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Knowledge And Perceptions Of Physiotherapists About Strengthening Exercises In The Management Of Stroke At Selected First-Level Hospitals In Lusaka, Zambia

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ABSTRACT

Background: Strength training involves repeated muscle contractions against a progressive load in order to increase muscle strength, endurance, and power. However, the knowledge and perceptions of physiotherapists about what constitutes good practice in stroke vary.

Objective: Determine the knowledge and perceptions of physiotherapists about strengthening exercises in stroke management in selected First Level Hospitals in Lusaka, Zambia.

Methods: The study used a phenomenological study design. Twelve physiotherapists, all with work experience of two years and older participated in this study. Three (3) participants were not available at the time of data collection. Therefore, one-on-one interviews were conducted on nine (9) participants using a

purposive sampling technique. The interviews were recorded and transcribed verbatim. Data were analyzed using thematic analysis (framework analysis). Ethical approval was obtained from the Lusaka Apex Medical University Bio-Medical Research Ethics Committee (LAMUBREC).
Main Results: Exercise timing, experiences, facilitation and hindering factors, and promotion of strengthening exercises were the four emerging themes from data analysis. The response rate was 75%. The composition of the participants was 67% (n = 6) of women and 29% (n = 3) of men with a mean age of 27.8 years. The majority were degree holders (67%, n=6). Some participants worked for 9 years (n=4), and the highest worked for 12 years (n=1). Participants had good knowledge about strengthening exercises. They recommended the start of strengthening exercises soon after the stroke event as long as the patient is stable. Participants perceived strengthening exercises as the modality that leads to improved function and independence. Participants encountered challenges related to inadequate information, physiotherapy equipment, staffing, and infrastructure.
Conclusions The participants were qualified physiotherapists equipped with adequate knowledge of strengthening exercises. However, the implementation of strengthening exercises was hampered by limited dissemination of information to patients and inadequate equipment, staffing, and infrastructure.

KEYWORDS: KNOWLEDGE, PERCEPTIONS, PHYSIOTHERAPY, PHYSIOTHERAPY PRACTITIONERS, STROKE MANAGEMENT, STRENGTHENING EXERCISES, PHYSICAL ACTIVITY

1. INTRODUCTION

Stroke remains the leading cause of disability worldwide **[1, 2].** Stroke survivors often lose the ability to walk, sit, step, stand, and balance **[2, 3].** Physical inactivity is common in stroke patients due to physical dearth, but physical activity increases functional performance such as balance, gait speed, stair climbing, chair-stand, upper limb function, and quality of life **[1, 4, 5, 6].** There is increasing evidence for the use of strength training exercises and physical activity in the prevention of stroke and stroke rehabilitation **[2, 7, 8, 9]**. Strength training is most efficient when implemented at 50-80% of 1RM for 10-15 repetitions (1-3 sets) for 2-3 days per week and should be increased progressively **[9].**

The knowledge physiotherapy practitioners use in their daily profession is based on practice **[10].** Their knowledge about strengthening exercises is vital because it is a drive to use this approach during stroke rehabilitation **[11].** Among the barriers to implementing strength training is patient tolerance, as stroke patients easily get tired **[12].** Apparently, physiotherapists have not fully embraced strength training as part of their clinical practice **[5, 13].** Physiotherapists have inadequate knowledge on strength training because this modality is a late entry into the undergraduate curriculum. However, the literature shows that the knowledge and perceptions of physiotherapists about what constitutes good practice vary **[14].** Knowledge can be developed from both research and practice **[15].** The analysis is that physiotherapists can acquire practical knowledge to implement strength training in stroke patients if they can use the expertise of other clinicians or attend post-graduate training in exercise rehabilitation **[5].** Consequently, the professional knowledge of physiotherapists is influenced by their understanding of strengthening training and physical activity **[16].**

It is important to explore the perceptions of health professionals because their inherent beliefs about physical activity impact their capacity to promote it **[10, 16].** Physiotherapists are reluctant to take on the challenge of researching various interventions that they prescribe **[17].** However, the demand for evidence-based practice (EBP) is a catalyst for competent clinical practice in physiotherapy, since it involves research and decision-making based on clinical results **[18].** Many studies report positive attitudes towards EBP in physiotherapy and there are numerous factors that influence the use of strengthening exercises in stroke management **[16, 17, 18, 19].** Physiotherapists' perceptions of EBP are limited, difficult to apply, and inaccessible **[18].** A study **[20]** revealed that the perception of physiotherapists of intensive exercise therapy is lacking academic evidence with a tendency to focus on practical and personal experiences.

