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Abstract

Purpose: The purpose of study was to check the prevalence of CTS in pregnant women of Multan city.

Methodology: The study design was Cross sectional. Data was collected by convenient sampling technique from 260 participants, in accordance with defined inclusion & exclusion criteria. Study settings include Ibn e Sina Hospital, Nishtar Hospital and Fatima Hospital Multan. The study duration was 6 months. The Boston Carpal Tunnel Syndrome Questionnaire was used as an outcome measure to obtain data from targeted population. The questionnaire was filled by researcher through asking questions to participants. Data was analyzed by using spss 21.

Findings: The study results showed that 22% of women had CTS during pregnancy. It was more common among women in their third trimester with age of 18 to 28 years. About 13.1% had slight pain and 2.3% had severe pain in their hand or wrist. The study concluded that CTS is prevalent in pregnant women. With increasing gestational age, the frequency of CTS increased, while asymptomatic cases decreased. Maternal and child health (MCH) practitioners should be knowledgeable about the increased risk of carpal tunnel syndrome (CTS) during pregnancy and provide appropriate education and support to pregnant women who may be at risk.

Keywords: *Carpal tunnel syndrome, median nerve, prevalence, pregnancy, middle aged female*

INTRODUCTION

In wrist, the median nerve is compressed & irritated as it travels underneath transverse ligament called flexor retinaculum (1). It is a medical ailment brought on by the median nerve when it is compressed & irritated as it passes through the narrow space of carpal tunnel. First three and a half fingers of hand are the areas most commonly affected by discomfort, numbness, and tingling. Often, symptoms appear gradually and at night. Up to the arm, there may be pain. Poor grip power could happen. The muscles of thenar eminence may weaken after prolong time period. The disorder is bilateral in more than 50% of cases (2). Flexor retinaculum above carpal bones produces the carpal tunnel. Carpal tunnel is a narrow anatomical pathway that accommodates the median nerve & nine flexor tendons of forearm musculature. Compression of the nerve with the tunnel can result in ischemia, irritability and mechanical disruption (3).

Pregnancy frequently results in CTS. It takes place when fluid accumulates in the tissues of the wrist. When swelling occurs, the median nerve that runs down to the hand & fingers, can be compressed or pinched, resulting in sensations of tingling & numbness. The person can also notice that their grasp is weaker and that moving their fingers is tougher. In the second or third trimester, CTS typically manifests. Anybody who had CTS in one pregnancy is more likely to experience it in subsequent pregnancies. CTS may also persist or worsen in the days following the baby's birth. Though it may affect the entire hand, CTS will worsen in the dominant hand and in the first and middle fingers. Because the hands were curled up at night, it can hurt more when they wake up in the morning (4).

According to the available data, CTS can occur upto 62% in pregnant women. These statistics are largely based on clinical symptoms. Several prospective clinical trials examined how pregnancy affected the electrophysiology of the median nerve. Third-trimester pregnant women were matched with non-pregnant controls who were of similar age and gender. In comparison to control groups, pregnancy was observed to cause a prolongation of the sensory nerve conduction parameters of the median nerve (5). If there is a family history of CTS and the female had any back, neck, or shoulder issues, there is a higher likelihood that she may develop CTS. The median nerve passes through the upper part of the ribcage before extending down to the arm. Therefore, pre-existing issues in this area, such as a broken collarbone or whiplash injury, can increase the risk of developing CTS (6).

In a study conducted by Yazdanpanah et al. (2012) on the prevalence & severity of CTS in women, it was found that the incidence of CTS was higher in pregnant women compared to non-pregnant women by 3.4% and 2.3%, respectively. CTS was found in 2.7% of all females, and out of the 51 pregnant women diagnosed with CTS, 59.4 percent had mild symptoms, 18.8 persent had moderate, & 21.9 percent had severe CTS. It was suggested that conservative treatment is a safer and more effective option for pregnant women with CTS, despite the higher incidence rate among Iranian pregnant women compared to non-pregnant women (7).

