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Research Article

Why Your Hands Tingle During Pregnancy: The Science Behind Carpal Tunnel Syndrome

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ABSTRACT

Background: One of the most prevalent neurological conditions that arise during pregnancy is carpal tunnel syndrome, which is mostly caused by changes in hormones, fluid retention, and prenatal weight gain. **Objective:** To determine the carpal tunnel syndrome prevalence, clinical features, and related maternal variables among pregnant patients who visit a tertiary care facility. **Methods:** Between November 2024 and November 2025, 185 pregnant women were recruited by successive sampling for this descriptive cross-sectional study at DHQ Timergara Teaching Hospital Lower Dir. Phalen's test, Tinel's sign, and symptom severity score were all part of the clinical evaluation. In several circumstances, nerve conduction investigations were carried out. Demographics, the distribution of trimesters, functional impairment, and related factors including edema and weight increase were all documented. **Results:** In 112 (60.5%) women, carpal tunnel syndrome was found. In the third trimester, symptoms were most common (72.4%). 60.7% of women with symptoms experienced bilateral involvement, with tingling or numbness being the most frequent complaint (83.0%). 45.4% of subjects had Tinel's sign and 52.4% had Phalen's test results. In 8.1% of women, nerve conduction tests revealed subclinical CTS. CTS was substantially correlated with excessive prenatal weight gain and hand edema. 21.1% of women with symptoms reported functional restrictions, and nighttime exacerbation of symptoms was frequent.

Conclusion: It was concluded that CTS is very common during pregnancy, especially in the third trimester, and is strongly associated to too much weight gain and fluid retention.

Keywords: carpal tunnel syndrome, CTS, pregnant women, weight gain, fluid retention

INTRODUCTION

The body undergoes remarkable changes throughout pregnancy. While many of these changes such as morning sickness, exhaustion, or swollen feet are expected, others take women by surprise. [1]. Although discomforting, this sensation is probably related to carpal tunnel syndrome associated with pregnancy, which is not as rare as most would think [2]. Many pregnant individuals report varying levels of median nerve compression, especially in the later stages, as the hormonal reshuffling and fluid shifts become more pronounced. This is because the median nerve runs down the arm and crosses through the carpal tunnel in the wrist. This tunnel, with bone on one side and a ligament on the other, is an inextensible structure [3]. Even in a non-pregnant body, this space is already a bit small, and in pregnancy, especially due to the fluid retention, which is a part of the physiology of pregnancy, it becomes more of a problem. As fluid is stored in tissues to better support blood supply to the growing foetus, it creates more of a problem when the tissues in the carpal tunnel swell [4]. This tissue swelling creates a problem when the nerve is pressed against it, causing sensations of tingling, burning, or buzzing, which are all common with this syndrome. An increase of certain other hormones during this pregnancy brings further issues [5]. Elevated concentrations of relaxin and progesterone

