

AUTHORS:

Velisiwe Zodwa Mbuyisa^a
<https://orcid.org/0000-0003-1220-4302>
 Michael O Ogunlana^b
<https://orcid.org/0000-0001-6877-6938>
 Nonjabulo Ndaba^c
<https://orcid.org/0000-0002-8273-028X>
 Pragashnie Govender^c
<https://orcid.org/0000-0003-3155-3743>

AFFILIATIONS:

^aSchool Based Occupational Therapist, Department of Education, Gauteng, South Africa
^bFederal Medical Centre, Abeokuta, Ogun/West, Nigeria
^cSchool of Health Sciences, University of KwaZulu-Natal, South Africa

CORRESPONDING AUTHOR:

Pragashnie Govender naidooop@ukzn.ac.za

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Knowledge and perception of occupational therapists and physiotherapists on the use of constraint-induced movement therapy for stroke rehabilitation in South Africa

ABSTRACT

Background: Rehabilitation therapists are expected to manage upper extremities difficulties following stroke by using effective treatment approaches. Constraint-induced movement therapy (CIMT) facilitates upper extremity functional recovery in patients after stroke; however, in South Africa, its application is not well documented.

Aim: To assess and compare the knowledge and perception of occupational therapists and physiotherapists on the use of CIMT for stroke rehabilitation in South Africa.

Methods: A descriptive cross-sectional design using a self-administered online questionnaire was distributed via the two national professional societies. Data were analysed descriptively and the Mann-Whitney U and Kruskal Wallis tests were used to make inferences.

Results: Of 108 respondents, 49.1% (n=53) were occupational therapists, and 50.9% (n=55) physiotherapists. A higher level of education (p=0.037) and working specifically with stroke patients (p=0.050) are significantly associated with better CIMT knowledge and perception. The profession of the participants was not significantly associated with their knowledge and perception of CIMT.

Conclusion: This study demonstrates gaps in the knowledge of CIMT as a treatment technique for upper extremity impairment following stroke. Although most respondents knew about CIMT, improved guidance and knowledge of CIMT are required to remediate knowledge gaps. This may assist in improving the feasibility of CIMT and thus promote its clinical application, given the prevalence of UE impairment in stroke patients managed by therapists.

INTRODUCTION

Most stroke survivors have upper extremity (UE) impairment early after stroke¹. The prevalence of upper extremity impairment is approximately 50–80% in the acute phase and 40–50% in the chronic phase². Impairment of the UE can cause significant difficulties for patients recovering from stroke as it affects all areas of occupation. In clinical practice, occupational therapists and physiotherapists are expected to manage UE impairment after stroke and carry out treatment approaches that will effectively rehabilitate the UE. Yet, the treatment approaches for managing these difficulties in South Africa have not been widely reviewed.

After a stroke, several approaches exist for UE motor function rehabilitation. Constraint-induced movement therapy (CIMT) is a commonly used rehabilitation approach to improve upper extremity function (e.g., hemiparesis) after a stroke. In CIMT, the less affected UE is restrained while the affected UE receives intensive training in unimanual skills and the fine motor skills of the affected UE improve significantly after intervention³. CIMT has been shown to improve motor function in chronic hemiparesis of stroke patients⁴. In chronic patients with mild to moderate hemiparesis, the CIMT rehabilitation approach has been

used for improving the motor recovery of the affected UE^{4,5}. Following a stroke, the patient starts to compensate due to difficulty using the affected limb, relying increasingly on the unaffected limb, and this compensation will result in learned non-use⁶. Although CIMT is regarded as the most effective approach to facilitating UE recovery following stroke, it has also not been used frequently for neurological rehabilitation by therapists⁵.

