

PREVALENCE OF CARPAL TUNNEL SYNDROME IN PREGNANT WOMEN IN A TERTIARY CARE TEACHING HOSPITAL IN CENTRAL INDIA

¹Dr. Vipin Garg, ²Dr. Parul Trichal, ³Dr. Vijendra Damor, ⁴Dr. Pradeep Dubey, ⁵Dr. Roma Sharma

¹Assistant Professor, Department of Orthopaedics, GRMC, Gwalior, M.P

²Assistant Professor, Department of Obstetrics & gynaecology, Government Medical College, Ratlam, M.P

³Assistant Professor, Department of Orthopaedics, Government Medical College, Ratlam, M.P

⁴Assistant Professor, Department of Orthopaedics, Government Medical College, Ratlam, M.P

⁵ Senior Resident, Department of Obstetrics & gynaecology, Government Medical College, Ratlam, M.P

Corresponding Author:

Dr. Pradeep Dubey

Drpradeepdubey85@gmail.com

ABSTRACT

Background: Carpal tunnel syndrome (CTS) is a most common type of upper limb compression neuropathies. Carpal tunnel syndrome is common during pregnancy and the symptoms are mostly high in the third trimester. Various physiological and electro diagnostic tests are used to detect carpal tunnel syndrome in this stage. **Aim:** this study was aimed to find the prevalence of carpal tunnel syndrome among pregnant women.

Materials & Methods: A cross-sectional study was carried out in the department of orthopedics in Gajara Raja Medical College, Gwalior, India. Pregnant women presenting with sign and symptoms of CTS were enrolled in our study.

Results: Among 300 pregnant women, prevalence of CTS was 24 (8%). Majority of the women (66%) were found in third trimester of pregnancy. 37.4% pregnant women were 26-30 years age group, 54% was primiparous and 65.3% women were obese category. Physiologic tests (Phalen's Test, Tinel's sign and Carpal Compression Test) used for diagnosis of CTS.

Conclusion: Prevalence of carpal tunnel syndrome was higher among pregnant women mainly in third trimester.

Keywords: Carpal tunnel syndrome, pregnant women, Third trimester, Prevalence

INTRODUCTION

Carpal tunnel syndrome (CTS) is defined as entrapment of median nerve traveling through the carpal tunnel to the hand [1]. The American Academy of Orthopaedic Surgeons (AAOS) Clinical

Guidelines on the Diagnosis of CTS defines it as a symptomatic compression neuropathy of the median nerve at the level of the wrist [2]. Carpal tunnel syndrome (CTS) is the most common and the most widely known entrapment neuropathy. This leads to progressive pain, numbness and weakness in the palm associated with problems in fine movement and pain in the hand when tapping over the median nerve at wrist [3, 4]. CTS was more prevalent in the female population, it was postulated because morphologically, females are more prone to CTS compare to male [5] CTS was commonly occurs bilaterally, with a peak age range of 40 to 60 years [6] Carpal tunnel syndrome has been associated with pregnancy, with incidence reported as high as 62% among pregnant women [7]. There are several purported reasons for this high incidence, although the true cause remains unknown and is likely multifactorial. Increased Blood volume, Hormonal changes and fluid retention in pregnancy, leads to edema on the ligaments that form the roof of the tunnel this leads to nerve compression [8]. The factors thought to be causing the increase in CTS are advanced age, female gender, diabetes, and obesity. Pregnancy, certain occupations, repetitive and cumulative motion injuries, a strong family history, certain medical disorders such as hypothyroidism, autoimmune diseases, rheumatic diseases, arthritis, kidney disease, trauma, anatomical predisposition in the wrist and hand, infectious diseases, and substance abuse are also risk factors [9]. Diagnosis of CTS was made by clinical examination, conventional tests are Tinel test, Phalen test, and median nerve compression test, which cause or aggravate symptoms. The most accurate diagnostic method is electro-diagnostic tests conducted by a competent electro-myographer, which has most sensitive and specific [10]. Carpal tunnel syndrome may decrease spontaneously after child birth, within few weeks of delivery as seen in 95% of women [11].

Most of the studies specifically mentioned the prevalence of CTS in pregnancy is two times higher in third trimester than the first and second trimester of pregnancy [12, 13]

The aim of the present study was to determine the prevalence and severity of Carpal tunnel syndrome by electro-diagnostic studies in pregnant women in our regions.

MATERIAL AND METHODS

This analytical cross sectional study was conducted in the department of orthopedics in Gajara Raja Medical College, Gwalior, Central India. A total of 300 pregnant women were enrolled in our study, these are selected randomly referred for the routine checkup of pregnancy.

Inclusion criteria: pregnancy without symptoms of CTS before pregnancy and who willing to participate in the study

Exclusion criteria: Women with a history of fracture or trauma to the hand, hypothyroidism, diabetes, or diagnosed neuropathy

Carpal tunnel syndrome was diagnosed by typical history, Sign & symptom, clinical examination and some specific tests (Flick sign, Phalen's test, Tinel's sign and carpal tunnel compression test).