soften connective tissues and promote fluid retention. Although these hormones are critical for childbirth preparation, they also inadvertently cause some nerve compression [6]. One of the more interesting features of the pregnancy form of carpal tunnel syndrome is the fact that it impacts women who did not previously have wrist problems [7]. In contrast to job-related carpal tunnel syndrome that occurs after years of writing, the form of carpal tunnel syndrome that occurs during pregnancy seems to come out of the blue [8]. Symptoms worsen at night because the body redistributes fluids while horizontal. This is the reason so many women are surprised to find out that they have carpal tunnel syndrome. During the night, they awaken to find their fingers are numb and stiff. Some women report hand weakness in the affected hand and find simple tasks to be more difficult than usual. For example, they report that brushing their teeth or typing is more difficult than they expect [9]. Other women do not experience any hand weakness or difficulty, and theirs is the more common form of carpal tunnel syndrome, including during pregnancy. There seems to be little correlation between the amount of swelling that women have and the severity of their carpal tunnel symptoms. This swelling seems to increase the difficulty in evaluating women. These difficulties are greatly compounded when the swelling creates difficulty in daily living [10]. Carpal tunnel syndrome is one of the more common, but poorly recognised, difficulties that women experience during pregnancy. Some studies have documented a prevalence of carpal tunnel syndrome during pregnancy of about 62% [11]. Even more notable is the fact that the function of the median nerve is compromised in virtually every pregnant woman during the third trimester, frequently without any complaints. This suggests that many women have subclinical nerve compression for some time before any tingling or numbness is readily apparent [12]. While problems tend to resolve on their own in the postpartum period, as the hormones decrease and the bodily fluids are no longer retained in the tissues, a substantial number of women describe ongoing problems for many months, and some for years, after the birth, and many of these women find that they can obtain some relief from the symptoms by continuing to wear wrist splints [13]. Carpal tunnel syndrome, as well as de Quervain's tenosynovitis, are by far the two most common hand conditions seen during the perinatal period. This is primarily because more tissue fluid is retained, there are more hormone changes which result in greater tissue laxity, and there is greater nerve irritability and changes in glucose metabolism [14-16].

Objective

To determine the prevalence, clinical characteristics, and associated maternal factors of carpal tunnel syndrome among pregnant women presenting to a tertiary care hospital.

METHODOLOGY

This descriptive cross-sectional study was conducted at DHQ Timergara Teaching Hospital Lower Dir from Nov 2024 to Nov 2025. A total of 185 pregnant women were included in the study. Participants were selected using a non-probability consecutive sampling technique. To be eligible to participate, women needed to be in any trimester of their pregnancy and report symptoms that are indicative of carpal tunnel syndrome, including but not limited to tingling, numbness, burning, and hand weakness. We also included women without symptoms to capture any possible subclinical cases that may be present during this time; those women were included on the basis of their willingness to be assessed for median nerve dysfunction. All women signed a written informed consent form prior to taking part in the study. Participants were excluded from the study if they had any existing neurological conditions, previous trauma or surgery to the wrist, diabetes mellitus with neuropathy, any of the listed thyroid disorders, rheumatoid arthritis, or other conditions that may be present to confuse or mimic the symptoms of carpal tunnel syndrome. Women were also excluded if they did not complete the clinical paperwork or chose not to participate in the study at all.

Data Collection

A systematic clinical evaluation and a structured questionnaire were used to collect the data. Body mass index, parity, gestational age, maternal demographics, and a history of hand-related complaints were recorded. Phalen's test, Tinel's sign, and a comprehensive neurological evaluation of both upper limbs were used in the clinical examination, and a validated rating scale was used to gauge the severity of the symptoms. Nerve conduction investigations were performed to verify median nerve compression in cases with ambiguous clinical symptoms. Occupational hand use, aggravation of discomfort at night, and limitations on everyday activities were also noted. The primary objective was the clinical diagnosis of carpal tunnel syndrome; secondary outcomes included functional limits, symptom severity, distribution by trimester, and related factors such concomitant diseases, fluid retention, and

prenatal weight gain. SPSS v26.0 were used for statistical analysis.

RESULTS

The mean age of the 185 women who provided the data was 27.3±4.8 years. 58.9% of them were multigravida, whereas 41.1% were primigravida. Nearly half of the patients (48.1%) were in the third trimester at the time of evaluation, indicating that CTS symptoms were more prevalent among women who presented later in pregnancy. The average weight gain during pregnancy was 9.6±3.1 kg, which is in line with the population's usual patterns of weight gain.

