If a family member suffers from stroke, the other members extensively support that patient. Thus, the patients play "patient roles" and rely more on their therapist to set goals for them[25]. The patients sometimes have low confidence or feel

ashamed to make decisions, may over rely on medication, and have high expectations of medical treatments. This passive attitude may discourage clinical therapists from selecting a self-reporting instrument. The second barrier entailed unfamiliarity with the COPM: Before using the COPM, therapists should have sufficient knowledge regarding the COPM and personal interview techniques[5]. Although most therapists generally learn how to use the COPM during their studies, they may lose their confidence because of infrequent use. Chen, Rodger, and Polatajko[25] reported that Taiwanese patients were unfamiliar with the terms "performance" and "satisfaction" and sometimes had difficulty identifying their performance problems. In brief, therapists cannot use the COPM efficiently, which may reduce their motivation to use it.

The COPM appears to be used for any stage of stroke because the reviewed RCTs enrolled patients with chronic, subacute, and acute stroke (Table 2). However, cognition is affected in a high proportion of stroke patients[31], and their cognition level may affect COPM use. The advantage of using the COPM is that patients with adequate communication skills can accurately identify their occupational performance[26]. Thus, clinical therapists who treat patients with poor cognition should exercise caution in analyzing COPM results.

Goal setting was the main purpose of two RCTs that used the COPM. Carswell et al. (2004) reported that the COPM is typically considered a useful measurement tool because it demonstrates significant efficiency in enabling patients to set appropriate therapeutic goals and in reflecting and providing effective feedback for patients and therapists. Furthermore, the COPM enables patients to set goals for themselves and assists the clinical staff in providing more effective rather than ordinary treatments[32]. In addition, McColl et al.[8] reported that 75% of their patients considered the COPM to be useful for identifying their problems; all the patients stated that the COPM was comprehensible. However, Shaw et al. [32] reported that the goals set by patients themselves may not be achievable or realistic.

This study had several limitations. First, the small number of studies analyzed in our review provided limited evidence. Second, the search strategies of the study were limited to searching terms associated with psychometric properties and RCTs; some relevant studies might have been excluded. Third, only studies published in English were included; relevant studies not published in English may have been missed. Although the study has some limitations, it still has some contributions to clinical therapists, including physiotherapists. It helps physiotherapists to identify problem in common clinical patient such as neuralgic disease[42], and it also can be an outcome measure for assessing children performance and satisfaction such as cerebral palsy children[43]. Moreover, the COPM is newly used to assess the occupational performance for patients with cardiac disease, because it is necessary to understand their needs for this group of patients[44].

In summary, the COPM has satisfactory reliability and validity for patients with stroke, enables patients to identify their needs, and provides therapists with directions regarding interventions. The COPM also enables therapists to concentrate on patients' perceptions and to develop effective intervention strategies. However, the COPM has some drawbacks; for instance, it is not suitable for patients with stroke who exhibit cognitive deficits, and the goals set during a COPM interview may not be achievable.

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