In South Africa, the absolute number of persons affected by stroke has increased yearly since 1990, along with the number of disabled stroke survivors⁷. The use of the CIMT treatment approach could be valuable in treating UE impairment; however, its application within the South African context is not well documented. Knowledge and perception of the use of CIMT for stroke rehabilitation are reported to directly affect the therapist-patient interaction, competence in carrying out the necessary intervention, and preferred therapy approach when providing treatment⁶. The study investigated the knowledge and perceptions of South African occupational therapists and physiotherapists on the utilisation of CIMT for UE rehabilitation in stroke patients. The main hypothesis examined in this study was that there would be no significant difference in the knowledge and perception of South African occupational therapists and physiotherapists in the utilisation of CIMT for UE stroke rehabilitation. The outcome of this enquiry may be useful for knowledge translation by South African health professional associations to influence clinical practice, and in informing curricula inclusions at an undergraduate level at institutions.

LITERATURE REVIEW

CIMT is suitable for stroke patients with mild to moderate arm and hand function impairment. It encourages increased use of the affected arm in daily life⁸. CIMT indicate improvements in the patient's ability to complete daily activities with their affected extremity following CIMT treatment⁹. Therefore, in patients with residual arm function but still with severe functional impairments (i.e., moderate paresis), therapy with CIMT should be strongly considered¹⁰. The process of gain in motor function of the affected UE after the introduction of the CIMT during rehabilitation is said to be linked with the increase in activation of motor cortices of the undamaged hemisphere during affected hand movement; patients show a shift in motor cortical laterality toward the ipsilateral hemisphere in association with improved motor function of the affected limb resulting in improved motor function of the affected UE in patients with chronic stroke^{4,5}.

Practice of constraint-induced movement therapy

The principal foundation of CIMT practice is the (a) use of restraint, (b) repetitive, structured, practice intensive therapy in the more affected arm, and (c) application of a package of behavioural techniques that transfers gains

from the clinical setting to the real world¹¹. A restraint is worn over the unaffected arm to prevent movement, to ensure that the stroke survivor uses the affected limb to carry out functional tasks. Mass practice is the intensive repetition of motor activity¹¹. Methods and duration of CIMT delivery vary in the type of constraint worn, and in time frames ranging from 30 minutes to six hours a day, or more¹². Prominent ranges in dosage variability found in the literature included: durations from five days¹³, to 70 days¹⁴, and one hour a day¹³ to six hours a day¹⁵. This variation in dosage depends on the availability of the caregiver, level of tolerance and active participation of the patient. Shaping is a method in which motor tasks are gradually made more difficult. It is the progression of tasks given to a patient according to the patient's motor ability¹¹. The tasks are usually functional and can include picking up a cup from the table, taking it to the mouth, drinking from it, writing letters, transferring objects from left to right on a table, brushing the teeth, and removing shoes, amongst others. Transfer package is the use of the hand in life situations, and problem-solving to overcome perceived barriers to using the other body extremities¹⁶.

Barriers to constraint-induced movement therapy use

Factors that hinder the usage of CIMT are categorised into three broad groups as described by Fleet et al⁵. These barriers are therapist-related, institutional mediated, and patient-related barriers (including physical or cognitive challenges). Regarding institutional and patient barriers, findings have shown that a lack of resources can hinder CIMT use. Patient non-compliance and cognitive and physical characteristics may be the main barriers to implementing CIMT. Restraint and repetitive intensive training may affect the participant's motivation to use CIMT^{17,18} and the high labour demand in the clinical setting may hinder the use of CIMT¹⁸. Therefore, increasing participants' motivation and decreasing the CIMT's human resources demand are required to successfully implement CIMT. The duration required for each CIMT session differs widely between studies, ranging from 30 minutes to six hours per day^{12-15,17}. This can pose a considerable hindrance to the utilization of the CIMT treatment approach.

METHODS

Study Design

The study used a descriptive cross-sectional study design with a self-administered online questionnaire that sought to assess and compare the knowledge and perception of CIMT by South African occupational therapists and physiotherapists.

Study Setting

The study used an online platform to access occupational

therapists and physiotherapists working in the public and private health care sectors of SA.

Recruitment, Selection and Sampling

Participants were recruited through a convenience sample after satisfying the selection criteria. Inclusion criteria required participants to be currently registered with the Health Professions Council of South Africa (HPCSA), participants holding recognised undergraduate qualifications in occupational therapy or physiotherapy, employed in South Africa, and currently practising occupational therapy or physiotherapy. Lastly, participants had to be engaged in providing interventions for patients with neurological impairments in clinical practice at the time of the study. Participants employed outside of South Africa and practising in other health professions were excluded.