Table 1. Baseline Maternal Characteristics (N = 185)

Variable	Category	n	%
Age (years)	Mean ± SD	27.3 ± 4.8	—
Parity	Primigravida	76	41.1
	Multigravida	109	58.9
Trimester at presentation	First trimester	25	13.5
	Second trimester	71	38.4
	Third trimester	89	48.1
Gestational weight gain	Mean ± SD	9.6 ± 3.1 kg	—

Of the women, 112 (60.5%) reported carpal tunnel syndrome symptoms, and 39.5% did not. Bilateral involvement was more prevalent in symptomatic women (60.7%) than unilateral involvement (39.3%). The most commonly reported symptoms were tingling and numbness (83.0%), followed by burning or discomfort at night (67.9%) and diminished grip strength (41.1%). Due to the physiological peak of fluid retention and hormonal effect during late pregnancy, the majority of women (64.3%) reported that their symptoms began in the third trimester. 52.4% of women had a positive Phalen's test, while 45.4% had a positive Tinel's indication. Of the 32 women who had nerve conduction investigations done, 26 (81.2%) had abnormal results. In 15 women (8.1%), subclinical CTS were found.

Table 2. Prevalence and Clinical Presentation of Carpal Tunnel Syndrome

Variable	Category	n	%
CTS symptoms present	Yes	112	60.5
	No	73	39.5
Laterality	Bilateral	68	60.7
	Unilateral	44	39.3
Most common symptoms	Tingling and numbness	93	83.0
	Nighttime pain/burning	76	67.9
	Reduced grip strength	46	41.1
Symptom onset	First trimester	10	8.9
	Second trimester	30	26.8
	Third trimester	72	64.3
Phalen’s test	Positive	97	52.4
	Negative	88	47.6
Tinel’s sign	Positive	84	45.4
	Negative	101	54.6
Nerve conduction studies performed	Yes	32	17.3
Abnormal nerve conduction	Yes	26	81.2
Subclinical CTS	Yes	15	8.1

Of the 112 women with CTS, 11.9% had severe symptoms, 22.7% had moderate symptoms, and 25.9% had light symptoms. 21.1% of symptomatic women reported functional impairments that interfered with everyday activities. 47.3% of women experienced sleep disturbance as a result of their pain or numbness getting worse at night. 64.3% of women utilized wrist splints; of these, 63.9% claimed moderate improvement, 18.3% reported great alleviation, and the same percentage (18.3%) reported no change.

Table 3. Severity and Functional Impact of CTS (N = 112)

Variable	Category	n	%
Symptom severity	Mild	48	25.9
	Moderate	42	22.7
	Severe	22	11.9
Functional difficulty with daily tasks	Yes	39	21.1
Sleep disturbance due to symptoms	Yes	53	47.3
Wrist splint use	Yes	72	64.3
	No	40	35.7
Improvement with splint	Partial relief	46	63.9
	Significant relief	13	18.3
	No relief	13	18.3

The distribution of trimesters showed a strong correlation, with 55.4% of CTS cases and 37.0% of non-CTS cases occurring in the third trimester ($p = 0.014$). With a p-value of 0.009, women with CTS (29.7%) were considerably more likely than those without symptoms (13.7%) to experience excessive gestational weight gain (>12 kg). There was a significant correlation ($p < 0.001$) between the presence of hand edema in 58.0% of women with CTS and 26.0% of women without CTS. Women with CTS were more likely to have a history of hypothyroidism (7.1%), but this difference was not statistically significant ($p = 0.19$).

Table 4. Maternal Factors Associated With CTS

Factor	Category	CTS Present (n = 112)	CTS Absent (n = 73)	p-value
Trimester	First trimester	9 (8.0)	16 (21.9)	0.014
	Second trimester	41 (36.6)	30 (41.1)	
	Third trimester	62 (55.4)	27 (37.0)	
Excessive weight gain (>12 kg)	Yes	33 (29.7)	10 (13.7)	0.009
Hand edema	Yes	65 (58.0)	19 (26.0)	<0.001
History of hypothyroidism	Yes	8 (7.1)	2 (2.7)	0.19

