

Original Article

Physical therapists' perspectives on improving walking capacity in patients with stroke: a cross-sectional study from Saudi Arabia

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Abstract

Objectives: Stroke is a serious condition that leads to disability and death, which affects around 16 million people worldwide each year. The considerable loss of function after stroke is likely to impede walking ability. The current study was to understand the practices of physical therapists in Saudi Arabia and their perspectives on treatment to improve walking capacity after stroke. **Methods:** This prospective cross-sectional survey was conducted using a 12-item, semi-structured questionnaire, which included demographic characteristics and physical therapy practices. The questionnaires were distributed as hard copies to physical therapists working in Saudi Arabia and were asked to return the forms after completion. Totally 191 respondents from 18 institutions in Saudi Arabia completed the survey and were included in the analysis. **Results:** There was comparable agreement from respondents regarding the use of ankle foot orthosis (84.8%). The use of walking aids was supported more by physical therapists with higher qualifications (post-graduates=40%, doctorates=55.6%), while evidence-based practice showed a higher rate in less-experienced to moderately experienced physical therapists (2-5 years=24.2%, 5-10 years=19.3%). **Conclusion:** Variable responses from different sectors according to qualification, experience, and institution were observed among the physical therapists in Saudi Arabia for improving the walking capacity in patients after Stroke.

Keywords: Perspectives, Physical Therapist, Practices, Stroke Rehabilitation, Walking

Introduction

Globally, stroke is a serious condition that leads to disability and death¹. Each year, stroke affects nearly 16 million and the individuals who survived are living with secondary impairments reached 62 million². Out of this, 80% have functional deficits like; difficulties in sitting, standing, and stepping activities³. Impairments among patients with stroke can continue long-term and may alter the capabilities of performing daily living tasks⁴. This long-term limitation in

functional activities can predispose to several risks including secondary stroke⁵.

Considerable loss of function is likely to affect and impede locomotion. In addition to sensory motor dysfunction, the inactivity, weakness, cognitive impairment, and postural asymmetry leads to balance and gait abnormalities⁶. Walking deficits have been found to lower the quality of life and restrict participation, which result in social isolation if remained untreated, since walking ability is essential for functional tasks⁷.

Regaining fundamental motor abilities such as walking is considered as one of the most challenging tasks after stroke, especially due to their reduced gait speed and distance. Consequently, even when the patient is finally able to walk, they often end up with an inadequate and laborious gait. Physical training following a stroke lessens recurrent stroke possibility and enhances walking ability and velocity, spatiotemporal parameters and symmetry of gait, muscle power and bone density, in addition to quality of life⁸⁻¹². The collaboration of physical therapists, caregivers, and stroke

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survivors with their perspectives is required to develop rehabilitation programs for physical activities¹³. Salbach et al.¹⁴ addressed the physical therapists' perceptions of walking capacity as one of the standardized examinations after stroke in Canada. They also demonstrated that only a few physical therapists consider assessment scores when determining walking recovery prognoses and discharge plans. Khan et al.¹⁵ analyzed the views and assumptions of physical therapists in the state of Kerala in India to determine their attitudes and knowledge level. Their findings suggested that more detailed information regarding the aspect of walking and the use of walking aids must be addressed.

In post-stroke subjects, the disability can be directly related to the rehabilitation program more than in other cases of disabled subjects with other conditions¹⁶. Accordingly, unlike other progressive condition of chronic diseases, the form of disability for stroke cases is considered different as it is a result from a sudden incident¹⁶. In Saudi Arabia, there is no considerable knowledge of the practices used by physical therapists in stroke rehabilitation. The main goal of physical therapy is to reach optimum physical capabilities, and it plays a central role in the rehabilitation of walking ability after stroke¹⁴. Correspondingly, the knowledge regarding physical therapists' practices and viewpoints of walking interventions by addressing several aspects of their expertise will assist in improving clinical guidelines in order to enhance health care services. Therefore, the current study was undertaken to assess the attitudes and practices of physical therapists in Saudi Arabia in their use of different interventions to improve walking capacity after stroke.

Materials and methods

Sample and settings

This prospective cross-sectional survey was designed to study targeted physical therapists involved in subacute to chronic rehabilitation of patients with stroke in Saudi Arabia. A cross-sectional survey questionnaire was distributed randomly to 18 institutions, where in 13 hospitals and 5 academic institutions were included, so as to keep similar proportions of academic and non-academic institutions that have physical therapy facilities in Saudi Arabia. The purpose of this study, as described on the first page of the questionnaire, was explained to the participants. Consent was also obtained from the physical therapists who participated in the study. Questionnaires were given to each participant by hand and they were asked to return them to the coordinator after completing their answers. Out of 360 questionnaires, only 191 (53%) answered questionnaires were returned. A total of 188 questionnaires were analyzed since 3 surveys were replicated. The study was conducted from February 2018 to July 2018 and ethical clearance was obtained from the ethical committee of the Faculty of Applied Medical Sciences, King Abdulaziz University, Jeddah, Saudi Arabia.