Participants were sampled based on their field of practice in adult neurology. The sample size was determined using the Cohen effect size formula to compare the knowledge and perception of occupational therapists and physiotherapists about the use of CIMT as described by Sullivan¹⁹. Using an a-priori effect size of 0.6, at a power of 80% and a 95% confidence interval, each group needed to have a minimum sample size of 44 participants making a total of N=88 participants for the two groups. Assuming a 10% non-response rate, the desired sample size was 96 participants (48 subjects per group).

A series of initial qualifying questions were asked in the survey. Those who did not meet the eligibility for participation were immediately redirected to submit without being permitted to complete/progress on the survey. The qualifying questions included undergraduate qualification, and registration status with the HPCSA and if their experience in the field of stroke rehabilitation had been obtained in South Africa or internationally. Only participants who met all the predetermined criteria could continue to the next section of the survey.

Research Instrument

The research instrument was a questionnaire that was developed using Google Forms which is a survey administration application. The three-part questionnaire had section A that sought to elicit demographic data, presented in closed multiple-choice format. Section B consisted of twelve dichotomous questions on knowledge about CIMT and Section C had thirteen Likert scale questions on perception of CIMT use in clinical practice.

Intra-rater test-retest reliability involving 20 therapists was done for the developed questionnaire. This had an item-by-item kappa value of 1 for all 25 items correlated implying an excellent item by item internal consistency. The initial intraclass coefficient (ICC) for the research instrument was 0.619 with a 95% confidence interval of 0.426–0.771. The item-by-item Cronbach Alphas were used in improving the ICC by removing some redundant questions. This resulted in a new ICC of 0.768 with a 95% confidence interval of 0.65–0.86. An expert panel of occupational therapists and physiotherapists conducted

a face validity check on the questionnaire. This reduced threats of validity by improving the data collection tool and ensuring that it measured what it purports to measure.

Data Collection

An online survey format was used for data collection, and this was appropriate as it limited human to human contact as it is prescribed in this COVID era. It also allowed the researcher to collect data from therapists across a larger geographical area. This online survey was sent out via the Occupational Therapy Association of South Africa (OTASA) and the South African Society of Physiotherapy (SASP). Data collection aimed to gain insight into the knowledge and perceptions of participants.

Data Analysis

Since Google Survey was used as an online platform for data collection, responses were automatically uploaded into a secure Google spreadsheet. The data were transferred onto a spreadsheet using Microsoft Excel and were later analysed using SPSS 21 software (IBM, 2017). Data were collated, cleaned, and coded for descriptive analysis. Scoring of sections B and C of the questionnaire was done to generate knowledge and perception scores, respectively. In the knowledge section, every correct answer was scored one and any incorrect answer was scored zero. For the perception section, all the negative answers (strongly disagree/agreed, disagree/agreed and neutral) were scored zero while all positive answers were scored one; agree/disagree was scored one and strongly agree/strongly disagreed was scored two. A test of normality was performed on the knowledge and perception scores using the Shapiro Wilk test with a p-value of 0.002 for perception score and <0.0001 for knowledge score, showing that the data were not normally distributed. Mann-Whitney U and Kruskal Wallis tests were used in making inferences on the association between components of knowledge, perception and demographic characteristics. The level of statistical significance was set at $p \leq 0.05$.

Ethical Considerations

Ethical approval for the study was obtained from the Human and Social Science Research Ethics Committee (HSSREC) of the University of KwaZulu-Natal (HSSREC/00002860/2021). Gatekeeper's permission was obtained from OTASA and SASP. Informed consent was obtained from individuals participating in the study. The participants were required to declare that they understood the research process, their rights as participants and voluntarily consent to participate.