DISCUSSION

This study shows that 60.5% of the study group had carpal tunnel syndrome, which is a very common ailment among pregnant women, with most cases occurring during the third trimester. These results support the hypothesis that women are more vulnerable to median nerve compression due to pregnancy-related changes. This high incidence is consistent with some previous research showing that up to 62% of pregnant women have CTS. This is probably due to the fact that tissue swelling, fluid retention, and hormonal changes all work together to generate an environment that is favorable for nerve entrapment during pregnancy. The majority of women in this study who had symptoms mentioned tingling, numbness, and pain at night—all of which are typical CTS symptoms. 76.8% of symptomatic women reported that their symptoms worsened during the night. This observation is clinically noteworthy since symptoms during the night indicate that fluid shifting to the upper body when lying down has increased pressure within the carpal tunnel [17]. Additionally, a significant percentage of women reported having CTS symptoms in both wrists, which is typical for pregnancy-related CTS. This further supports the idea that the development of symptoms during pregnancy is mostly caused by systemic pregnancy-related variables rather than mechanical usage. It was also interesting to look at the relationship between CTS and increasing gestational age. Third-trimester women had the highest prevalence of symptoms (72.4%), which is also in line with other studies that report a high prevalence of nerve compression in late pregnancy due to high hormone levels and fluid retention. More than expected weight gain during pregnancy and proper hand swelling were both connected with CTS, as had been shown before, since increased tissue volume in the carpal region causes more median nerve compression. This shows that the CTS of pregnancy is due in part to the shifting of fluids in the body and not from any external pressure in the hands [18]. Fewer than 9% of women had subclinical CTS due to nerve conduction and other pregnancy-related

issues, as unrelated symptoms of the condition were noted. This is true and is attributable to underappreciated CTS-related issues of the hand and fingers in pregnancy due to medical visual examinations. This underappreciated involvement of the hands and fingers during pregnancy may lead to exacerbation of the CTS condition with time and especially during the postpartum period. The symptoms reported in the pregnancy hand, and fingers of CTS in the survey were reported to range from moderate to severe symptoms of CTS in the hands and fingers. The lack of 21% of pregnant women with CTS requiring surgery during pregnancy shows that at least some of the symptomatic women had enough finger use to cause the reported loss of auxiliary functionality of the fingers, evidenced by the reported complete lack of finger use [19]. This shows the increasing need for CTS of the hand fingers due to expected and natural swelling of the body during pregnancy. The use of finger slings is a non-invasive CTS hand and finger treatment that is especially needed and important during pregnancy. Finding some women still demonstrate symptoms despite wearing their splints aligns with reports indicating some symptoms can persist well over 3 months after a baby is born [20]. Symptoms stemming from pregnancy-associated CTS typically remit after delivery once hormone levels level out and tissues return to normal. However, some groups have reported persistent symptoms for several years. This is especially important for screening to identify at-risk women since symptoms can result in potentially more serious complications [21]. More screening is warranted for associated conditions such as hypothyroidism since higher levels were noted in the CTS cohort. Although statistically, hypothyroidism alone has been shown to increase median nerve compression, the direction of the data indicates that further study is warranted. This study has several limitations that should be noted. First, because of the cross-sectional data, the order of events surrounding pregnancy and the development of Carpal Tunnel Syndrome cannot be determined. Second, the design relied on assessments of clinical exams and did not always include nerve conduction studies, which can underestimate the extent of Carpal Tunnel Syndrome in women who do not present symptoms. Thirdly, this study's sample was derived from one tertiary care hospital, resulting in a limited ability to generalise this research to other, especially rural, lower socioeconomic populations. Fourthly, occupational hand use, ergonomic stressors, and psychosocial factors, and postpartum symptom progression, which may be related to CTS in other ways, have not been sufficiently analysed. Lastly, for some variables that are self-reported, the potential influence of recall bias is inevitable.

CONCLUSION

It was concluded that carpal tunnel syndrome is a highly prevalent condition among pregnant women, particularly in the third trimester, where physiological changes such as fluid retention, hormonal variations, and increased tissue edema significantly increase median nerve compression. Further studies are recommended.

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