Table 1. Demographic profile of participants.

Sex	
Male	49.5%
Female	50.5%
Type of Institution	
Academic	23.0%
Non-academic	77.0%
Years of Experience	
0-2 years	30.4%
2-5 years	17.3%
5-10 years	29.8%
10-20 years	17.8%
More than 20 years	4.7%

Validation and development of the survey

A questionnaire addressed physical therapists' perspectives regarding rehabilitation to improve walking capacity after stroke. In order to proceed with content validation, five experts in the field of neuro-rehabilitation were contacted by e-mail and were asked to rate each item of the questionnaire according to structure, clarity, and relevance. Items were selected based on their level of agreement where, 80% was set as the minimum percentage. The final questionnaire was modified and prepared for to be printed as hard copy.

Survey tools

The first 5 items of the questionnaire addressed the demographic characteristics of the participants; which included age, gender, qualifications, years of experience as a physical therapist, and whether they worked in an academic or non-academic institution. Questions were presented in a multiple choice manner consisting of 7 items, apart from the demographic characteristics section. Items 6 and 7 were to determine the type of assessments and approaches the physical therapists followed to evaluate as well as to treat stroke patients. Item 8 was to find out which type of sources physical therapists mostly rely on, and which influence their way of treatment with stroke patients. Items 9 to 11 were constructed in a 3-point Likert scale format regarding the physical therapists' decision to allow patients to walk, including the use of walking aids. Item 12 was a yes or no question regarding whether the physical therapists consider the use of orthotics in managing spasticity and gait patterns. Items were coded to quantitative values in order to be analyzed.

Statistical analysis

Data collected from the samples were digitalized and cleaned for the purpose of analysis. Data were analyzed using SPSS 19 (IBM Corp. Released 2010. IBM SPSS Statistics for

Table 2. Attitudes of Physical therapists according to qualification.

	Diploma	Graduate	Post-Graduate	Doctorate
Type of Assessment				
10MWT	4.0%	5.4%	6.7%	0.0%
My Own	16.0%	17.0%	22.2%	11.1%
FMA	60.0%	69.6%	68.9%	77.8%
Never Assess	20.0%	8.0%	2.2%	11.1%
Concepts and Approaches				
Conventional	24.0%	7.1%	13.3%	22.3%
Bobath	12.0%	21.4%	15.6%	11.1%
Brunnstrom's	12.0%	0.0%	0.0%	11.1%
Roods	0.0%	1.8%	2.2%	0.0%
PNF	16.0%	7.1%	8.9%	11.1%
MRP	8.0%	5.4%	15.6%	11.1%
Mixed	16.0%	40.2%	33.3%	22.2%
Other	12.0%	17.0%	11.1%	11.1%
Sources alter treatment				
Book information	12.0%	8.0%	6.7%	22.2%
Course information	20.0%	18.8%	17.8%	0.0%
Colleague information	12.0%	16.1%	2.2%	11.2%
Special interest group	4.0%	3.6%	2.2%	0.0%
Expert in the field	20.0%	15.2%	8.9%	33.3%
Personal experience	24.0%	19.6%	22.2%	0.0%
Research article	8.0%	9.8%	37.8%	33.3%
Other	0.0%	8.9%	2.2%	0.0%
Movement Quality Prior to walking				
Agree	56.0%	45.6%	55.5%	55.6%
Unsure	16.0%	10.7%	15.5%	11.1%
Disagree	28.0%	43.7%	30.0%	33.3%
Patient's Goal is Walking				
Agree	72.0%	67.8%	75.6%	55.6%
Unsure	20.0%	18.8%	8.8%	33.3%
Disagree	8.0%	13.4%	15.6%	11.1%

10MWT: 10 Meter walk test, FMA: Fugl Meyer Assessment, PNF: Proprioceptive Neuromuscular Facilitation, MRP: Motor Relearning Program.

Windows, Version 19.0. Armonk, NY: IBM Corp). Descriptive statistics including univariate and bivariate analysis were carried out with alpha as 0.05.

Results

Table 1 represents the demographic profile of physical therapists who participated in the study. Respondents were aged between 23 to 60 years with a mean age of 30.84 ± 7.4 . The results were described according to the qualification, experience and the institution in which they work, as follows:

Observations according to qualification

Type of Assessment: Majority of the respondents with a doctoral degree (77.8%) evaluated their patients by the

Fugl-Meyer Assessment; this was preferred also by physical therapists with a diploma (60%), graduates (69.6%), and post-graduates (68.9%).