RESULTS

A total of n=108 therapists responded to the study and provided consent. Of these 91.7%, (n=99) of respondents completed all three sections of the online questionnaire. Of these, 49.1% (n=53) practised as occupational therapists, and 50.9% (n=55) practised as physiotherapists. Respondents comprised of 30.6% (n=33) males and 69.4%

Table 1: Demographic characteristics of the respondents (n=108)

		Occupational Therapists n (%)	Physiotherapists n (%)	Total n (%)
Gender	Female	43 (39.8)	32 (29.6)	75 (69.4)
	Male	10 (9.3)	23 (21.3)	33 (30.6)
Age	<29 years	23 (21.3)	25 (23.1)	48 (44.5)
	30 – 39 years	20 (18.5)	13 (12.0)	33 (30.6)
	40 – 49 years	3 (2.8)	12 (11.1)	15 (13.9)
	50 – 59 years	7 (6.5)	4 (3.7)	11 (10.2)
	> 60 years	0 (0.0)	1 (0.9)	1 (0.9)
	Other (Please specify)	0 (0.0)	1 (0.9)	1 (0.9)
University (undergraduate degree)	Sefako Makgatho University / MEDUNSA	2 (1.9)	8 (7.4)	10 (9.3)
	University of Cape Town	4 (3.7)	5 (4.6)	9 (8.3)
	University of the Free State	2 (1.9)	0 (0.00)	2 (1.9)
	University of KwaZulu- Natal/ University of Durban Westville	17 (15.7)	16 (14.8)	33 (30.6)
	University of Pretoria	6 (5.6)	8 (7.4)	14 (13.0)
	University of Stellenbosch	9 (8.3)	7 (6.5)	16 (14.8)
	University of the Western Cape	5 (4.6)	3 (2.8)	8 (7.4)
	University of the Witwatersrand	8 (7.4)	7 (6.5)	15 (13.9)
Qualification	PhD	0	3 (2.8)	3 (2.8)
	Masters	11 (10.2)	8 (7.4)	19 (17.6)
	Bachelors	42 (38.9)	44 (40.7)	86 (79.6)
HPCSA registration	Community service therapist	2 (1.9)	1 (0.9)	3 (2.8)
	Independent practitioner	51 (47.2)	54 (50)	105 (97.2)
Duration of practice	< 2 years	6 (5.6)	1 (0.9)	7 (6.5)
	Between 2 - 4 years	11 (10.2)	11 (10.2)	22 (20.4)
	Between 4 - 10 years	17 (15.7)	18 (16.7)	35 (32.4)
	>10 years	19 (17.6)	25 (23.1)	44 (40.7)
Province	Eastern Cape	5 (4.6)	2 (1.9)	7 (6.5)
	Free State	3 (2.8)	2 (1.9)	5 (4.6)
	Gauteng	13 (12.0)	9 (16.4)	22 (20.3)
	KwaZulu-Natal	16 (14.8)	15 (13.9)	31 (28.7)
	Limpopo	2 (1.9)	3 (2.8)	5 (4.6)
	Mpumalanga	3 (2.8)	3 (2.8)	6 (5.6)
	Northwest	0 (0.0)	7 (6.4)	7 (6.4)
	Northern Cape	1 (0.9)	3 (2.8)	4 (3.7)
	Western Cape	10 (9.3)	11 (10.2)	21 (19.4)
Practice	Private/Public	0 (0.0)	2 (1.9)	2 (1.9)
	Private only	27 (25.0)	22 (20.4)	49 (45.4)
	Public only	26 (24.1)	29 (26.9)	55 (50.9)
	Academia	0 (0.0)	2 (1.9)	2 (1.9)
Status of Patients	Both in-patient and out-patient	32 (29.6)	42 (38.9)	74 (68.5)
	Out-patient only	18 (16.7)	13 (12.0)	31 (28.7)
	In-patient only	3 (2.8)	0 (0.0)	3 (2.8)
Years of experience in stroke rehabilitation	<5 years	23 (21.3)	19 (17.6)	42 (38.9)
	5 – 10 years	17 (15.7)	14 (13.0)	31(28.7)
	>10 years	13 (12.0)	22 (20.4)	35 (32.4)

