

## Prevalence Of Carpal Tunnel Syndrome Among Pregnant Women In Gujranwala

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### ABSTRACT

**Background:** Carpal tunnel syndrome is one of the most predominant neuromuscular issue in pregnant women. Compression of median nerve within the tunnel causes numbness, tingling and pain along the distribution of median nerve.

**Objective of study:** To determine the prevalence of carpal tunnel syndrome among pregnant women in Gujranwala; Pakistan

**Materials & Methods:** This study was observation cross sectional survey. Epitool was used to collect sample size. Data was collected from pregnant women from different maternity care clinics. We used three different Questionnaire to collect data which includes; Symptoms severity scale, Functional status scale, Carpal Tunnel diagnostic questionnaire. Statistical Package for Social Sciences was used to conduct data analysis. Percentages and frequency tables was defined. Bar or pie chart was plotted.

**Results:** Out of 250 pregnant females, 86 were diagnosed with CTS. The overall prevalence of CTS was 34.4%. Changes in hormonal and glucose level, increased weight gain during pregnancy, increased blood pressure, fluctuations in glucose metabolism, alcoholism and hypothyroidism are highly associated with the symptoms of carpal tunnel syndrome.

**Conclusion:** The overall prevalence of carpal tunnel syndrome among pregnant females in Gujranwala is about 34.4%.

**Keywords:** Carpal Tunnel Syndrome, Phalen's Test, Tinel's Sign, History And Physical Examination Functional Limitations.

### INTRODUCTION

The median nerve is compressed when it passes through the carpal tunnel in the wrist, resulting in carpal tunnel syndrome (CTS), a neuromuscular condition. It results in ischemia and functional impairment in the vicinity of nerve.

Structures between hand and front forearm flow through the carpal tunnel. The carpal bones, flexor retinaculum and nine tendons come together to form a confined space. The base is produced by hook of hamate, which is anteriorly positioned and medially pisiform. The median nerve supplies lateral half of ring finger as well as lateral three fingers. When there is problem with the nerve supply, the symptom manifests. Carpal tunnel syndrome is frequently evaluated using Tinel's sign and Phalen's. Historically, it has been thought that the repetitive movements harm the median nerve.(Meems, 2016)

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Numerous studies have been done; however, the precise explanation is still unknown. However, some ideas suggest that successive ischemia and nerve compression in the tunnel may be the cause of idiopathic CTS. These alternations eventually cause demyelination, inflammation, fibrosis. Edema and fibrosis in tendon can occasionally result from age related changes. As a result, the tunnel's tissue volume increases and the median nerve becomes compressed. Edema and altered nerve sensitivity are brought on by hormone and glucose metabolism fluctuations, by which increase the risk of carpal tunnel syndrome. Increased gestational weight gain is caused by a rise in blood volume, uterine mass, a growing fetus and obesity. To show weight increase and to pinpoint fluid retention and oedema, various techniques might be utilized.(Meems, 2016)

Third trimester of pregnancy results in musculoskeletal alterations, hormonal changes and a shift in extravascular and intravascular fluid. It is still unclear what causes carpal tunnel syndrome in pregnant women. However, a number of reasons such that compression of median nerve brought on by physiological changes, might result in CTS. Maternal blood volume increases as plasma volume increases. Increased heart rate, accelerated metabolism and greater stroke volume are frequently linked to decreases in peripheral vascular blockage. (Rehman et al., 2023)

Edema develops as the result of fluid retention, which is brought on by hormonal changes such as raised level of angiotensin, adrenaline and progesterone. Increased weight growth brought on by development of embryo also increases stress on musculoskeletal system elevated risk for development of CTS is associated with elevated blood pressure during pregnancy. It is also connected to changes in glucose metabolism during pregnancy. The development of CTS in pregnant diabetic bodies increase metabolic demands. The development of CTS signs and symptoms in a pregnant diabetic female can be caused by changes in endocrine system. (Rehman et al., 2023)Based on physical examination and a review of your medical history, carpal tunnel syndrome can be identified. All pregnant women experience median nerve damage throughout the three trimesters, though symptoms may not to be present at the time. Compression neuropathy affects the upper extremity the most frequently. Numbness and tingling in the thumb, index, middle and radial half of ring finger are its defining symptoms. Burning dysthetic wrist discomfort, loss of grip power and decreased dexterity are also frequent symptoms. Severe occurrences of carpal tunnel syndrome are more likely to result in thenar muscle weakness and atrophy. Repetitive motion and uncomfortable wrist position can exacerbate symptoms, which are typically worse at night.(Abllove and Abllove, 2009)

