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Research Article

### PREVALENCE OF CARPAL TUNNEL SYNDROME IN PREGNANT WOMEN: A PREVALENCE STUDY

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#### Abstract

**Objectives:** To find out the prevalence of Carpal Tunnel Syndrome in pregnant women including both primagravida and multigravida women of all three trimesters of pregnancy and to find out functional limitation in affected women with Carpal Tunnel Syndrome.

**Methods:** A cross sectional survey was conducted. Closed ended questionnaire, clinical tests and physical examination were used to collect data from 200 pregnant women by using non-probability convenience sampling technique in different hospitals of Punjab, Pakistan. Primagravida and multigravida women, 1st, 2nd and 3rd trimester pregnant women were included. Fisher's Exact Test was used for associations and Spearman correlation between wrist pain and nature of pain. The duration of study was 3 months from December 2016 to end of February 2017.

**Results:** The result revealed that prevalence of Carpal Tunnel Syndrome in pregnant women with classical sign and symptoms of wrist pain with alteration of sensation and functional limitation is 40%.

**Conclusion:** This study concluded that prevalence of Carpal Tunnel Syndrome is more common in multigravida pregnant women in third trimester of pregnancy with alteration of sensation and functional limitation occurs due to this syndrome.

**Key Words:** Carpal Tunnel Syndrome, Pregnant Women, Multigravida, Third Trimester, Wrist pain, Alteration of Sensation, Functional Limitation.

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**INTRODUCTION:**

The typical entrapment of median nerve between muscles of hand and wrist ligaments (perpendicular ligament and carpal ligament which run longitudinal) is termed as Carpal Tunnel Syndrome (CTS).(1) This common mononeuropathy can be caused by thickening of tendon sheaths, synovial ligaments or generalized tendinitis. CTS is characterized by pain and paresthesia such as tingling sensation, numbness or throbbing or swollen sensation of wrist and arm. It interferes with routine daily tasks such as holding or gripping objects.(2)

It is common complication of pregnancy and have been found up to 62% of pregnant women specially in final trimester. Swelling due to excess fluid in body (edema) squeeze the median nerve or generate overall compressive pressure, leading to development of CTS.(3) Although it can occur in both hands with a 50% of chance, however, dominant hand is most likely to be involved. Particularly it is more disabling in morning, which gets easy with activity in mild cases. However, standardized diagnosis and treatment is required to avoid further severe complication.(4)

Some pregnant women may be on comparative more risk. Abnormally high body mass index before pregnancy, pregnancy induced hypertension or diabetes may be on more risk. Furthermore, with history of past pregnancies, amount of Relaxin secretion may be high to help expand pelvis and cervix. This is accompanied by more edema and more risk of CTS.(5)

In majority of cases, CTS is diagnosed with clinical examination, history, system review sign/ symptoms and physical tests such as Tinel's sign. In some cases, electrodiagnostic tests may be performed such as nerve conduction studies and electromyography to confirm diagnosis. Both Tinel's sign and electrodiagnostic tests are safe during pregnancy.(6-8)

CTS may require surgical intervention but mostly it is relieved conservatively. The treatment components range from prevention, precaution to treatment. Patients are advised to reduce symptom provoking activities or take rest by stopping use of affected hand and switching the activity to other hand or hold that activity entirely for some time. The elements that reduce swelling and inflammation are advised to follow such as elevating arm whenever convenient, using compressive bandages and application of ice therapy.(4)

Splints may also be advised if patient has difficulty in inducing constraint. Splint keeps hand in neutral position, restricts its use and provide compression in some designs. These all advised should be followed by physical therapy.(9) Physical therapy is very efficacious and efficient in relieving CTS symptoms. Myofascial release and exercise therapy are used to address CTS. NSAIDs are other way to reduce pain and symptoms but should not be used without prescription during pregnancy. There are chances of spontaneous recovery after delivery in post-partum period.(8)

In 2012 an analytic cross-sectional study was conducted in which 2656 non-pregnant and 1508 pregnant women were surveyed regarding symptoms of CTS. The symptomatic women were cross tested with electrodiagnostic tests. There found 3.4% CTS in pregnant women and that of 2.3% in non-pregnant women. Furthermore, the majority of women with CTS was at mild to moderate severity level.(5)

However, there is diverse literature regarding prevalence of CTS in pregnancy, as high as 62%. It may be related to life style of a particular culture or country and awareness about early symptoms of CTS. This study was conducted with objective to determine carpal tunnel syndrome in pregnant women irrespective of trimester or number of previous pregnancies.