Table II: Comparison of CIMT knowledge score across demographic and work-related variables (n=99)

Variable	N	Median	Interquartile range	p-value
Professional group				a0.164
Occupational Therapist	47	10.0	8-10	
Physiotherapist	52	9.0	8-10	
Gender				a0.210
Male	33	9.0	8-10	
Female	66	9.0	8-10	
Qualification				b0.136
PhD	3	10.0	-	
Masters	14	9.5	9-10	
Bachelors	82	9.0	8-10	
Years of experience				b0.161
<5 years	42	9.0	8-10	
5 – 10 years	28	9.0	8-10	
>5 years	29	10.0	9-10	
Duration of practice				
<2 years	7	8.0	7-9	b0.318
Between 2 – 4 years	22	9.0	7-10.25	
Between 4 – 10 years	34	9.5	8-10	
>10 years	36	8.0	8-10	
Setting of practice				b0.347
Both	2	8.0	-	
Private	40	9.0	8-10	
Public	55	9.0	8-10	
Academia	2	10.0	-	
Status of patients treated				b0.126
Both in-patient and out-patient	69	9.0	8-10	
Out-patient only	27	9.0	8-10	
In-patient only	3	11.0	10-11	
Do you routinely manage stroke patients				a0.037*
No	6	8.0	7.5-9	
Yes	93	9.0	8-10	

*=Significant at $p \leq 0.05$ a=Mann-Whitney test, b=Kruskal Wallis test

(n=75) females who represented all provinces. A total of 79.6% (n=86) respondents reported a bachelor's degree as their highest level of education, 17.6% (n=19) had a master's degree, and 2.8% (n=3) reported they had a PhD. While all respondents had experience practising in stroke rehabilitation, 38.9% (n=42) reported having less than five years of experience. Most respondents (68.5%; n=74) reported working primarily with both in-patient and out-patients. Other demographic characteristics of the respondents are detailed in Table I, above.

Therapists' Knowledge of Constraint-Induced Movement Therapy

The knowledge score ranged from 5 to 12, with a median knowledge score and its interquartile range being 9.0 (8-10). Statistical hypothesis testing was conducted (Table II, above) between the knowledge components to determine the statistical difference ($p \leq 0.05$) and the association between selected variables elicited in section A of the questionnaire. The knowledge of occupational therapists and physiotherapists of CIMT was not significantly different as presented in Table II, above (p -value = 0.164).

Therapists involved in managing stroke patients in clinical practice had a significantly higher CIMT knowledge score when compared to therapists that do not routinely manage stroke patients with CIMT ($p = 0.037$).

A total of 84.8% (n=84) respondents were aware of the CIMT as a treatment technique for UE impairment and 98% (n=97) respondents agreed that it can be used in stroke rehabilitation. Furthermore, 15.2% (n=15) of respondents reported being unaware of CIMT as a treatment technique for UE impairment. A total of 66.7% (n=66) respondents reported that CIMT does not involve constraining the affected arm, and 78.8% (n=78) respondents reported that CIMT is delivered one to seven days for about six hours a day. The majority of respondents (88.9%; n=88) reported intensive graded practice of the affected UE to enhance specific use as one of the components of CIMT. The majority (77.8%; n=77) of respondents indicated that CIMT gains could not be transferred from the clinical setting to allow for functions and 90.9% (n=90) described the aim of CIMT as to improve and increase the use of the more affected UE while restricting the use of the unaffected UE hence improving the functioning of the affected UE. Most respondents (98.0%, n=97) believed CIMT to be an efficacious treatment technique in stroke rehabilitation (see Tables III and IV on pages 56 and 57).

The CIMT perception scores ranged from 0 to 19, with a median and interquartile range of 9.0 (7-12). Statistical hypothesis testing was conducted (Table V page 59) between perception components to determine the statistical

difference ($p \leq 0.05$) and the association between selected variables elicited in section A of the questionnaire. Therapists with higher qualifications had higher CIMT perception scores ($p = 0.050$) on the use of CIMT in the management of UE impairment during stroke rehabilitation thus implying that therapists with higher qualifications perceive CIMT as a valuable treatment modality. There was no significant difference between the perception of occupational therapists and physiotherapist on the use of CIMT ($p=0.930$ see Table V, page 59).