Concepts and approaches: Among diploma holders, 24% used conventional approaches to treat the stroke patients, while majority of therapists with higher qualifications mainly followed an eclectic approach (graduates=40.2%, post-graduates=33.3%, doctorate=22.2%).

Sources Alter Treatment: Responses showed an increasing trend in evidence-based practice as therapists with higher qualifications more likely relied on research articles (diploma=8%, graduates=9.8%, post-graduates=37.8%, doctorate=33.3%) to change the way they treat patients. Accordingly, the respondents with higher qualifications depended less on personal experience (diploma=24%, graduates=19.6%, post-graduates=22.2%, doctorate=0%).

Giving walking aid: Almost half of 54 post-graduates

and doctorates (40%, 55.6%, respectively) considered patient's independency by giving walking aid, and 22.2% of doctorates disagreed with this statement. On the contrary, there was a disagreement to this from almost half of diploma holders (44%), and 28% agreed with giving walking aid to the patient.

Movement Quality prior to Walking: In response to the statement "I will not allow a stroke patient to walk unless I feel that they have gained a high quality of movement", the percentage of therapists who agreed was 56% (with diploma), 45.6% (graduates), 55.5% (post-graduates), and 55.6% (doctorates).

Patient's Goal is Walking: Irrespective of qualifications, respondents reported agreement in stating that walking ability is the most important goal according to patients' concern (diploma=72%, graduates=67.8%, post-graduates=65.6%, doctorate=55.6%). However, respondents with doctoral qualifications had less representation; 44.4% of them were unsure or disagreed with this approach.

Using Ankle Foot Orthosis (AFO) in improving gait: The majority indicated that AFO is useful to improve walking gait irrespective of their qualification (diploma=92%, graduates=85.7%, post-graduates=80%, doctorate=77.8%) (Table 2).

Observations according to experience

Type of assessment: The 10-meter walk test was used more by the physical therapists who have more than 20 years of experience (11.1%) compared to the physical therapists with less experience. Therapists having more clinical experience will not treat their patients without assessment, as the percentage of respondents with more than 20 years of experience who never assessed their patients was 0%. However, the respondents showed similar agreement irrespective of experience in other variables, wherein Fugl Meyer Assessment was mostly preferred (0-2 years=79.3%, 2-5 years=63.6%, 5-10 years=61.4%, 10-20 years=67.6%, >20 years=66.7%).

Concepts and approaches: The more experienced therapists (>20 years) mostly used Bobath or mixed approaches (66.6%), while mixed approach was preferred by experienced therapists over other approaches (0-2 years=32.8%, 2-5 years=39.2%, 5-10 years=31.6%, 10-20 years=38.4%, >20 years=33.3%). Motor Relearning Program (MRP) approach was used mostly by physical therapists who had less than 20 years of experience (11.2%) when compared to physical therapists who had more experience.

Sources alter treatment: 55.6% of experienced physical therapists (>20 years) alter their treatment by their personal experience, and 24.2% of 58 junior physical therapists (0-2 years) rely on information gained from a course. Among 90 physical therapists with moderate experience, 24.2% (2-5 years) and 19.3% (5-10 years) consider the use of research articles to change treatment as the evidence-based practice

Table 3. Attitudes of Physical therapists according to Institution.

	Academic	Non Academic
Type of Assessment		
10MWT	4.5%	5.4%
My Own	20.5%	17.0%
FMA	68.2%	68.8%
Never Assess	6.8%	8.8%
Concepts and Approaches		
Conventional	13.7%	10.9%
Bobath	15.9%	19.0%
Brunnstrom's	0.0%	2.8%
Roods	0.0%	2.0%
PNF	4.5%	10.2%
MRP	13.6%	6.8%
Mixed	36.4%	34.0%
Other	15.9%	14.3%
Sources alter way of treatment		
Book information	15.9%	6.8%
Course information	22.7%	16.3%
Colleague information	4.5%	14.3%
Special interest group	0.0%	4.1%
Expert in the field	20.5%	13.6%
Personal experience	20.5%	19.7%
Research article	13.6%	18.4%
Other	2.3%	6.8%
Movement Quality Prior to walking		
Agree	38.7%	53.0%
Unsure	9.0%	13.6%
Disagree	52.3%	33.4%
Patient's Goal is Walking		
Agree	54.5%	70.0%
Unsure	22.7%	15.6%
Disagree	9.1%	14.2%
<i>10MWT: 10 Meter walk test, FMA: Fugl Meyer Assessment, PNF: Proprioceptive Neuromuscular Facilitation, MRP: Motor Relearning Program.</i>		

showed higher representation in the experienced group than the other 101 respondents.

Giving walking aid: The percentage of experienced respondents (>20 years) who supported the concept of providing walking aid to the patients was 66.7%. In contrast, the less experienced (<5 years) did not prefer to advise a waling aid (0-2 years=34.5%, 2-5 years=51.5%).