In a different study on the prevalence and risk factors of CTS during 3rd trimester of pregnancy, Oliveira et al. 2019 reported that a total of 482 women were recruited, and 111 of them showed symptoms and signs that were suggestive of the condition, giving a prevalence of about 23.03%. The USG was unable to differentiate between CTS group-specific indicative signs and symptoms. The symptoms were not severe, and neither was the manual function impairment. Gestational diabetes mellitus, maternal age, and left-handedness were linked to the telltale CTS signs and

symptoms. The high prevalence of CTS's telltale symptoms and the problems they can cause highlight the significance of a proper diagnosis and course of action (8). There are many potential causes. Any condition that increases pressure within the carpal canal or negatively affects nerve function can lead to the development of CTS. Post traumatic deformity, alcoholism, diabetes mellitus, hypothyroidism, pregnancy, and rheumatoid arthritis are common conditions linked to CTS. Most likely causes during pregnancy are edema and hormonal changes. Due to a generalized slowing of nerve conduction, gestational diabetes may also be involved (9).

Despite the well-established and widespread knowledge among medical professionals regarding the link between pregnancy and CTS, it is not uncommon to encounter pregnant women with untreated CTS symptoms in obstetrics clinics. A study conducted by Voitk et al discovered that only 35% of women who reported hand symptoms to their doctors sought medical attention. Additionally, only 46% of these women were experiencing symptoms. In a retrospective study conducted by by Stolp-Smith et al. found that less than 1 percent of women were diagnosed clinically with CTS during pregnancy. If the women were unwilling to mention hand symptoms as their primary complaint or if the symptoms were not severe or distressing, the majority of doctors did not diagnose CTS (10).

The exact proportion of pregnant women suffering from CTS who were overlooked by their physicians & left untreated has not been adequately reported in the literature. The purpose of this study was to draw attention to CTS in expectant women, which frequently goes unnoticed by attending physicians. The objective of study was to determine the prevalence of CTS in pregnant Multan city residents aged 20 to 45 who had no prior history of the condition.

MATERIALS AND METHODS

It was a Cross sectional study. Study duration was 6 months. Sample size of research was 260. Data from the target population were gathered using the convenience sampling technique. The study's inclusion criteria were pregnant Multani women between the ages of 20 and 45 who had no history of CTS prior to becoming pregnant. The data was obtained from the Multan hospitals Ibn e Sina, Nishtar, and Fatima. The symptoms of carpal tunnel syndrome were explained to patients, who were also told that wearing wrist orthoses could lessen their discomfort until it was likely to go away after delivery. They were asked to participate as volunteers in study. The study excluded women who had any prior history of hand trauma or fracture, any previously diagnosed thyroid or diabetic issue. The Boston Carpal Tunnel Syndrome Questionnaire was used to collect data from the targeted population. The researcher distributed the questionnaires to all pregnant women and filled it out by asking them questions. Data was analyzed by using spss version 21.

RESULTS

The study consisted of 260 pregnant women in total. 65.4% who were experiencing carpal tunnel syndrome were among age 18-28 years, 27.7% were 28-38 years old, 6.9% were 28-38 years old. Demographic data showed that 24.6 percent women were underweight, 45.4 percent women had normal BMI, 28.5 percent were overweight & only 1.5 percent women were obese. 30% women were in their 1st trimester, 35.4% were in 2nd trimester, and 33.8% were in 3rd trimester. Among 260 pregnant women who were experiencing carpal tunnel syndrome, 56.9% were Primigravida, 34.6% were multigravida, and 8.5% were grand gravid.