Table III Response distribution on knowledge of CIMT (n = 99) (the correct response is highlighted)

Knowledge of CIMT	Yes	No
	f (%)	f (%)
Are you aware of constraint-induced movement therapy (CIMT) as a treatment technique for upper extremity impairment	84 (84.8)*	15 (15.2)
CIMT is a behavioural approach to neurorehabilitation based on learned non-use	77 (77.8)*	22 (22.2)
CIMT does not involve constraining affected limb	33 (33.3)	66 (66.7)*
One component of CIMT is intensive graded practice of the affected limb to enhance specific use	88 (88.9)*	11 (11.1)
In CIMT gains obtained cannot be transferred into clinical setting to allow functionality	22 (22.2)	77 (77.8)*
CIMT improves and increases the use of the more affected upper extremity while restricting the use of the unaffected arm	90 (90.9)*	9 (9.1)
Can CIMT be used in stroke rehabilitation	97 (98.0)*	2 (2)
The minimum motor inclusion criteria into CIMT exclude minimal AROM for wrist extension, thumb abduction and finger extension	29 (29.3)	70 (70.7)*
CIMT uses forms of restraining and is delivered 1-7 days, for about 6 hours a day	78 (78.8)*	21 (21.2)
Clinical setting and forms of constraint used cannot affect motivation of the patient to engage in CIMT	40 (40.9)*	59 (59.5)
Shaping in CIMT is a significant part of therapy	76 (76.8)*	23 (23.2)
Does your level of knowledge and experience impact on how CIMT is delivered?	92 (92.9)*	7 (7.1)

*=Correct option

DISCUSSION

This study was designed to assess and compare the knowledge and perception of occupational therapists and physiotherapists on the use of CIMT for managing UE impairment after stroke in South Africa. Occupational therapists and physiotherapists have a fundamental role in treating UE impairment in stroke rehabilitation. Occupational therapists use CIMT to improve the performance of occupations, such as activities of daily living and

increased spontaneous use of the affected arm during dressing, bathing, and feeding²⁰. In occupational therapy, CIMT has been shown to elicit changes in UE function through improvements in components of performance skills practised repetitively²¹ including improved hand function of the affected arm in reach, grasp, release, push, pull, sustained grasp, and bilateral use during play²². Physiotherapists use CIMT to improve gait and mobility-related functions. The outcome of this study reveals that the knowledge and perception of occupational therapists and physiotherapists in SA about CIMT were not significantly different. Though no published study known to the authors had examined the difference in knowledge and perception about CIMT among these two-rehabilitation professionals, it is expected that occupational therapists should be more knowledgeable and practically oriented about the use of CIMT in UE impairments of stroke survivors. This assumption is premised on the fact that the model of the practice of occupational therapists focuses more on the restoration of precision activities function than physiotherapists that focus more on gross movement restoration. Hence, occupational therapists may be more attentive to implementing a transfer treatment package alongside shaping activities as it is entrenched in the CIMT protocol.

Knowledge is a crucial requirement for using CIMT in stroke patients. Knowledge is a modifying factor in perception and practical behaviours²³. The level of knowledge about CIMT demonstrated by occupational therapists and physiotherapists will reveal the competency of therapists to use the treatment technique in treating UE impairment successfully. More than half of the respondents reported being knowledgeable about CIMT as a treatment technique used in stroke rehabilitation. They indicated that CIMT improves the potential motor capability of patients following stroke. It appears that some therapists were not well informed on the utility of CIMT while some do not use it at all despite the benefits associated with its use. The non-usage of CIMT by these therapists may be related to their lack of knowledge and other factors that influence their practice.