The principles of exercise prescription in physiotherapy are the same, but the application is highly dependent on the needs of the patient and the experience and basic training of physiotherapy practitioners **[21, 22]**. Mostly because there is no agreement on which rehabilitation programme offers optimal training **[23].** Physiotherapy is the most popular healthcare profession and physiotherapists spend the most time with stroke patients than any other profession **[24].** However, the choice of treatment for stroke patients depends on the background, knowledge, clinical experience, personal preferences of physiotherapists and the development of clinical practice **[18, 21].** Common factors that influence the choice of intervention include lack of time, lack of confidence in skills, failure to identify and critically assess research, lack of support from other healthcare professionals and insufficient access to evidence **[10, 16, 22, 23].**

2. RESEARCH METHODOLOGY

This study used a qualitative design with a phenomenological approach to determine the knowledge and perceptions of physiotherapists about strengthening exercises in stroke management. Phenomenology is the study of lived experiences of an individual within the world **[25].** Three First-Level Hospitals in Lusaka, namely Matero, George, and Chipata, also known as District Hospitals were selected for the study. These hospitals offer basic medical services to patients before referring them to a general hospital. They serve a population of between 16,000-80,000 and provide services such as medical, surgical, obstetric, and diagnostic services and all clinical services that support health center referrals. The bed capacity depends on the available infrastructure with an average bed capacity of 80 patients **[26].**

2.1Population and Sample

The literature recommends a large sample size that can easily yield a new and rich understanding of the phenomenon, and at the same time small enough to obtain deep and case-oriented data [**27**]. Clearly, the authors have not yet established what the exact size of a proper sample size is supposed to be for qualitative studies **[28].** The implication is that the sample size in qualitative research ranges from one person to small groups of people. However, a systematic review of empirical tests revealed that the sample size for saturation is between 5-20 interviews **[29].** Purposive sampling is a nonprobability sampling technique where the researcher decides who to include in the sample **[30].** This method is widely used in qualitative research to identify and select cases rich in information that are most effective in limited resources **[31].** The purposive sampling process requires identifying and selecting individuals or groups of people who have knowledge or have experienced a phenomenon of interest **[32].** Therefore, 12 physiotherapists both men and women were supposedly recruited to this study. However, three (3) practitioners were not interviewed due to non-availability, thus reducing the sample size to nine (9) participants. The selection criteria included qualified practitioners registered with the Zambian Health Professionals Council (HPCZ), with two years and more work experience, and were from the selected First-Level Hospitals. Practitioners who were on leave and rotational leave or who did not give their consent were excluded from this study.

The principal researcher conducted semi-structured one-on-one interviews based on an interview guide that contained open-ended questions (**See attached**). This technique is highly recommended because it is insightful and highlights perceptions, understanding and experiences of people in relation to the phenomenon and contributes to in-depth data collection **[33, 34].** To facilitate this process, probes such as repeating a question and asking for an example were used. The principal researcher audio-recorded the interviews and took detailed handwritten notes. The interviews only stopped when the saturation point was reached. Saturation is a guiding principle for assessing the suitability of purposive samples in qualitative research **[29].** Furthermore, saturation means that the sample size is adequate for the phenomenon; there is diversity, depth, and nuances of the issues in the collected data. A pilot study was conducted in two (2) physiotherapists from the Levy Mwanawasa University Teaching Hospital to test the usability of the interview guide and minor alterations were made to the tool.

Prior appointments were made through physiotherapy head of department (HOD), and physiotherapy practitioners were identified using institutional registers and identification cards (ID). Participants received an information sheet to read before starting the face-to-face interviews. The interviewer assured the participants that there was no right or wrong answer. The researcher took note of the overall impression of the interview and spontaneous reflections. The face-to-face interviews were private and took place at a convenient scheduled time for the participants at the First Level Hospitals and lasted 26 minutes. The interviews were conducted in English and transcribed verbatim in English because all participants spoke English. To ensure anonymity, the names of the participants were withheld both in the recordings and when making notes.