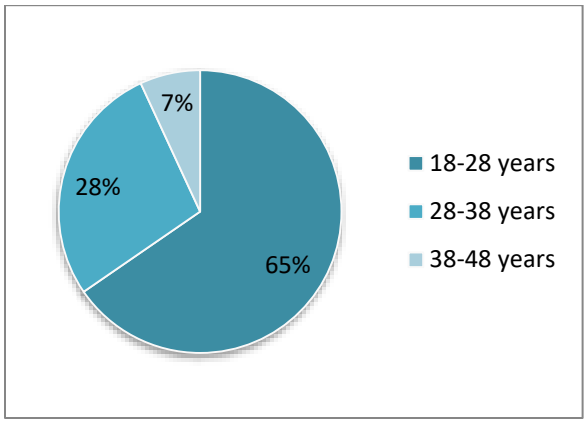

Figure 1: Age of Participants

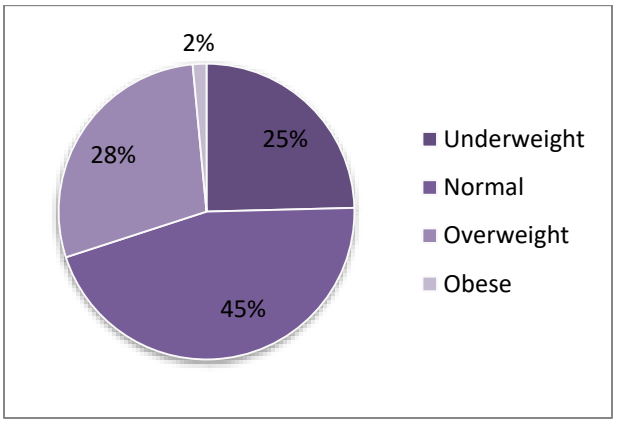

Figure 2: BMI

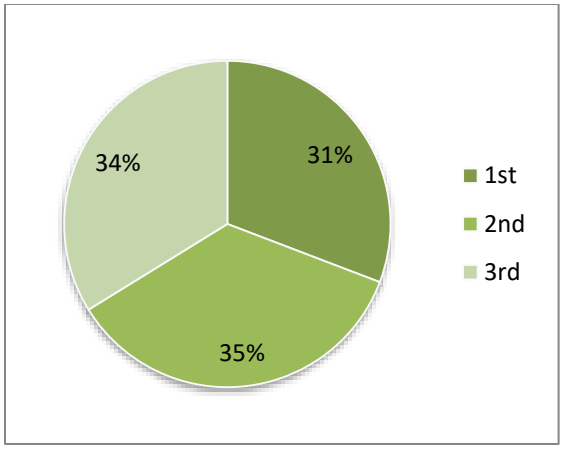

Figure 3: Trimester

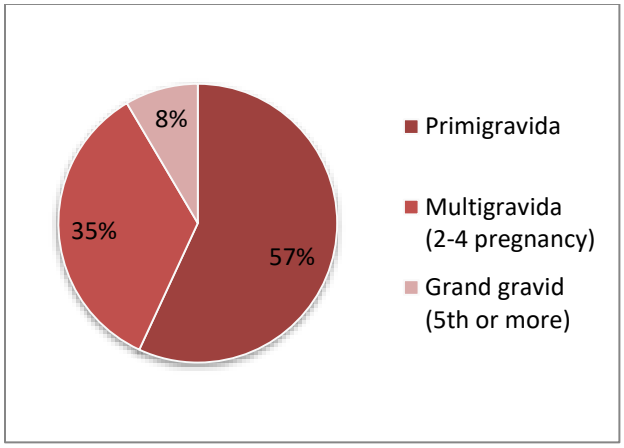

Figure 4: Gravid

Table 1 shows the frequency and percentage of symptoms in the pregnant women suffering from CTS.

Table 1: Symptoms severity

1	Severity of hand / wrist pain at night	Normal	Slight	Medium	Severe	
		194 (74.6%)	34 (13.1%)	26(10.0%)	6 (2.3%)	
2	Hand/ wrist pain woke you up at night during past 2 weeks	Normal	Once	2 to 3 times	4 to 5 times	More than 5 times
		202 (77.7%)	42 (16.2%)	10 (3.8%)	4 (1.5%)	2 (0.8%)
3	Pain in hand / wrist at daytime	No pain	Slight	Medium	Severe	
		202 (77.7%)	28 (10.8%)	20 (7.7%)	10 (3.8%)	
4	Frequency of hand / wrist pain at daytime	Normal	1-2 times/day	3-5 times/day	More than 5 times	Continued
		202 (77.7%)	32 (12.3%)	14 (5.4%)	8 (3.1%)	4 (1.5%)