Movement quality prior to walking: Comparable agreement was found from all levels of experience (0-2 years=48.3%, 2-5 years=51.5%, 5-10 years=47.4%, 10-20 years=53%, >20 years=55.5%) regarding the statement of allowing patients to walk after gaining a high quality of movement. The more experienced therapists represented higher percentages.

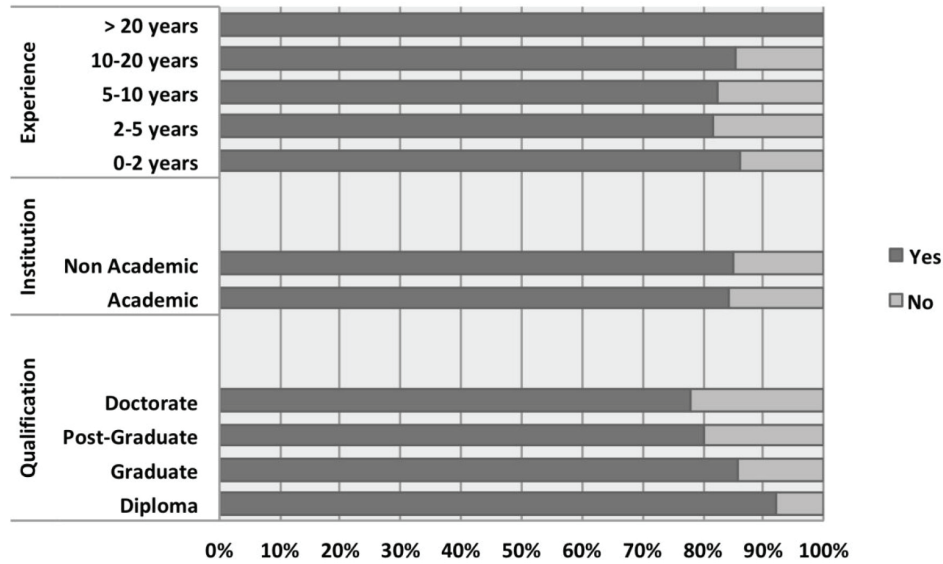


Figure 1. Attitude of physical therapists in prescribing AFO according to qualification, experience and institution.

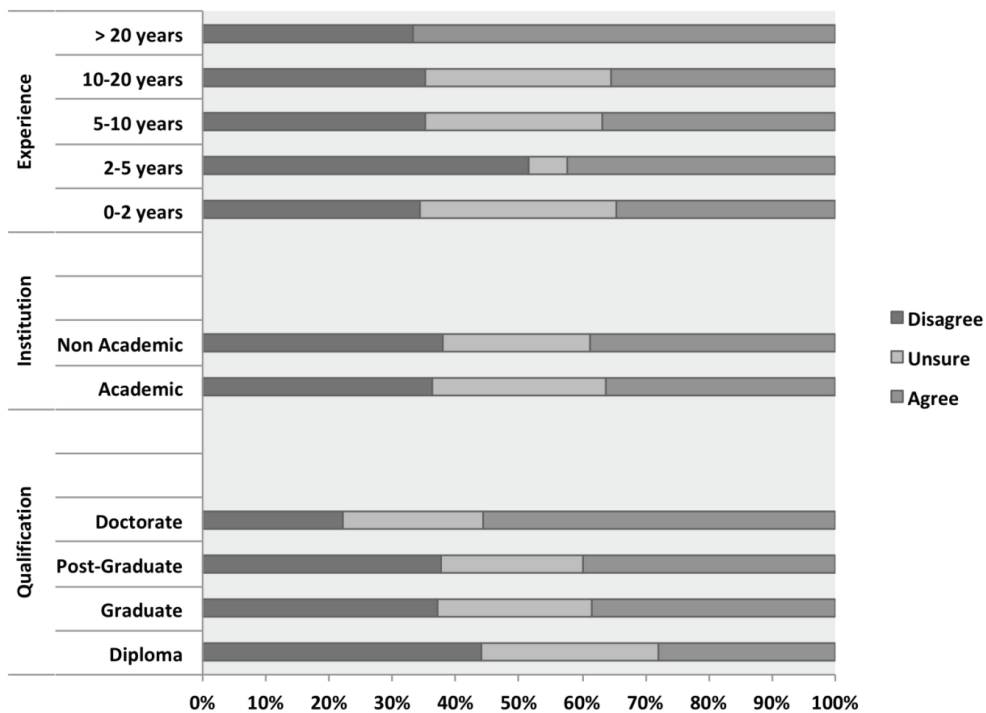


Figure 2. Attitude of physical therapists in prescribing walking aids according to Qualification, experience and institution.

