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Prevalence of Carpal Tunnel Syndrome among Hypothyroid Patients in Bhusawal City: An Observational Study

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Abstract

Aim: To find out the prevalence of carpal tunnel syndrome among hypothyroid patients in Bhusawal city.

Relevance of study: Hypothyroidism is a common endocrine disorder that affects both CNS and PNS. Patients assume that the symptoms like tingling, numbness and paresthesia are due to anemia and hyperlipidemia, so they ignore them. Carpal tunnel syndrome is a treatable condition and hence this study aims to determine the presence of carpal tunnel syndrome in patients with hypothyroidism.

Methodology: In this cross-sectional study 151 patients of diagnosed hypothyroidism not on medications were included according to inclusion & exclusion criteria. Evaluation of carpal tunnel syndrome was done using the CTS-6 Evaluation Tool.

Result: Out of 151 hypothyroid patients, prevalence of carpal tunnel syndrome was found in 12 patients. The study resulted that 7.94% of hypothyroid patients were prevalent for CTS, in which 10 were females and 2 were males.

Conclusion: The prevalence of Carpal Tunnel Syndrome in Hypothyroid Patients is relatively less i.e. 7.94%. Females affected more than the males.

Keywords: CTS, Hypothyroidism, CTS-6 Evaluation Tool

Introduction

Carpal tunnel syndrome is a commonest entrapment neuropathy of upper limb ^[1].

It is a painful disabling condition ^[3].

Carpal tunnel is a space between the carpal bones and transverse carpal ligament. It is a narrow space through which median nerve passes providing motor and sensory function to the palm of hands and first four digits of hand ^[3].

Increased pressure in the tunnel results in reduced blood supply to the median nerve due to blood vessel stenosis and also the compression of the median nerve ^[2].

The risk factors of CTS includes: repetitive use of hands and wrist, pregnancy, diabetes mellitus, arthritic conditions (osteoarthritis, rheumatoid arthritis), advanced age, amyloidosis, trauma, renal diseases, etc ^[4].

The symptoms of CTS are: pain (nocturnal pain), paresthesia, tingling sensation along the median nerve distribution in hand ^[5].

Hypothyroidism is an endocrine disorder in which the thyroid gland does not secrete enough thyroid hormone ^[6].

Myxoedema (myxoedema coma) is an advanced level of hypothyroidism in which little or no thyroid hormone is produced ^[7].

Women above 60 years of age are at high risk of developing hypothyroidism than men ^[7].

Hypothyroidism can result in fatigue, weight gain, increased cold intolerance, joint pain, infertility, heart diseases ^[5].

Hypothyroidism also affects both CNS and PNS resulting in peripheral mononeuropathy, polyneuropathy or compression neuropathy ^[7].

Materials and Methods

Study design- A Cross sectional study.

Place of study- Bhusawal city.

Sample Size- $n = \frac{z1^2pq}{d^2}$
 $n = 151$

Study duration- 6 months.

Participants

A Cross sectional study was conducted on 151 diagnosed hypothyroid patients not on medications in Bhusawal city. Inclusion criteria was 1. Diagnosed cases of hypothyroidism not on medications 2. Patients above 25 years of age 3. Both males and females 4. Patients who are willingly participate in the study. Exclusion criteria was 1. Other risk factors of CTS like pregnancy, diabetes mellitus, arthritic conditions, renal diseases, etc. 2. Post thyroidectomy patients 3. Pathological and non-pathological trauma to upper limb 4. Uncooperative patients. Outcome measure- CTS-6 Evaluation Tool.

Procedure

To conduct the following study, permission was taken from Ethical Committee of Dr. Ulhas Patil College of Physiotherapy, Jalgaon. On the basis of inclusion and exclusion criteria, 151 patients were included in the study. Prior to starting the study, the procedure was explained and a written consent form was taken from the patients. Initially, the demographic data i.e. name, age, gender, occupation, address, etc of the patients was taken. Then the patients were assessed by using CTS-6 evaluation tool. Based

on the score, the patients were analyzed statistically and the result was generated.