5	Length of episode of pain during daytime	Normal	<10 minutes	10-60 continued	>60 minutes	
		198 (76.2%)	34 (13.1%)	16 (6.2%)	12 (4.6%)	
6	Numbness in hand	Normal	Slight	Medium	Severe	Very serious
		194 (74.6%)	44 (16.9%)	16 (6.2%)	4 (1.5%)	2 (0.8%)
7	Weakness in hand or wrist	Normal	Slight	Medium	Severe	
		202 (77.7%)	36 (13.8%)	12 (4.6%)	10 (3.8%)	
8	Tingling sensation in hand	Normal	Slight	Medium	Severe	Very serious
		200 (76.9%)	28 (10.8%)	16 (6.2%)	14 (5.4%)	2 (0.8%)
9	Severity of numbness or tingling sensation at night	Normal	Slight	Medium	Severe	
		198 (76.2%)	36 (13.8%)	14 (5.4%)	12 (4.6%)	
10	Hand numbness / tingling woke you up at night in previous 2 weeks	Normal	Once	2 to 3 times	4 to 5 times	More than 5 times
		208 (80.0%)	28 (10.8%)	18 (6.9%)	(2 .8%)	4 (1.5%)
11	Diff in grasping & using small objects	Without difficulty	Little difficulty	Moderately difficulty	Very difficulty	
		210 (80.8%)	26 (10.0%)	12 (4.6%)	12 (4.6%)	

Table 2 shows the frequency & percentage of functional status of pregnant women suffering with CTS.

Table 2: Functional status

	No difficulty	**Little difficulty**	**Moderate difficulty**	**Intense difficulty**	**Cannot perform the activity at all**
Writing	214 (82.3%)	30 (11.5%)	10 (3.8%)	2 (0.8%)	4 (1.5%)
Buttoning of clothes	210 (80.8%)	28 (10.8%)	16 (6.2%)	6 (2.3%)	0 (0%)
Holding a book while reading	212 (81.5%)	20 (7.7%)	14 (5.4%)	12 (4.6%)	2 (0.8%)
Gripping of a telephone handle	208 (80.0%)	24 (9.2%)	16 (6.2%)	12 (4.6%)	0 (0%)
Opening of jars	212 (81.5%)	20 (7.7%)	8 (3.1%)	18 (6.9%)	2 (0.8%)
Household chores	200 (76.9%)	38 (14.6%)	10 (3.8%)	12 (4.6%)	0 (0%)
Carrying of grocery basket	200 (76.9%)	32 (12.3%)	18 (6.9%)	8 (3.1%)	2 (0.8%)
Bathing and dressing	212 (81.5%)	22 (8.5%)	14 (5.4%)	12 (4.6%)	0 (0%)

DISCUSSION

Pregnancy frequently results in CTS. In third trimester Pregnancy related CTS (PRCTS) is most prevalent and occurs frequently bilateral. Prevalence estimates for CTS in pregnancy have ranged from 0.23% to 62% in previous studies (5). Main goal of research was to identify the prevalence of neck CTS in women during prenancy. Data were gathered from 260 women during pregnancy. In study, it was discovered that 22% of pregnant women had CTS. Descriptive statistics showed that women in their 3rd trimester who were between the ages of 18 and 28 were more likely to experience it. During the third trimester of pregnancy, a study conducted by Voitk et al. found that 25% of 1,000 postpartum patients reported experiencing symptoms of CTS in their hands, which was in line with our finding (10). In the other research study, a total of 2385 pregnant women were examined, and 56 of them tested positive for CTS (2.3% prevalence). Paresthesia was the most typical symptom, followed by nocturnal pain. 46 patients had Tinel and Phalen positive tests (11). The results of recent study showed that 13.1% had slight pain and 2.3% had severe pain in their hand or wrist. A total of 56.9% were Primigravida, 34.6% were multi-gravida, and 8.5% were grand gravid. Almost 7.7% were normal, 12.3% had pain 1 to 2 times per day and 1.5% had continued pain during the whole day.