Patient's goal is walking: The majority of the therapists (n=133) agreed that walking ability is the patients' main goal (0-2 years=70.7%, 2-5 years=60.7%, 5-10 years=72%, 10-20 years=76.5%, >20 years=55.5%). However, the more experienced therapists showed less representation.

Using AFO for improving gait: Similar to the findings according to qualifications, most of respondents preferred the use of AFO in order to improve walking (0-2 years=86.2%, 2-5 years=81.8%, 5-10 years=82.5, 10-20 years=85.3%, >20 years=100%) (Table 3 and Figures 1 & 2).

Table 4. Attitudes of Physical therapists according to experience.

	0-2 years	2-5 years	5-10 years	10-20 years	> 20 years
Type of Assessment					
10MWT	3.4%	6.1%	7.0%	2.9%	11.1%
My Own	10.4%	21.2%	21.1%	20.6%	22.2%
FMA	79.3%	63.6%	61.4%	67.6%	66.7%
Never Assess	6.9%	9.1%	10.5%	8.9%	0.0%
Concepts and Approaches					
Conventional	5.2%	9.1%	14.0%	17.6%	22.2%
Bobath	27.6%	6.1%	12.2%	20.6%	33.3%
Brunnstrom's	0.0%	6.1%	1.8%	2.9%	0.0%
Roods	0.0%	0.0%	3.5%	2.9%	0.0%
PNF	12.1%	15.2%	7.0%	2.9%	0.0%
MRP	8.6%	6.1%	8.8%	8.8%	11.2%
Mixed	32.8%	39.2%	31.6%	38.4%	33.3%
Other	13.7%	18.2%	21.1%	5.9%	0.0%
Sources alter Treatment					
Book information	8.6%	15.2%	8.8%	2.9%	11.1%
Course information	24.2%	6.1%	15.7%	23.5%	11.1%
Colleague information	20.7%	15.1%	7.0%	5.9%	0.0%
Special interest group	1.7%	0.0%	7.0%	2.9%	0.0%
Expert in the field	12.1%	21.2%	8.8%	26.5%	11.1%
Personal experience	8.6%	18.2%	24.6%	23.6%	55.6%
Research article	13.8%	24.2%	19.3%	14.7%	11.1%
Other	10.3%	0.0%	8.8%	0.0%	0.0%
Movement Quality Prior to Walking					
Agree	48.3%	51.5%	47.4%	53.0%	55.5%
Unsure	12.1%	9.1%	19.3%	5.8%	11.1%
Disagree	39.70%	39.40%	33.30%	41.20%	33.30%
Patient's Goal is Walking					
Agree	70.7%	60.7%	72.0%	76.5%	55.5%
Unsure	17.2%	21.2%	17.6%	11.8%	22.2%
Disagree	12.1%	18.2%	10.5%	11.8%	22.2%
<i>10MWT: 10 Meter walk test, FMA: Fugl Meyer Assessment, PNF: Proprioceptive Neuromuscular Facilitation, MRP: Motor Relearning Program.</i>					

Observations according to institution

Type of assessment: Fugl-Meyer Assessment was selected by 131 physical therapists, almost equally from both sectors (Academics=68.2%, Non-Academics=68.8%).

Concepts and approaches: None of the respondents from academic institutions used either the Brunnstrom or Rood's approach in treating patients with hemiplegia as this is considered comparatively older approaches. The practice of MRP was greater in academic (13.6%) than non-academic physical therapists (6.8%). The Bobath concept was used by non-academics (19%) more than academics (15.9%). In both fields. There were no differences in using mixed approach (36.4%, 34%).

Sources alter treatment: Academics (22.7%) consider course information as a reliable source more than non-academics (16.3%).

Giving walking aid: Responses reported almost similar percentages in the agreement (Academics=36.3%, Non-Academics=38.8%) and disagreement (Academics=36.4%, Non-Academics=38.1%) of prescribing a walking aid.

Movement quality prior to walking: Physical therapists working in non-academic institutions suggested that patients must gain a high quality of movement before walking, (53%) have shown greater representation than academics (38.7%).

Patient's goal is walking: In contrast to the above statement, 70% of 147 clinicians consider patients' ability

to walk as more important, compared to 54.5% of physical therapists who work in academic institutions.

Using AFO in improving gait: 162 respondents considered AFO useful to enhance gait pattern (85% non academic; 84.1%, academic) (Table 4).

Discussion

The current study aimed to evaluate the attitudes and practices of physical therapists in improving walking ability of patients with stroke in Saudi Arabia. Generally, there was a high rate of using (68.6%) Fugl-Meyer Assessment scale which had an excellent construct and criterion validity of 0.86 and 0.96 respectively irrespective of respondents' qualifications, institution, or experience. However, the standardized assessments such as the 10-meter walk test (construct validity; 0.84 and criterion validity; 0.76) was used by highly experienced therapists more than the other respondents. Additionally, it was noted that all physical therapists with more than 20 years of experience assessed their stroke patients, indicating that the more experienced therapists tend to pay more attention in assessing stroke survivors.