2.2 Data and Sources of Data

The information guide and the audio recordings were kept in a password-protected folder on a personal computer. The data was manually analysed using the six (6) phases of the thematic analysis method. Thematic analysis is a data analysis that allows the researcher to precisely determine the relationship between concepts and compare them with the replicated data **[35].** Thematic analysis is a qualitative method to identify, analyze, organize, describe, and report topics found within a data set **[36].** Thematic analysis method involves familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report **[37, 38].** Trustworthiness is the quintessential framework for evaluating qualitative research **[39].** This framework comprises four elements which include credibility, dependability, conformability, and transferability. This was ensured through a detailed

description of the study design, the data collection procedure, and the participation of participants. The interviewer shared transcribed verbatim with the co-researchers.

Permission was obtained from Lusaka Apex Medical University (LAMU) to conduct this study. Ethical approval was obtained (Ref: 00095-17) from the Lusaka Apex Medical University Biomedical Research and Ethics Committee (LAMUBREC) as well as from the Directors of the First Level Hospitals of Chipata, Matero, and George. Confidentiality and anonymity were ensured by using codes and withholding names.

2.3 Theoretical framework

In this study the dependent variable was strengthening exercises in stroke management. The independent variables were demographic characters such as age, gender, occupation, educational level and knowledge and perceptions.

3. RESULTS

Nine **(9)** physiotherapists with experience working with stroke patients participated in face-to-face interviews, giving a response rate of 75%. **Table 1** shows the demographic profile of each participant. The female physiotherapists were six (67%, n=6) and the males were three (29%, n=3). Six (6) out of nine physiotherapists were Bachelor's degree holders (physiotherapists) while three (3) were Diploma holders (physiotherapy technologists). The participants whose work experience ranged from two to six years (2-6) were three (3) while the rest (6) had work experience of nine to twelve (9-12) years. To maintain anonymity, the illustrative quotes were presented using abbreviations to denote the participant (p), a numbering system to represent changes in the quotation of the participants (p1, p2).

Table 1: Demographic Characteristics

Participants	Age (years)	Gender	Education level	Work Experience (years)	Work Location	Name of First Level Hospital
p1	24	F	Diploma PT	5	Active Room	Matero
p2	19	F	Diploma PT	4	Active Room	Matero
p3	30	M	BSc PT	9	Passive Room	Matero
p4	27	F	BSc PT	9	Passive Room	Matero
p5	32	F	BSc PT	12	Paediatrics	Matero
p6	26	F	Diploma PT	5	Passive & Active Room	Matero
p7	32	M	BSc PT	9	Passive & Active Room	George
p8	32	F	BSc PT	10	Active	George
p9	28	M	BSc PT	9	General	Chipata

3.1 Knowledge of strengthening exercises

All the participants interviewed agreed that they had knowledge about strengthening exercises. This theme included categories such as strengthening, the right time to begin strengthening exercises, and the reasons for conducting these exercises. However, participants described strengthening exercises based on its attributes such as:

'Exercises that are administered to stroke patients to increase their strength'- P5.

Participants also described strengthening exercises by focusing on the use of equipment and other assistive devices to perform this type of exercise. They used terms like external force, gravity, weights, and the use of energy.

"These *are exercises that are done…. by application of weight or resistance." P5.*

Furthermore, the participants highlighted the aim of strengthening exercises as to regain normal or near normal function due to the muscles.

"They help stroke patients. . Help them get to normal or near normal."- P6.

'So *that your muscles can be strengthened to regain normal or near normal'- P2.*

3.1.1 Knowledge on the right time to start strengthening exercises

Participants unanimously agreed that strengthening exercises for stroke patients should begin immediately after the event of stroke, although some participants echoed the need to wait until the patient reaches grade three (G.3) muscle strength, until blood pressure is stable and when the patient has progressed from acute to subacute stroke phase.