**METHODOLOGY:**

A cross sectional survey was conducted. The study design required prevalence of carpal tunnel syndrome in pregnant women. A sample of 200 pregnant women with carpal tunnel syndrome from different cities of Punjab, Pakistan was selected on volunteer basis to participate in this study. Non-probability Convenience Sampling was used to pick the patients as the sample was met by the source of inclusion; primigravida and multigravida women, 1st, 2nd and 3rd trimester pregnant women and exclusion; high risk pregnancies, pregnant women with history of gestational diabetes, diabetic neuropathy, hypertension and hyperthyroidism, criterion and sample qualities are mentioned in inclusion criteria. The duration of study was 3 months from December 2016 to end of February 2017. The study had been conducted at Mian Maula Bakhsh Hospital Sargodha, DHQ Hospital Jhang, City Hospital Jhang, Dar-ul-Barkat Medicare Hospital Sheikhpura, Nawaz Sharif Children Complex Sheikhpura, Military Hospital Rawalpindi, Shifa International Hospital Islamabad.

Data had been collected through close ended questionnaires (Annexure) and clinical tests as well as demographic details. Total 18 questions were asked. The questionnaire was distributed in government and private hospitals of Punjab and data was collected on the same day. Questions were asked related to the presence of pain at wrist mostly during at night and the nature of pain, swelling, alteration of sensations and any functional limitation if present was the main focus. Pregnant women were free to choose the best option. The study was unbiased and there was no favoritism included. Two clinical tests were utilized for evaluation.

1. Phalen's maneuver: in this test allow the wrist to fall freely into maximum flexion and maintain this position for 60 seconds. A positive response is sensation of tingling over the distribution of median nerve.<sup>7</sup>
2. Tinel's sign: in this test tap over the median nerve as it passes through the carpal tunnel in the wrist. A positive response is sensation of tingling in the distribution of median nerve over the hand.<sup>8</sup>

Carpel tunnel syndrome diagnosed by pain, alteration of sensation, clinical tests and functional limitations of wrist joint.<sup>1</sup> Confirmation of the above any three stated symptoms declare the carpal tunnel syndrome in pregnant women.

All investigations were carried out with SPSS statistical software (version 21). Distributions of frequency and also percentages were utilized for expressive reasons. Fisher's Exact Test was used for associations and Spearman correlation between categorical variables.

### RESULTS:

The total numbers of patients were 200. The percentage of ages 15.5% of first trimester, 26% of second trimester and 58.5% of third trimester and mean $\pm$ SD were calculated as 24.77 $\pm$ 2.19, 27.44 $\pm$ 5.09 and 30.74 $\pm$ 4.86 respectively. Occupation out of 200 pregnant women, there are 71.5% are house wives, 11.5% are teachers, 4.5% are computer operators, 4.5% are doctors, 2% are receptionist and 6% are of others occupation.

**Table I: Pain in Trimesters (N=200)**

Trimesters	N	Frequencies	Percentage
1 <sup>st</sup> Trimester	31	7	22.58
2 <sup>nd</sup> Trimester	52	18	34.62
3 <sup>rd</sup> Trimester	117	55	47.00

