



ASSESSMENT OF HAND GRIP STRENGTH IN PRACTICING PHYSIOTHERAPISTS.

Physiotherapy

**Ami Umesh
Chheda**

Intern, college of physiotherapy, Tilak Maharashtra Vidyapeeth, Pune

Dr. Nisha Shinde

Professor, college of physiotherapy, Tilak Maharashtra Vidyapeeth, Pune

ABSTRACT

The hand grip strength is important and well evident in all aspects of our daily living and work be it eating, maintaining personal hygiene, mobilizing patients while treating, writing, etc. Physiotherapists need good hand grip strength for optimal force implications for manual therapy and patient management, and therefore in this study assessment of hand grip strength in practicing physiotherapists was done thoroughly. A total of 100 practicing physiotherapists were included in the study (females = 68, males = 32). CAMRY [EH101] electronic hand dynamometer was used to assess the hand grip strength. The average hand grip strength of male therapists was stronger than the female therapists. It was seen that the grip strength in males was at peak at the age group of 26-30 years and in females at the age group of 31-35 years and after this it gradually decreases with age in both male and female therapists. The hand grip strength of dominant hand was stronger than the non-dominant hand. Therapists who followed a regular fitness regime had a stronger hand grip strength than those who did not follow fitness regime. Therapists with years of experience of anywhere between 3 to 7 years had the maximum HGS. This study has concluded that the hand grip strength varies in relation to many factors such as age, gender, dominance, physical fitness, years of experience and type of work.

KEYWORDS

Hand Grip Strength, Physiotherapists, hand Dynamometer, age

INTRODUCTION:

Human hand performs all the fine motor and gross motor functions in day-to-day life and it is irreplaceable when it comes to performing any of these movements be it gross or skilled. The hand grip strength and function is important and well evident in all aspects of our daily living and work be it eating, maintaining personal hygiene, mobilizing patients while treating, playing tennis, writing, etc.¹ Physiotherapists assess, plan and implement rehabilitative programs that improve or restore human motor functions, maximize movement ability, relieve pain syndromes, and treat or prevent physical challenges associated with injuries, disease and other impairments. (WHO)⁶ To execute patient's spinal and peripheral joint mobilization and manipulation, ambulation, aided walking, transfers, and safe mobility, physiotherapists need strong hands.¹ Grip is defined as forceful act resulting in flexion at all the joints of the fingers along with thumb when used as a stabilizer to the object being held between the finger and the palm.⁴ Hand grip strength (HGS) is described as the force applied by the hand to hold on, to pull on, or to suspend objects in the hand.³ In order to assess general strength, work capacity, the severity of disease and injury processes, and the possibility for improvement in rehabilitation, grip strength is usually taken in to consideration and utilized.² Many factors influence the hand grip strength age, gender, hand and forearm anthropometric, and hand dominance, muscle hypertrophy, range of motion, and types of muscle fibre, muscles coordination, and muscles shortening velocity are the internal factors that affect muscular strength. Besides, internal factors, some external factors like motivation, type of training, time of day, and anabolic steroids also affect muscular strength. This simple method of non-invasive measurement may provide nutritionists and medical professionals with valuable screening data, prior to further more invasive testing.⁸ Hand held dynamometer is a valid and reliable instrument for assessing hand grip strength. The Camry electronic hand-held dynamometer has a validity of 0.95 and reliability of 0.94 for right side and 0.91 for left side.¹⁰ An additional benefit of this electronic hand-held dynamometer is that it can automatically measure and display the maximum grip strength that was achieved, which can be calibrated to 200 lbs (90 kg). To accommodate different hand sizes, the instrument has adjustable grip lengths. It has a digital LCD read-out with results displayed on screen.² The American Society of Hand Therapists provided standardised norms for proper positioning while assessment of Hand Grip Strength. Other instructions regarding the same have been followed as per American Society of Hand Therapists. (ASHT)¹⁰ Profession like physiotherapy requires physiotherapists to have good grip strength to handle the patient properly, assess them thoroughly and to deliver appropriate and effective treatment to the patient. Considering the needs of the profession assessment of the hand grip strength in practicing physiotherapists was done thoroughly.

This study was conducted in Pune by including 100 practicing physiotherapists via purposive sampling method. The materials used for this study were CAMRY [EH101] electronic hand dynamometer, data collection sheet, notepad, pen, pencil and stopwatch.

Inclusion Criteria:

- Physiotherapists practicing clinically
- Work experience of minimum 6 months
- Both male and female physiotherapists
- Age group: 21 to 40 years.

Exclusion Criteria:

- Any previous physical or medical illness
- Certified physiotherapists who are not practicing.
- Pregnant females
- Any other illness causing pain or restrictions in the movement.

Permission was taken from the ethical committee of Tilak Maharashtra Vidyapeeth and various physiotherapy clinics and hospitals were approached. Physiotherapists were enlightened were made to understand about the study. Participants were included according to the inclusion and exclusion criteria. Aims, objectives, and method was explained to all the participants.

Written consent forms were taken from each participant. The subjects were made to sit on a chair, without any arm rest, back rest, the shoulders were adducted and neutrally rotated, the elbows were flexed to 90 degrees, and the forearm was in neutral position, and the wrist in 0 to 15 degrees of extension and 0 to 15 degrees of ulnar deviation.