'Immediately after a stroke happens'- P1.
'Immediately they are diagnosed with stroke' - P2.
'The right time to begin strengthening exercises is immediately when they are referred to the physiotherapy department.' P6.
'When the patient has reached grade three of muscle power' - P5.
'When a patient can do some active exercises because you cannot do strengthening exercises in a patient with grade zero muscle or a patient who cannot move his limbs'- P7.
'In the subacute phase, the stages where the patient can move the limbs with muscle power, grade three.' - P8
'When blood pressure has stabilized to avoid causing another stroke' -P4.

3.1.2 The reasons for prescribing strengthening exercises

Participants indicated that strengthening exercises after the stroke help to achieve normal muscle control and functional independence.

'Strengthening *exercises help patients recover and be as independent as possible.' -P4.*

Some participants prescribed strengthening exercises because they felt that they help in the recovery of optimal function and ADLs, as indicated below:

'When *a patient has a stroke, they have difficulties with activities of daily living and motor skills.' –P7.*

Other participants felt that by prescribing strengthening exercises, the patient will not suffer a second stroke.

'When strengthening exercises are introduced, they help prevent some of the post-problems that can develop after a stroke. They can even prevent the chances of having a second stroke '- P8.

3.2 Perceptions of physiotherapists

Pertinent to their perceptions of strengthening exercises were the experiences of physiotherapists relating to exercise outcomes and education of stroke survivors.

3.2.1 Past experiences of using strengthening exercises

Physiotherapists who had used strengthening exercises in post-stroke patients commended the exercises, citing various beneficial effects and good outcomes.

'You can never go wrong with strengthening exercises for stroke patients as long as you use them correctly.'- P2.

'Their *recovery was quick and after six months, the patients were able to walk.'-P5.*

'My *experience has been overwhelming as far as using this type of exercise is concerned. Most of the patients I have treated have shown good progression. 'P9.*

'Patients get to improve, though others take time to improve, so the period differs'- P2.

3.2.2 Learn to train stroke survivors about strengthening exercises

In this study, the need for patients to be followed up in the community to reinforce adherence to prescribed exercise was highlighted.

'Initiate *a door-to-door campaign movement in which stroke patients are followed with a time frame.' - P1.*

Participants also emphasized the need to educate patients about rehabilitation and adherence to prescribed treatment.

'Through *health education, for example having a health talk with stroke patients, this will help patients continue or maintain what they have gained.'-P3.*

3.3 Facilitating and hindering factors

The participants cited inadequate caregiving, patient attitudes, raising awareness, and lack of transport to take patients home to the hospital. They agreed that physiotherapists have little time to give a detailed account of the condition and the intervention to patients and caregivers.

'Physiotherapists *do not take time to explain to patients about these exercises, therefore our patients cannot learn and also do not give patients a home program'-P7.*

'Lack of awareness, if patients do not know about strengthening exercises, they would not want to participate' - P8.

3.3.1 Attitude of patients towards exercises

Physiotherapists perceived stroke patients as having a myriad of attitudes that could hinder them from learning strengthening exercises. For example, one participant said:
'Patient attitudes. ' . such that they have given up, that they will never get back to normal '-P6.
In terms of patient attitude, the participants claimed that some patients feel already defeated by stroke, and others fear exhaustion.
'Some patients may try to avoid exercises because they know that they are exhausted'-P3.
'Poor perceived recovery from stroke, some patients think that when you have a stroke, you will never recover' -P8.

3.3.2 Unavailability of care-givers and suitable transport

About care-givers, participants indicated that some care-givers have other commitments which make them fail to support the patient and attend scheduled rehabilitation sessions at the hospital:
'Some patients are not consistent with coming for physiotherapy, others come alone and there is no one to help them'-P4.
'Lack of care from caregivers.. . they need to be reminded constantly."-P5.
'Lack *of a caregiver to bring them to the hospital and help or assist with exercises at home', P6.*
The participants cited the lack of transport to take the patients to the hospital. Therefore, patients did not adhere to exercise sessions to recover quickly.
'Coming to the hospital every day is not possible for some stroke patients, so we need to follow up.'-P5

3.4 Promoting the use of strengthening exercises

In this study, participants were asked how best they can promote strengthening exercises in the rehabilitation of stroke patients. Participants listed awareness, equipment, staffing, and infrastructure as ways that can promote the use of strengthening exercises in a health facility.