Fig 1: Patient performing Phalen's test

Result

Total 151 hypothyroid patients were included in the present study. The obtained data was statistically analysed in MS Excel.

Table 1: Age wise Distribution

Sr. No.	Variable	Groups	Frequency	Percentage
1	Age (in years)	26-35	21	13.91
		36-45	38	25.17
		46-55	48	31.79
		56 & above	44	29.14

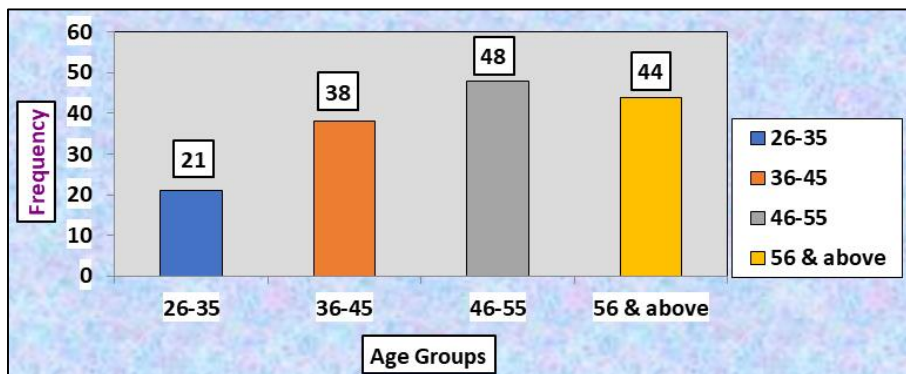


Fig 1: Age wise Distribution

Table 2: Gender wise Distribution

Sr. No.	Variable	Groups	Frequency	Percentage
2	Gender	Male	46	30.46
		Female	105	69.54

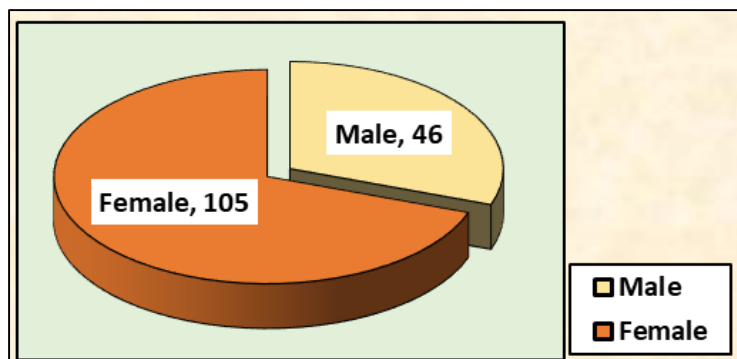
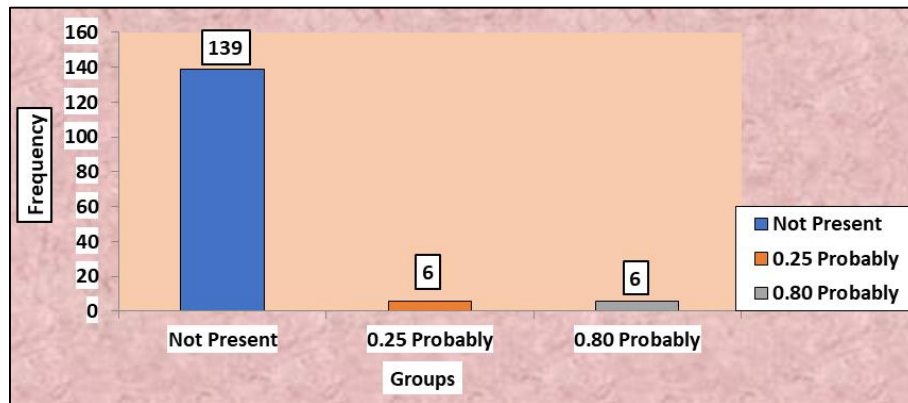


Fig 1: Gender wise Distribution**Table 3:** CTS-6 Evaluation Tool Score

Variable	Groups	Score	Frequency	Percentage
CTC-6 Score	Not Present	0-5	139	92.05
	0.25 Probably	6-12.	6	3.97
	0.80 Probably	above 12	6	3.97

**Fig 3:** CTS-6 Evaluation Tool Score

Discussion

The aim of the present study was to find out the prevalence of carpal tunnel syndrome among hypothyroid patients in Bhusawal City.