The survey indicated that physical therapists (34.6%) do not prefer to follow a particular approach in management, but rather use what appears to be beneficial from several approaches, as mixed approach showed a higher percentage compared to the other options. This implies the need of developing an eclectic approach as stated by Khan et al.¹⁵. There was a negligible use of Rood's and Brunnstrom approaches (1.6%, 2.1%) among all physical therapists. However, the use of these approaches among the physical therapists was 0%, as both these techniques are older concepts. It was also noticeable that MRP was used more by therapists in the academic field. Langhammer et al.¹⁷ conducted a randomized controlled trial to compare Bobath and MRP, where they concluded that higher scoring of movement quality was associated with MRP, which confirmed that task-oriented exercises are preferable in acute rehabilitation of stroke.

There is no doubt that evidence-based practice matters in mostly all aspects. Thus, physical therapists' practice in this area should be addressed. A prior cross-sectional study in the field of stroke management evaluated physical therapists' perspectives on relevance and clarity of the research literature in directing walking rehabilitation, and positive insights about the efficacy of research literature in stroke rehabilitation for walking interventions were noted¹⁸. Responses showed an increasing trend of evidence-based practice among physical therapists with higher qualifications. Furthermore, relying on research articles as a source to alter treatment occurred much higher in moderately experienced therapists, which signifies that the trend of evidence-based practice is growing.

Some therapists have believed that gait training with the prescription of walking aid is less ideal as it might result in more compensatory senescent¹⁹. However, the current study

demonstrated that physical therapists with a higher level of experience or qualifications tended to prescribe walking aids to stroke patients unlike less experienced or qualified therapists who disagreed with this. Polese et al.¹⁹ used a 3-D motion analysis system and one force platform to assess how the use of a cane influences gait speed and joint angles in chronic stroke patients. They stated that speed improvement and power generation of paretic hip flexion, knee extension, and plantar flexion were found to be improved, suggesting that aids are not detrimental to patients in the stabilization of walking. Tyson et al.²⁰ supported using assistive devices including canes, AFOs, and slider shoes to enable early locomotion after stroke, in addition to non-ambulant patients' opinion of having a more confident and safer walking ability.

In order to avoid formation of synergic patterns, physical therapists usually delay walking in early stages until the patient gains a more controlled gait cycle¹⁵. This viewpoint was supported by almost half of the respondents (49.8%), especially by more experienced ones and 53% of them were clinicians who utilize their clinical experience in treating patients with stroke.

Optimum physical capabilities and independence cannot be achieved unless walking ability is restored, which is a possible reason why it is the most important goal as far as patients are concerned. This statement was observed to have a 69.6% agreement, with the more experienced participants having less representation, and stating that walking is not the only important factor since patients require other functions too. Majority of respondents who showed their agreement to this statement were clinicians (70%), which might contradict their impression of movement quality as a factor prior to walking, which was mentioned previously. However, this might be due to their point of making their patients as independent as possible.

The survey revealed major agreement of AFO use to improve gait (84.8%). Conversely, according to the level of qualifications, there was a declining trend in this agreement. Recent evidence also stated that, the use of AFO may not be that useful as a non-significant summary effect sizes were found in walking with or without AFO comparisons²¹. Dogan et al.²² investigated the use of AFO on hemiparetic stroke patients, and an improvement in gait speed, balance, and mobility were found, but there was no significant difference in stair climbing, and 60% of subjects considered AFO unaesthetic. A systematic review was conducted by Tyson et al.²³ to assess evidence of AFO use on gait biomechanics post-stroke, which stated that although there were positive effects in the stance phase, there was none in the swing phase. Additionally, insufficient data on joint movement and muscle activity or spasticity was reported. Another study supported significant positive findings of orthotics on speed, step length, and balance, but those were immediate effects only, not as a long-term basis as stated by the author. Furthermore, there were no significant effects on postural sway and mobility²⁴. Thijssen et al.²⁵ stated an improvement only in energy cost in the long-term (3 weeks) effect of using

orthotics with chronic stroke patients, which resulted from orthosis familiarization.

The current study has explored physical therapists' perspectives to enhance walking capacity post-stroke, which has been elaborated by also addressing different aspects of their background and expertise including level of qualification, years of experience, and type of institution. One of the limitations of the present study was that the questionnaire did not specify whether the type of walking aid preferred was a tripod, a tetrapod, a cane, or a walker. Additionally, although the item that addressed the post-qualification courses that have been taken by therapists which influence their practices was included in the questionnaire, it could not be analyzed due to a technical issue for the bivariate analysis. Another limitation was the low response rate, which could be due to the distribution of the questionnaires as hard copies. In order to obtain more detailed and relevant observations, future studies should concentrate on a longitudinal survey design as well, which should include an intervention program by the means of lecture, presentation or workshop. Pre and post assessment of awareness of physical therapist can be obtained which will analyze the effect of intervention executed.