3.4.1 Increase awareness

Physiotherapists suggested that the implementation of awareness programs to educate patients, caregivers, and the general public on the importance of strengthening exercises in stroke patients is very important. Participants also suggested follow-up programs and the use of current information and practices, and technology.
'Initiate a door-to-door campaign movement in which stroke patients are followed up with a time frame and give health talks through the media to reach the community'-P1.
'Most people only learn about strengthening exercises when they come to the hospital'-P5.
"Because we are supposed to have outreach so we can sensitise the community about stroke and importance. . and give information to the community."-P8.
Physiotherapists expressed the need to be up to date with information on current stroke care practices and related technologies if they wanted to pass on the benefits of strengthening exercises to patients.
'Keeping up with new technology because physiotherapists need to have evidence-based information or we need (to be up to date on the latest treatment or rehabilitation in relation to stroke).'-P9.

3.4.2 Equipment

The results showed that stroke care settings are riddled with widespread inadequacies in basic rehabilitation equipment and supplies. Compared to specialized and teaching hospitals such as University Teaching and Levy Mwanawasa Teaching Hospitals, other hospitals seem to have far inadequate equipment.
'Less equipment in our department compared to the University Teaching Hospital and the Levy Mwanawasa Teaching Hospital, here we have only sand weights. So we need more exercise equipment."-P6.
'Our department needs to be equipped so we can manage our patients effectively'-P7.

3.4.3 Staffing

The results revealed that the physiotherapists wanted to promote strengthening exercises, but the challenges were low staff numbers and inadequate time to meet the needs of stroke patients.
'We need more staff so that we can have more physiotherapists treating stroke patients' -P4.
"*We need manpower in the department.. . and today I was alone in the gym and I had about 16 patients."-P5.*
'Cause you know that sometimes we can start scaling down activities due to manpower shortages. . There are certain activities that you do not take on because staffing can be very tricky '-P6.

3.4.4 Infrastructure

All participants in this study recognized that the current infrastructure in First-Level Hospitals was not adequate to meet the huge demands for physical therapy.
'Our department is not conducive to rehabilitation services. It needs to be partitioned and renovated. '-P6.

'We *have to create certain days for certain activities'-P9.*

4. Discussion

Most of the participants in this study were women, unlike in the study **[40**] where men were the majority. In addition, demographic characteristics such as gender, institution of practice, educational level, and location of work did not influence the knowledge of physiotherapists on the effects of strengthening exercises in stroke patients. This is confirmed by studies conducted in Pakistan **[40]** and **[41],** which showed that work experience had no significant influence on physiotherapists with respect to knowledge of strengthening exercises in stroke patients.

4.1 Knowledge and perceptions of practitioners about strengthening exercises

The knowledge assessed was about strengthening exercises, the right time to start strengthening exercises in stroke rehabilitation and the reasons for prescribing these exercises. All physiotherapists had good knowledge of strengthening exercises. They understood how these exercises can be applied in the management of stroke but could not give a precise definition of strengthening exercises. For example, participants defined strengthening exercises as exercises that require the use of weights or resistance and the recruitment of muscle groups. Similarly **[42]** physiotherapy professionals were familiar with strengthening exercises in the management of stroke, but could not fully define these exercises. Instead, the participants related to attributes of strengthening exercises. They also acknowledged that this modality is part of the stroke rehabilitation program that is designed to restore the functional ability of a patient. Participants also reported that these exercises had the capacity to increase muscle strength and helped stroke patients return to normal function. Nigerian physiotherapists as in this study were very knowledgeable and had a good attitude towards physical activity **[43].** Likewise **[5]** attested that strength training leads to increased muscle strength, improved functional ability, and health-related quality of life in stroke patients.