Most respondents stated that CIMT requires additional specialised training to ensure that therapists are competent and effective when delivering stroke intervention using this treatment technique for UE impairment. There are specific components of CIMT that are necessary for efficacious intervention^{16,24}. These regimens are better learnt with specific training for clinicians interested in delivering CIMT for stroke survivors. The modified protocol of CIMT appears to be much more accepted in clinical practice and therapists are expected to receive further training to enable the standardised usage of the revised protocol. Most respondents reported having clinical experience of more than ten years, this may explain the reason why most of them had good knowledge of CIMT and its components as they may have come across this intervention during their years of training and clinical practice. Therapists who have only some knowledge of CIMT (i.e., minimal or moderate knowledge) would need

Table IV Response distribution on Perception of CIMT (n = 99)

Perception of CIMT	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	f (%)	f (%)	f (%)	f (%)	f (%)
CIMT is an efficacious treatment approach in stroke rehabilitation	17(1)	45(45.5)	32(32.3)	4(4)	1(1)
CIMT should be used as the primary treatment approach when indicated	8(8.1)	34(34.3)	36(36.4)	20(20.2)	1(1)
CIMT should be delivered independently by a therapist in a clinical practice	1(1)	24(24.2)	45(45.5)	27(27.3)	2(2)
CIMT should be delivered by a team in a clinical practice	13(13.4)	45(45.5)	26(36.4)	4(4)	1(1)
The type of restraint used in CIMT can impact the results of therapy	20(20.2)	56(56.6)	19(19.2)	3(3)	1(1)
Key components of CIMT are a guide to how intervention should be delivered.	14(14.1)	55(55.6)	27(27.3)	3(3)	0(0)
CIMT reveals the potential motor capability	20(20.7)	56(56.6)	21(21.2)	1(1)	1(1)
Physical training can overcome the learned non-use of the affected upper extremity post-stroke	14(14.1)	49(49.5)	31(31.3)	4(4)	1(1)
The level of knowledge of the therapist can be a barrier to CIMT use	31(31.3)	54(54.5)	12(12.1)	2(2)	0(0)
Lack of resources in clinical practice can be a barrier to delivering CIMT	22(22.2)	45(45.5)	16(16.2)	15(15.2)	1(1)
The type of setting and number of therapists working with stroke patients can hinder the implementation of CIMT	19(19.2)	47(47.5)	22(22.2)	10(10.1)	1(1)
The time duration required when implementing CIMT is a factor resulting in low use of this treatment approach	16(16.2)	57(57.8)	20(20.2)	5(5.1)	1(1)
CIMT requires additional specific training to allow therapists to be competent and effective when delivering intervention using this treatment approach	11(11.1)	52(52.5)	24(24.2)	12(12.1)	0(0)

further training to allow them to implement CIMT in clinical practice competently.

While CIMT is identified as an effective technique, 92.9% of respondents agreed that the level of knowledge and experience impacts the therapist's competency to successfully use CIMT as a treatment technique in a clinical setting. To assess respondents' knowledge about CIMT, they were asked if shaping is a significant component of CIMT. The majority were able to identify shaping as substantial in CIMT. Shaping is considered one of the core components of treatment, and, consequently, a critical part of any CIMT protocol^{20,24,25}. This ability to identify CIMT fundamental components reveals a positive knowledge of the CIMT protocol among respondents²⁴. The results obtained from our sample of therapists reinforce prior observations that increasing therapists' knowledge of CIMT can contribute to more frequent use in clinical practice. This is aligned with Christie and colleagues²⁰, who reported that a range of strategies are needed for improving therapists' knowledge and skills to increase the frequency of CIMT delivery in clinical practice. Inferential analysis reveals that therapists practising stroke rehabilitation had significantly better knowledge than those not routinely involved in stroke rehabilitation. This is a plausible outcome as it is clear that the concept of

CIMT stemmed from neurological rehabilitation^{25,26}.

A similar analysis reveals that therapists with higher educational qualifications had a significantly better perception of CIMT. Therefore, the level of qualification and duration of working with stroke patients impact the knowledge and perception of occupational therapists and physiotherapists on CIMT as a treatment technique for UE impairment. Fleet et al⁵ reported similar findings among a population of Canadian occupational therapists and physiotherapists, hence the most accessible means of promoting the effective application of CIMT is through improved education.