We have obtained written informed consent from all patients who participating in the study. The most specific test is the carpal tunnel compression test. The examiner applies direct thumb pressure over the median nerve at the carpal tunnel; a positive test consists of paresthesias elicited within 30 seconds. A positive Phalen's test consists of paresthesias elicited within 60 seconds of passive wrist flexion. In this test, it is important to not simultaneously flex the elbow. The Tinel test involves direct percussion of the median nerve at the carpal tunnel; reproduction of paresthesias is considered a positive result. Flick sign: Where the subjects were asked 'Will you shake your hand when the symptoms are at their worst at night. Nerve conduction and electromyographic testing are the diagnostic gold standard, although if carpal tunnel compression, Phalen's, and Tinel tests are all positive, there is a specificity of >98%.

All data were collected analysed statistically, The *P* value of less than 0.05 was considered statistically significant.

RESULTS:

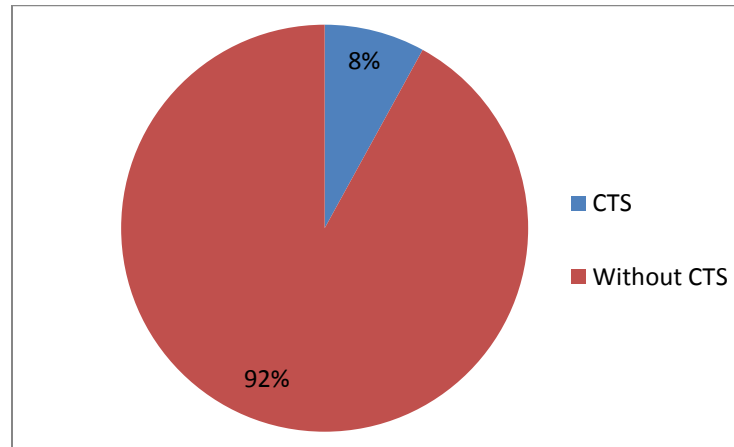
A total number of 300 pregnant women those attending obstetrics OPD were enrolled in our study. Majority of the pregnant women (37.4%) belonged to age group of 26-30 year followed by (32%) were 21-25 years. Out of total pregnant women 25.4%, 34.6%, and 40% experienced their first, second, and third of pregnancy, respectively, most of them (54%) was primiparous and 46% were Multiparous. Most of pregnant women (43.3%) having mild obesity (BMI 25-30), 18.7% moderate obesity and 3.3% severe obesity, whereas 32% was normal BMI. [Table:1]

Table 1: Population characteristics of the study participants

Character		Frequency (N=300)	Percentage (N=100%)
Age group	16-20 year	22	7.4
	21-25 year	96	32
	26-30 year	112	37.4
	31-35 year	54	18
	36-40 year	12	4
	>40 year	4	1.3
Month of pregnancy	First trimester	76	25.4
	Second trimester	104	34.6
	Third trimester	120	40
Parity	Primipara	162	54
	Multipara	138	46
Body mass index	Underweight	8	2.7
	Normal	96	32
	Mild obesity	130	43.3
	Moderate obesity	56	18.7
	Severe obesity	10	3.3

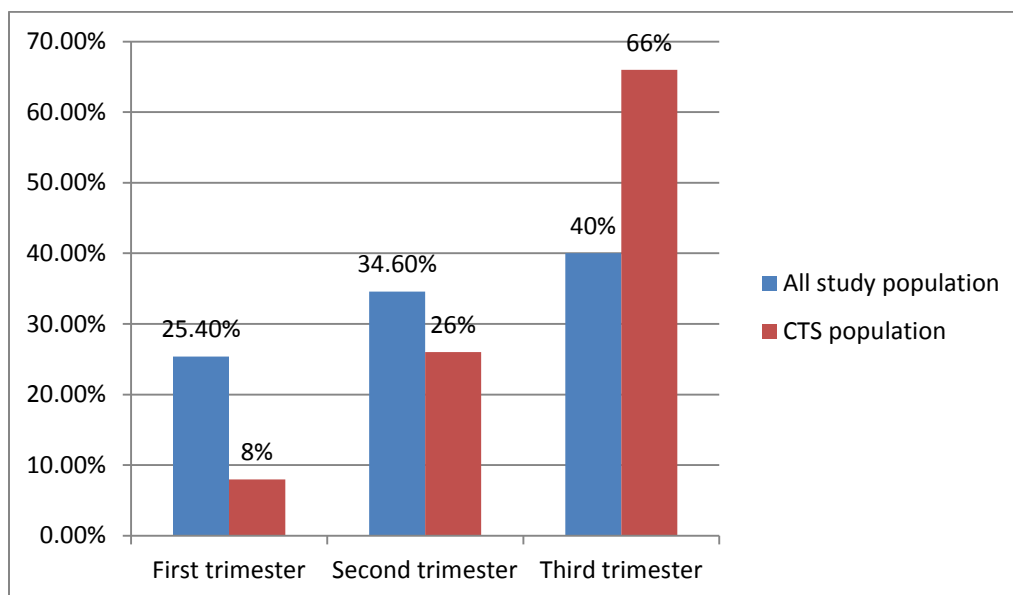
Prevalence of carpal tunnel syndrome was very less, observed only 8% diagnosed CTS in pregnant women [Figure:1].