**Table II: Association between Side of wrist pain, Nature of pain and Parity status (N=200)**

		Side of Wrist Pain				Total	Fisher's Exact Test value	Exact Sig. (2-sided)
		Bilateral	Left	Right	No			
Trimesters	1st Trimester	4	2	1	24	31	7.02	.000
	2nd Trimester	9	5	4	34	52		
	3rd Trimester	29	11	15	62	117		
Total		42	18	20	120	200		
		Nature of Pain				Total	Fisher's Exact Test value	Exact Sig. (2-sided)
		Sharp	Dull	Radiating	No			
Trimesters	1st Trimester	1	4	2	24	31	7.15	.000
	2nd Trimester	2	7	9	34	52		
	3rd Trimester	9	24	22	62	117		
Total		12	35	33	120	200		
		Parity Status		Total	Fisher's Exact Test value	Exact Sig. (2-sided)		
		Multigravida	Primagravida					
Trimesters	1st Trimester	20	11	31	0.28	.000		
	2nd Trimester	32	20	52				
	3rd Trimester	78	39	117				
Total		130	70	200				

**Table III: Correlation between Side of wrist pain, Nature of pain and Parity status (N=200)**

		Side of Wrist Pain	Nature of Pain	Trimesters	
Spearman's rho	Side of Wrist Pain	Correlation Coefficient	1.00	.987	-.172
		Sig. (2-tailed)		.000	.015
	Nature of Pain	Correlation Coefficient	.987	1.00	-.182
		Sig. (2-tailed)	.000		.010
	Trimesters	Correlation Coefficient	-.172	-.182	1.00
		Sig. (2-tailed)	.015	.010	

**Table IV: Frequencies and Percentages of All Variables**

Variables		Frequency	Percentage
Swelling	Yes	36	18.0
	No	164	82.0
Alteration of sensations	Yes	80	40.0
	No	120	60.0
History of CTS	Yes	42	21.0
	No	158	79.0
Physiotherapy Taken	Yes	15	7.5
	No	185	92.5
Trauma	Yes	12	6.0
	No	188	94.0
Family History	Positive	23	11.5
	Negative	177	88.5
Functional limitations	Yes	79	39.5
	No	121	60.5
Clinical Tests	Positive	80	40.0
	Negative	120	60.0

**DISCUSSION:**

The findings of this study showed that there was 65% of women were with multigravida and 35% with that of primigravida status of parity. Overall prevalence of carpal tunnel syndrome was 40% of which 47% of women were in third trimester. It was very high in comparison to most of study where prevalence has been reported as low as 4.3%, however, still less than the prevalence reported by Ablove RH who conducted study to find out CTS prevalence in pregnant women in University of Wisconsin, USA. Here it was reported to be 62%, the highest reported prevalence in literature so far.

There is a lot extensive comparison present in previous literature relating to prevalence of CTS in pregnant women. A study conducted in Iran's Isfahan University of Medical Sciences and there found 19% of CTS prevalence in pregnant women, while a similar study in Physical Rehabilitation and School of Medicine, Iran reported same prevalence of 19% with a further division showing 47% having bilateral CTS and 26.3% having severe CTS. Another study conducted in Poznan in Gynecological and Obstetrical University Hospital concluded that 32.6%

women report at least one symptom of CTS and 22.4% with multiple pregnancies report repeated symptoms. A study conducted in 2012 at University Kebangsaan, Department of Orthopedic and Traumatology, Malaysia showed that there were 24.6% pregnant women presented CTS symptoms. In the same year, Yasouj University of Medical Sciences published results with very comparative very low prevalence of CTS i.e. 2.7% majority of which were having mild symptoms. A study conducted by Bukhari et al in 2018 showed a CTS prevalence of 34% in pregnant women in Faisalabad city of Pakistan.(1) (2-4)

In summary, there is diverse range of prevalence reported in different studies. It is must need of figuring factors which would be impacting CTS. In current study it was 40%, i.e. in 80 women out of 200 pregnant women of which 21% were having bilateral involvement. There also found a marked functional limitation in 39% of women having carpal tunnel syndrome.

**CONCLUSION:**

It is being concluded that carpal tunnel syndrome is

directly related to pregnancy due to hormonal changes experience wrist pain, numbness and swelling. Moreover, parity status, trimester, occupation, site of wrist pain with functional limitation is factors for symptoms to develop. Findings of our research demonstrated that frequency of carpal tunnel syndrome among pregnant woman is more common in third trimester in multigravida woman with bilateral involvement of wrist and hands.

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