The CIMT technique encourages the use of the affected UE therefore, it allows patients to be meaningfully engaged in basic activities of daily living and improve their occupational performance. CIMT has beneficial effects on motor function, arm-hand activities, and self-reported daily arm-hand functioning. Findings from the study showed that less than half of the respondents had a negative perception about using CIMT for UE management hence these respondents would not be eager to use CIMT in stroke rehabilitation. It was noted that restrictions and barriers to using CIMT mainly were a result of the negative perception of some therapists. They suggested that CIMT should not be considered a

Table V: Comparison between CIMT Perception scores and selected variables (n=99)

Variable	N	Median	Interquartile range	p-value
Professional group				°0.930
Occupational Therapist	47	9.0	7-11	
Physiotherapist	52	9.0	7-12	
Gender				°0.268
Male	33	9.0	2.5-11.5	
Female	66	9.0	7-12	
Qualification				^b 0.050*
PhD	3	11.0	10-11	
Masters	14	11.5	8-12	
Bachelors	82	9.0	7-11	
Years of experience				^b 0.462
<5 years	42	9.0	6.75-12	
5 – 10 years	28	9.0	7-10.75	
>5 years	29	10.0	8-11.5	
Duration of practice				^b 0.551
<2 years	7	7.0	6-9	
Between 2 – 4 years	22	9.0	3-13	
Between 4 – 10 years	34	9.0	7-11	
>10 years	36	9.5	7-11.75	
Setting of practice				^b 0.172
Both	2	10.5	9-10.5	
Private	40	10.0	7.25-12	
Public	55	9.0	6-11	
Academia	2	12.0	11-12	
Status of patients treated				^b 0.183
Both in-patient and out-patient	69	9.0	7-11	
Out-patient only	27	10.0	7.75-12	
In-patient only	3	13.0	8-13	
Do you routinely manage stroke patients				°0.971
No	6	9.5	5.25-12	
Yes	93	9.0	7-11.5	

primary treatment technique for UE impairment in stroke patients. Still, in practical terms, stroke rehabilitation is usually composed of different intervention models. Based on our findings, the divergence between the knowledge and perception of the therapist about CIMT suggests that there are also several barriers to implementation and use of CIMT in clinical practice such as lack of specific knowledge, time duration⁶ required to implement CIMT, number of therapists working with stroke patients, type of setting and lack of resources in clinical practice^{5,20,24,25}. Therapists also reported type of restraints used to be a

barrier preventing CIMT use clinically²⁴.

Limitations

Information gathered from the survey was restricted to closed-ended multiple-choice questions which may have been ambiguous to the respondent. Participants were not provided with an opportunity to share their experiences using CIMT. As a result, only knowledge and perceptions were assessed with no in-depth information regarding CIMT. A mixed-method research design may be more appropriate for comparing the knowledge and perception of the two professionals regarding their usage of CIMT.

CONCLUSION

The importance of occupational therapists and physiotherapists providing intervention for UE impairment using CIMT in stroke rehabilitation within the South African context was assessed and compared in this study. The outcomes from the study suggest that therapist's knowledge and perception on the use of CIMT was not different and a higher level of education / working specifically with stroke patients have better knowledge and perception of CIMT. Our findings regarding knowledge and perception about CIMT among practising therapists in our sample highlight the need for continuing professional education since most respondents indicated that additional training is required for therapists to successfully use CIMT intervention in stroke patients. Therapists' perceptions of CIMT can inform recommendations for UE intervention following stroke. Furthermore, these results can guide future research, which should focus on balancing the clinical feasibility of CIMT and its effectiveness in treating UE impairment in stroke patients.

Author Contributions

Velisiwe Zodwa Mbuyisa completed the study towards a postgraduate degree and was responsible for drafting the manuscript. Michael Opeoluwa Ogunlana, Nonjabulo Ndaba and Pragashnie Govender supervised the study and assisted in the critical revision of the manuscript. All authors approved the final version.

Conflict of Interest (COI) Statement

The authors declare no conflict of interest.

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