The feet were completely flat on the ground. Participants were then asked to squeeze the handle of the dynamometer as maximally as possible and release. Three grip strength measurements were taken for each dominant and non-dominant hand alternately with a 1-minute rest period in between each measurement to avoid muscle fatigue. The best of all the three successive grip strength measurements were noted.

RESULTS:

A total of 100 participants were included in the study, among them 68 were female therapists and 32 were male therapists.

Table No.1

FEMALES (AGE GROUP)	HAND GRIP STRENGTH	
	RIGHT(MEAN)	LEFT(MEAN)
20-25	24.06	23.43
26-30	26.10	24.72
31-35	26.45	25.08
36-40	25.56	25.7

MATERIALS AND METHODOLOGY:

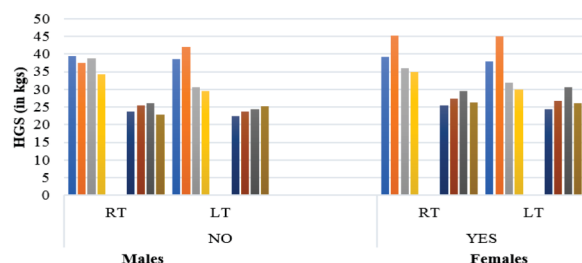
MALES (AGE GROUP)	HAND GRIP STRENGTH	
	RIGHT(MEAN)	LEFT(MEAN)
20-25	40.59	38.32
26-30	42.65	43.97
31-35	37.86	31.13
36-40	32.86	29.2

The average hand grip strength of both male and female therapists according to the age group is mentioned above. Hand grip strength of both the right and left hand is mentioned.

Table No.2

MALES(AGE GROUP)	HAND GRIP STRENGTH			
	NO PHYSICAL FITNESS		PHYSICAL FITNESS	
	RIGHT	LEFT	RIGHT	LEFT
20-25	39.52	38.51	39.98	37.98
26-30	37.55	42.1	45.2	44.91
31-35	38.85	30.7	35.9	32
36-40	29.6	29.5	35	30
FEMALES(AGE GROUP)	HAND GRIP STRENGTH			
	NO PHYSICAL FITNESS		PHYSICAL FITNESS	
	RIGHT	LEFT	RIGHT	LEFT
20-25	23.75	22.42	25.40	24.37
26-30	25.39	23.73	27.44	26.66
31-35	26.12	24.3	29.5	30.6
36-40	22.8	25.26	26.33	26.13

PHYSICAL FITNESS V/S GRIP STRENGTH (MALES & FEMALES)



Graph No.3

Hand grip strength of practicing physiotherapists who follow a fitness regime regularly and who do not follow fitness regime is mentioned above for both male and female physiotherapists.

DISCUSSION:

Physiotherapists from 20-40 years age group were included in the study. All the included physiotherapists were right dominant. Hand grip strength was assessed by using electronic hand-held dynamometer [CAMRY-EH101] according to the guidelines of American Society of Hand Therapists (ASHT).

The hand grip strength of male physiotherapists on average was greater than the hand grip strength of female physiotherapists. A study was done on healthy individuals by Verma Chhaya in 2016 which showed that the HGS of males is stronger than Females. They explained that gender was one of the most important factors that had an impact on grip strength. It is a known fact that males have greater muscle mass and thus larger amount of contractile tissue leading to greater grip strength as compared to females.

Further, in the study, the hand grip strength was then correlated with different age groups of both male and female therapists which gives us the reference values of hand grip strength in physiotherapists. A similar study was done in Mumbai in 2016 by P. Walankar on study of hand grip strength in Indian population in which reference values for normal healthy individuals were generated. It is seen that the hand grip strength increases gradually with age and is at peak at the age group of 26-30 years in males and in female therapists it is at peak at the age group 31-35 years and then gradually declines in both male and female therapists.

Later, the hand grip strength of the dominant and non-dominant hand were taken into consideration and it was seen that the hand grip strength of the dominant hand was stronger than the non-dominant hand. A similar study was done in 2016 by Prachita Walankar, et al in which similar results were obtained. The study also stated that the

dominant hand is approximately 10% stronger than the non-dominant hand.

Further, physiotherapists who follow fitness regime regularly have a better and stronger hand grip strength than those who are physically inactive in both male and female physiotherapists. A study similar to the present study was done by V. Bhandare in 2022 which showed similar results. The study the association of low physical activity with low hand grip strength leading to sedentary lifestyle.

In this study, the years of experience of the therapists in this profession was also recorded. Therapists had 1 year to 14 years of experience, and out of these, therapists with the years of experience of anywhere between 3 years to 7 years had the maximum hand grip strength. After that the HGS started to gradually decline with increasing years of experience.

CONCLUSION:

This study concluded that the hand grip strength varies in relation to many factors such as age, gender, dominance, physical fitness, years of experience and profession of an individual.

Future Scope:

- Similar study should be performed with a larger sample size.
- Equal number of therapists should be taken from each specialty and gender.
- Further intervention-based study can be done for the therapists with low hand grip strength.
- Along with power grip, pinch grip can also be considered and studied upon.

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