The results of this study suggest that the use of strengthening exercises should be integrated into clinical practice. Stroke patients are encouraged to participate in strength training exercises because they are crucial to maintaining health and preventing a second stroke **[1].** The participants unanimously agreed that strength training in stroke patients should start soon after stroke, except for a few participants who suggested that stroke patients should be stable and at least gain muscle power up to grade 3 (G.3) before starting strength training. The review **[21]** recommended the start of strength training immediately after the patient was stable because stroke patients who undergo early rehabilitation have better outcomes.

Not all participants in this study knew why strength training should be prescribed for stroke patients. Participants cited promoting functional independence and prevention of stroke recurrence as the ultimate goals of strength training. A systematic review of randomized controlled trials instituted **[2]** established that stroke negatively impacts functional independence, quality of life, productivity, and participation in the social and economic life of victims. Therefore, prescribing strengthening exercises not only increases muscle strength, but subsequently improves gait performance, functional independence, and quality of life in stroke patients. Participants in this study affirmed that strength training is beneficial and a facilitator of good outcomes. Contrary to a qualitative study conducted **[20]** to compare patients' perceptions and physical therapists on factors that influence the implementation of higher intensity activity in stroke patients. The patients perceived physiotherapists as too mechanical, as they concentrated on counting the units of exercise delivered.

4.2 Influencing factors

The participants highlighted inadequate equipment, lack of information exchange with caregivers, lack of transportation to the health facility, patients' attitudes, inadequate family support and lack of treatment plans by physiotherapists as factors that influenced the implementation of strength training. A qualitative study conducted in seven Peshawar physiotherapists in Pakistan categorically stated that recovery from stroke is highly dependent on family support **[40].** Similarly, the three influencing factors highlighted in one study were exercise history, intervention content, and family support **[20].** Patients had positive beliefs about intensive exercises, positive therapeutic relationships, and the belief that working hard during strengthening exercises would lead to improvement. In the same study, some patients said that the reason to have family and friends during rehabilitation is for them to offer moral support and encourage them to work hard.

This study proved that stroke patients do not participate in strengthening exercises because they do not understand what these exercises are about, as well as confirmed that some clinicians did not share adequate information and home advice related to health education with caregivers and patients. [**43**] Asserts that some practitioners do not have enough time to offer counseling services to their patients because consultation time is limited. Furthermore, **[40]** affirms that the lack of patient education on the mechanism of their condition and the prescribed physiotherapy intervention can have an impact on the ability of patients to participate in strength training. In the same vein, inadequate communication with patients and caregivers about the

condition and expectations is one of the major hindrances to the implementation of strengthening exercises in stroke patients [**44].**

4.3 Promoting the use of strengthening exercises

As a way of promoting the use of strength training, this study identified subthemes such as awareness, equipment, staffing, and infrastructure. Physiotherapists recommended an awareness program to sensitize patients, caregivers, and the general public on the importance of strengthening exercises in stroke patients. They suggested that door-to-door campaigns be instituted to facilitate communication with the community. Consequently, in some countries, physiotherapists make a post-discharge plan that involves following up with the patient in the community [**45**]. Similarly, **[46]** supports the notion that care providers develop follow-up programs for community patients as a way to enforce adherence to treatment protocols.

In another study, **[47**] reported that patients have high expectations of how much recovery they can achieve through physiotherapy interventions. Subsequently, being discharged from the physiotherapy department before the expected degree of recovery is achieved is disappointing and distressing for them. Therefore, physiotherapists should make a proper discharge and follow-up plan. In this study, physiotherapists responded that strengthening exercises are a prescription that takes a long time to implement. **[48]** Agrees with this sentiment by stating that authorities need to consider up-scale resources such as physiotherapy practitioners, adequate physiotherapy supplies and equipment for physiotherapy units.

Conclusions

This study attests to the fact that physiotherapists from selected first-level hospitals had a comprehensive knowledge of strengthening exercises related to stroke rehabilitation. Most participants consistently perceived strengthening exercises as efficient and a catalyst for early functional recovery and independence of stroke patients. This study demonstrated that the use of strengthening exercises in stroke rehabilitation can only be promoted through dissemination of information, patient adherence to rehabilitation, and adequate equipment, up-scaled staffing and infrastructure. However, strengthening exercises should be started immediately after the incidence of stroke for as long as the patient is stable.

Declaration of Authors

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