In the present study, the prevalence of Carpal Tunnel Syndrome among Hypothyroid Patients in Bhusawal and City was 7.94%.

For current study 151 diagnosed patients of hypothyroidism not taking regular medications were considered. Out of 151, 12 patients had CTS in which 10 were females and 2 were males which showed that females were more affected than males.

Levothyroxine is widely used medication for hypothyroidism that often improves the symptoms of neuropathy [16].

According to CTS-6 evaluation scale, 3.97% had 0.25 probably of CTS while 3.97% had 0.80 probably of CTS.

A study conducted by Aldaghri *et al* in the year 2020 on “prevalence of Hypothyroidism Among Carpal Tunnel Syndrome” concluded that the CTS is prevalent in patients with thyroid abnormalities, especially those with hypothyroidism. They found 3.5% prevalence which was quite similar to the result of the present study [11].

The exact cause of CTS in hypothyroidism is not cleared but it may be due to the fact that, in hypothyroidism, mucopolysaccharides, hyaluronic acid and glycosaminoglycan's excessively deposited in the subcutaneous tissues that leads to dermal edema [3].

Also, the mucopolysaccharides, chondroitin and hyaluronic acid gets accumulates in the interstitial spaces leading to retention of water and weight gain which may leads to CTS [8].

Despite many contradictory researches few studies still supporting current study as in current study only patients who are not on medications that are considered.

Deposition of these substances in the tissues causes compression of the surrounding peripheral nerves resulting in swelling and degeneration of the nerves [9, 10].

Pseudo-mucinous substances gets deposited in the narrow carpal tunnel at wrist resulting in compression of the median nerve which leads to CTS [3].

The result of a study conducted by Hoda Taghavian and Sharareh Roshanzamir in 2013 “Prevalence of Carpal Tunnel Syndrome in Female Hypothyroid Patients Visiting Motahari Endocrinology and Metabolism Clinic in Shiraz” indicated that the prevalence of clinical and paraclinical symptoms of CTS is relatively high in thyroid patients which converses with my study [12].

A study conducted by Eslamian *et al* (2011) [13] “Electrophysiological changes in patients with untreated primary hypothyroidism” concluded that female gender, advanced age, duration of the disease and frequency of clinical weakness were significantly related to the presence of CTS, which coincides with my study [13].

A study conducted by Suresh *et al* in 2004 “How Valuable is Screening For Thyroid Disease in Patients with CTS?”, found only 2 cases of hypothyroidism among 136 patients (CTS group). They concluded that routine screening of patients with isolated CTS for thyroid function abnormality does not appear to be worthwhile [14].

A study conducted by Sampada Karne in the year 2015 “Carpal Tunnel Syndrome in Hypothyroidism: a cross sectional study”, CTS were found in 6 (16.7%) patients. They concluded that increased BMI is an important risk factor for CTS in patients with hypothyroidism. As there was a methodological limitations still this study supports current study [15].

In the present study, the positive results could be undiagnosed or untreated CTS. So screening of the hypothyroid patients for presence of CTS is important as the treatment of CTS is inexpensive and very effective.

CTS can be treated conservatively by the physiotherapist using median nerve mobilization, therapeutic exercises, electrical modalities, etc.

Conclusion

The prevalence of Carpal Tunnel Syndrome among Hypothyroid patients in Bhusawal city is 7.94%. The result of the present study also showed that the females are more affected than males.

Limitation

Limitations of the study was: not considered the BMI of hypothyroid patients and not performed the electro diagnostic testing.

Clinical Implication

This study was designed to identify the prevalence of Carpal Tunnel Syndrome in Hypothyroid patients which in long term may develop functional limitations and disability and, an appropriate cost-effective measure can be taken at an early stage which will serve to be a primary prevention strategy in preventing risk of CTS.

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