Conclusion

Majority of the respondents opined differently in several aspects, especially regarding the use of AFO and walking aids. However, a consensus regarding the rehabilitation of patients with stroke is more preferable and can be attained by developing a stroke rehabilitation guideline in Saudi Arabia.

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References

- Sridharan SE, Unnikrishnan JP, Sukumaran S, Sylaja PN, Nayak SD, Sarma PS, et al. Incidence, Types, Risk Factors, and Outcome of Stroke in a Developing Country: The Trivandrum Stroke Registry. *Stroke* 2009; 40(4):1212-8.
- Mukherjee D, Patil CG. Epidemiology and the Global Burden of Stroke. *World Neurosurg* 2011;76(6):S85-90.
- Tyson SF, Hanley M, Chillala J, Selley A, Tallis RC. Balance disability after stroke. *Phys Ther* 2006;86(1):30-8.
- Desrosiers J, Demers L, Robichaud L, Vincent C, Belleville S, Ska B, et al. Short-Term Changes in and Predictors of Participation of Older Adults After Stroke Following Acute Care or Rehabilitation. *Neurorehabil Neural Repair* 2008; 22(3): 288-97.
- Warburton DE, Charlesworth S, Ivey A, Nettlefold L, Bredin SS. A systematic review of the evidence for Canada's Physical Activity Guidelines for Adults. *Int J Behav Nutr Phys Act* 2010;11(7):39.
- Bonan I V, Yelnik AP, Colle FM, Michaud C, Normand E, Panigot B, et al. Reliance on visual information after stroke. Part II: Effectiveness of a balance rehabilitation program with visual cue deprivation after stroke: A randomized controlled trial. *Arch Phys Med Rehabil* 2004;85(2):274-8.
- Ada L, Dean CM, Lindley R, Lloyd G. Improving community ambulation after stroke: the AMBULATE trial. *BMC Neurol* 2009;11(9):8.
- Družbicki M, Guzik A, Przsada G, Kwolek A, Brzozowska-Magoń A, Sobolewski M. Changes in Gait Symmetry After Training on a Treadmill with Biofeedback in Chronic Stroke Patients: A 6-Month Follow-Up From a Randomized Controlled Trial. *Med Sci Monit* 2016;22:4859-4868.
- English C, Hillier S. Circuit class therapy for improving mobility after stroke: A systematic review. *J Rehabil Med* 2011;43(7):565-71.
- Pang MYC, Ashe MC, Eng JJ, McKay HA, Dawson AS. A 19-week exercise program for people with chronic stroke enhances bone geometry at the tibia: a peripheral quantitative computed tomography study. *Osteoporos Int* 2006;17(11):1615-25.
- Carin-Levy G, Kendall M, Young A, Mead G. The Psychosocial Effects of Exercise and Relaxation Classes for Persons Surviving a Stroke. *Can J Occup Ther* 2009; 76(2):73-80.
- Lee CD, Folsom AR, Blair SN. Physical Activity and Stroke Risk: A Meta-Analysis. *Stroke* 2003;34(10):2475-81.
- Morris JH, Oliver T, Kroll T, Joice S, William B. From physical and functional to continuity with pre-stroke self and participation in valued activities: A qualitative exploration of stroke survivors', carers' and physiotherapists' perceptions of physical activity after stroke. *Disabil Rehabil* 2015; 37(1):64-77.
- Salbach N, Guilcher S, Jaglal S. Physical therapists' perceptions and use of standardized assessments of walking ability post-stroke. *J Rehabil Med* 2011;43(6): 543-9.
- Khan FR, Vijesh P V, Rahool S, Radha AA, Sukumaran S, Kurupath R. Physiotherapy Practice in Stroke Rehabilitation: A Cross-Sectional Survey of Physiotherapists in the State of Kerala, India. *Top Stroke Rehabil* 2012;19(5):405-10.
- Daniëls R, Winding K, Borell L. Experiences of Occupational Therapists in Stroke Rehabilitation: Dilemmas of Some Occupational Therapists in Inpatient Stroke Rehabilitation. *Scand J Occup Ther* 2002;9:167-175.
- Langhammer B, Stanghelle JK. Can physiotherapy after stroke based on the Bobath concept result in improved quality of movement compared to the motor relearning programme. *Physiother Res Int* 2011;16(2):69-80.
- Salbach NM, Guilcher S, Jaglal SB, Davis DA. Factors influencing information seeking by physical therapists providing stroke management. *Phys Ther* 2009; 89(10): 1039-1050.