According to a cohort study by Sapaun et al., pregnant women with CTS frequently experienced numbness and tingling (12). In the recent study, numbness and weakness were also reported complaints of women. Some experienced slight numbness 16.9% and 0.8% had very severe numbness. About 13.8% had slight weakness and 3.8 percent had very serious weakness. 76.9 percent women were normal, 0.8 percent had very serious tingling feelings in hand. According to a study, women were slightly more likely to experience numbness or tingling during the day than at night (12). The findings of this study were consistent with a recent study that found that severe pain occurred more frequently and lasted longer during the day than it did at night.

Another study revealed that the most of CTS sufferers thought their symptoms were almost negligible and range from mild to moderate (8). The findings of recent study also showed that mild to moderate symptoms are more frequent as compare to the severe. About 10 percent had little difficulty holding small objects, 4.6 percent wommen had moderate & 4.6 percent had very much difficulty. Almost 82.3 percent of women had no difficulty in writing, 11.5 percent had little difficulty and 1.5 percent female cannot perform any activity at all. Almost 7.7% had little difficulty in holding a book while reading, 5.4% had moderate difficulty and 0.8% could not perform any activity at all. About 76.9% had no difficulty in doing household chores, 14.6% experienced little difficulty, 3.8% had moderate difficulty and 4.6% had intense difficulty. 76.9% had no difficulty in carrying of grocery basket, 12.3% had little difficulty, 6.9% had moderate difficulty, 3.1% experienced intense difficulty and 0.8% cannot perform the activity at all.

Pregnant females had a higher prevalence of CTS than non-pregnant females. Fortunately, CTS is frequently mild despite the fact that it is extremely common during pregnancy. More women than non-pregnant women experienced severe CTS. To ensure a high quality of life during pregnancy and prevent these complaints from becoming chronic, all pregnant women should have their hands and wrists examined during routine antenatal visits.

CONCLUSION

The study's findings revealed that pregnant women have a high prevalence of CTS. With growing gestational age, prevalence of CTS rose while number of non symptomatic cases dropped. Clinical examinations and history-taking were not very sensitive or specific, and they could not detect all cases. In conclusion, because clinical signs in pregnant women are not routinely studied and because CTS is so common. It is crucial to conduct clinical assessments and use specific electrodiagnostic tests to screen all pregnant women, especially during 3rd trimester of pregnancy.

LIMITATIONS

Although a sample size of 300 was anticipated for this study, the researcher was only able to manage 260 samples due to time and resource constraints, which is a very small number for generalizing the findings to the population of pregnant women as a whole.

It is challenging to compare the study with other research because there is no literature on Carpal Tunnel Syndrome among pregnant women from the perspective of Multan.

The researcher was able to gather information from Multan, Pakistan's Ibn e Sina Hospital, Nishtar Hospital, and Fatima Hospital for a short time period, which will affect the study's ability to generalise its findings to a larger population.

RECOMMENDATIONS

The following are some key recommendations:

1. The random sampling technique rather than the convenient would be chosen for further studies in order to enable the power of generalization in results.
2. The study was limited in duration, so it may be advisable to allocate more time for future research.
3. In the future, a larger sample size should be considered as the investigator only used 260 participants in this study.
   The researcher only sampled from certain areas of Multan city in this study, which was a limited region to obtain available samples. As a result, it is strongly advised that pregnant women from all over Pakistan be included in future studies to ensure the generalizability of findings.
4. Maternal and child health (MCH) practitioners should be knowledgeable about the increased risk of carpal tunnel syndrome (CTS) during pregnancy and provide appropriate education and support to pregnant women who may be at risk.
5. Early diagnosis and treatment of CTS is crucial, and MCH practitioners should be prepared to provide non-surgical interventions and refer for surgical options if necessary.

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