Figure 1: Prevalence of carpal tunnel syndrome in pregnant women



Prevalence of CTS was higher (66%) in third trimester, 26% in second and only 8% in first trimester, whereas pregnant women without CTS was 40% in third trimester, 34.6% in second and 25.4% in first trimester of pregnancy.

Figure 2: Comparison of all study participants with CTS in various trimester of pregnancy



Diagnosis of CTS based on various symptoms and specific tests. Flick sign was positive in 10.6% cases, Phalen's Test positive in 8% cases, Tinel's sign positive in 5.4% cases and Carpal

Compression Test were positive in 9.4% of the pregnant women participated in our study [table:2]

Table 2: Various diagnostic test of CTS

Character	Observation	Frequency (N=300)	Percentage (N=100%)
Flick sign	Positive	32	10.6
	Negative	268	89.4
Phalen's Test	Positive	24	8
	Negative	276	92
Tinel's sign	Positive	16	5.4
	Negative	284	94.6
Carpal Compression Test	Positive	28	9.4
	Negative	272	91.6

Sign and symptoms was more severe in CTS patients as compared to the without CTS patients. Among CTS 52% was asymptomatic whereas without CTS 65% was asymptomatic.

Table 3: Comparison of sign and symptoms severity scale in with or without CTS patients

Sign and symptoms severity scale	Asymptomatic	Mild	Moderate	Severe
Percentage of without CTS patients (n=272)	65	18	13	4
Percentage of with CTS patients (n=28)	52	25	15	8

DISCUSSION:

Many studies have been performed about prevalence of carpal tunnel syndrome in pregnant women in different countries. The prevalence of pregnancy-related carpal tunnel syndrome has varied reports, from 0.8% to 70% noted. In fact, patients with pregnancy-related carpal tunnel syndrome may have more severe symptoms than those with idiopathic carpal tunnel syndrome [14].

The prevalence of carpal tunnel syndrome among pregnant women was 8% reported in present studies, comparable with the study conducted by Sonia et al [15] and Baumann F et al [16], found CTS prevalence 9% and 11% respectively in their study, different to that some studies like *Yazdanpanah et al* [17] and Yasouj et al [18] found very low prevalence of CTS, 3.4% and 2.7% respectively, whereas other studies like Waris M et al [19] and Ablove R.H et al [20] found very high prevalence of CTS 40% and 62% respectively. These differences in prevalence of CTS were due to various geographical and socio-demographic factors.

Significantly higher Prevalence of CTS (66%) was observed in third trimester of pregnancy in our study, correlated with other studies: Yasar K et al [21], Waqar A et al [22] and Khosrawi S et al [23] reported higher CTS among thirist trimester, 78%, 69% and 63% respectively.

Current study found the most common age group were 26-35 years of pregnant women in CTS evaluation, accordance to the Ganjoo S et al [24] and Ajroud et al [25]. This could be due to many hormonal changes occurs in reproductive age group.

Parity had a significant relationship with CTS incidence in pregnant women; in our study Primipara pregnant women were more than Multiparous pregnant women, consistent with the Prafitri, et al [26] and Purwanto S et al [27].

Obesity was also a contributing factor of CTS among pregnant women, present study reported 65.3% of pregnant women were overweight (BMI> 24.9%), concordance with the Onyemaechi, *et al* [28] and Bahrudin M et al [29].

Although most of the studies used only electro diagnostic tests or physiological tests and electro diagnostic tests together. Our study included only physiological provocative tests in the subjective and objective forms as diagnostic criteria for CTS in pregnancy. It is widely accepted and recognized that CTS is a syndrome whose accurate diagnosis requires a combination of both signs and symptoms. In the present study the most common signs were found to be Tinel's and Phalen's signs which were similar to the conclusions of some of the previous studies like: Sonia et al [15], Meems M et al [30] and de Oliveira GA et al [31].

Symptom severity scale was higher among CTS patients as compared to the non CTS pregnant women in the present study, concordance to the Sikkandar MF et al [32].

In our study most of the CTS pregnant women were Asymptomatic (52%), remaining 48% found following sign and symptoms: Pain, Paresthesia, Sensory disturbance in median nerve distribution, Thenar atrophy, Positive Tinnel Sign and Positive Phalen sign, constant finding also reported by Shaafi SH et al [33].

CONCLUSION

We have concluded that the prevalence of Carpal tunnel syndrome was higher among pregnant women. The prevalence and severity of CTS increased with increased gestational age (mainly in third trimester) and increased BMI in pregnancy. It is necessary to screen all pregnant women

based on their clinical signs and to use specific physiological provocative tests, especially in the third trimester of pregnancy.

Conflicts of interest: none

Source of funding: none

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