19. Polese JC, Teixeira-Salmela LF, Nascimento LR, Faria CD, Kirkwood RN, Laurentino GC, et al. The effects of walking sticks on gait kinematics and kinetics with chronic stroke survivors. *Clin Biomech (Bristol, Avon)* 2012;27(2):131-7.
20. Tyson SF, Rogerson L. Assistive walking devices in nonambulant patients undergoing rehabilitation after stroke: the effects on functional mobility, walking impairments, and patients' opinion. *Arch Phys Med Rehabil* 2009;90(3):475-9.
21. Veerbeek JM, van Wegen E, van Peppen R, van der Wees PJ, Hendriks E, Rietberg M, et al. What Is the Evidence for Physical Therapy Poststroke? A Systematic Review and Meta-Analysis. Quinn TJ, editor. *PLoS One* 2014; 9(2):e87987.
22. Dogan A, Mengulluoglu M, Ozgirgin N. Evaluation of the effect of ankle-foot orthosis use on balance and mobility in hemiparetic stroke patients. *Disabil Rehabil* 2011; 33(15-16):1433-9.
23. Tyson SF, Sadeghi-Demneh E, Nester CJ. A systematic review and meta-analysis of the effect of an ankle-foot orthosis on gait biomechanics after stroke. *Clin Rehabil* 2013;27(10):879-91.
24. Tyson SF, Kent RM. Orthotic devices after stroke and other non-progressive brain lesions. *Cochrane Database of Systematic Reviews* 2009;21(1):CD003694.
25. Thijssen DH, Paulus R, van Uden CJ, Kooloos JG, Hopman MT. Decreased energy cost and improved gait pattern using a new orthosis in persons with long-term stroke. *Arch Phys Med Rehabil* 2007;88(2):181-186.

**KNOWLEDGE, ATTITUDE AND PRACTICE OF PHYSICAL THERAPIST
ON REHABILITATION OF PATIENTS WITH STROKE**

**Department of Physical Therapy, King Abdulaziz University,
Jeddah, Saudi Arabia**

The following questionnaire is intended to assess your understanding and opinion on various aspects of stroke rehabilitation. We would appreciate it, if you could spare a few minutes of your time to complete the questionnaire.

Practical tips in completing the questionnaire:

- Almost all questions are provided with answer options. Please mark (✓) the answer that you consider most appropriate.
- Please answer all questions.

1. Are you

(a) Male	<input type="radio"/>	(b) Female	<input type="radio"/>
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2. Your qualification?

(a) Diploma	<input type="radio"/>	(b) Graduate	<input type="radio"/>
(c) Post graduate	<input type="radio"/>	(d) Doctorate	<input type="radio"/>

3. How old are you _____

4. Working institution

(a) Academic	<input type="radio"/>	(b) Non academic	<input type="radio"/>
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5. Your experience as Physical Therapist _____ (Years)

6. Which type of assessment do you use for stroke patients

(a) Standard one like Fugl Meyer Assessment	<input type="radio"/>
(b) My own assessment chart	<input type="radio"/>
(c) General stroke assessment	<input type="radio"/>
(d) Never assess the patient	<input type="radio"/>

7. Which of the following concepts or approaches do you use primarily in the treatment of stroke patients

(a) Conventional	<input type="radio"/>	(b) Bobath	<input type="radio"/>
(c) Motor Relearning programme	<input type="radio"/>	(d) Rood	<input type="radio"/>
(e) PNF	<input type="radio"/>	(f) Brunnstrom	<input type="radio"/>
(g) Mixed (eclectic)	<input type="radio"/>	(h) Other	<input type="radio"/>

Supplementary Figure 1. Saudi stroke awareness questionnaire (page 1).

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8. Which of the following is the single most likely means of persuading You to change or alter the way you treat patients?
- (a) Information gained from a book
 - (b) Information gained on a course
 - (c) Information gained from a colleague or senior
 - (d) Special interest group
 - (e) An expert in the field
 - (f) Personal experience
 - (g) Research Articles
 - (h) Other
9. The most important thing as far as patients are concerned, is that they can walk.
- (a) Agree
 - (b) Unsure
 - (c) Disagree
10. I will not give my stroke patient a walking aid if I can help it.
- (a) Agree
 - (b) Unsure
 - (c) Disagree
11. I will not allow stroke patients to walk unless I feel that they have gained high quality of movements.
- (a) Agree
 - (b) Unsure
 - (c) Disagree
12. Do you consider using Ankle Foot Orthoses in improving gait patterns in patients with stroke ?
- (a) Yes (b) No

Thank you

Supplementary Figure 1. Saudi stroke awareness questionnaire (page 2).