Diabetes mellitus, alcoholism, hypothyroidism, post traumatic deformity, pregnancy and rheumatoid arthritis may also be linked to carpal tunnel syndrome. Edema and hormonal changes during pregnancy are most likely to blame for carpal tunnel syndrome. Due to poor nerve conduction, gestational diabetes can also result in nerve compression. Additionally noted as significant risk factor for CTS are hormonal changes, mother's age, weight increase during pregnancy, pregnant related toxicity, smoking and alcohol. Microvascular dysfunction, endoneural edema, demyelination, inflammation, distal axonal degeneration, fibrosis, development of new axons, demyelinating and thickening of perineum and endothelium can all result in developing CTS.(Abllove and Abllove, 2009)

Throughout the gestational period, every pregnant woman's body goes through a variety of changes. According to the several research, oedema and fluid retention that are often present during pregnancy can result in CTS. Our study's primary goal is to determine the conditions that cause CTS so that pregnant women can avoid developing it.(Sikkandar et al., 2020)

Carpal tunnel is diagnosed by using variety of tests. Applying direct pressure on the thumb on median nerve's root at the carpal tunnel is the most accurate way to diagnose carpal tunnel syndrome; a positive test results in this scenario is significant paresthesia that starts to feel bad within the first thirty seconds. The Phalen's test, the reverse Phalen's test, the Tinel's sign, and the nerve conduction studies are a few tests that can be carried out to rule out carpal tunnel syndrome. The Phalen's test: passive wrist flexion is required for this test; the patient is instructed to hold the position for 60 seconds; a positive test includes paresthesia within 60 seconds of wrist flexion. Reverse Phalen's test maneuver: it entails holding extended finger and wrist motions for one minute. The Tinel' test: Tap the median nerve at the wrist while it is extended to conduct this test. A significant shock like sensation in the nerve area is a positive finding. Studies on nerve conduction test: All diagnostic procedure use it as the gold standard. Via EDT (Electro Diagnostic Testing), it is measured. An electrical impulse stimulates the nerve, causing it to produce an action potential. An electrode is utilized to measure the depolarization wave over a specific distance.(Sikkandar et al., 2020)

The two main categories of CTS treatment methods are conservative and non-conservative. Anti-inflammatory medications and hydrocortisone injections are examples of conservative therapy methods. Utilizing a night splint lessen pressure in carpal tunnel syndrome easing the pressure in the carpal tunnel, easing severity of discomfort. Injections of steroid often have a short-lived effect.(Meems et al., 2015)

## **CHAPTER 2: LITERATURE REVIEW**

Luca padua et al conducted a study on systematic review of pregnancy related carpal tunnel syndrome in 2010.They find out 7% - 43% confirmed neurophysiological cases of PRCTS and 31%-62% clinically diagnosed cases of PRCTS. They also suggest that symptoms can persist for more than 1 year postpartum.(Padua et al., 2010)

Margreet meems et al conducted a study on prevalence, course and determinants of carpal tunnel syndrome symptoms during pregnancy in 2015. Results show that out of 639 women, CTS was reported in 219 (34%) during pregnancy. Their study concluded that women with increased fluid retention during pregnancy are at high risk for development of CTS.(Meems et al., 2015)

Andrzej Zyluk et al conducted research on carpal tunnel syndrome in pregnancy in 2013.They reported CTS in 2\_70% of pregnant women. Their study showed that by wearing night splints symptoms of CTS are reduced. But in some cases, symptoms may persist for longer time period sometimes more than 3 years.(Zyluk and Puchalski, 2010)

Gladys Alexandra Dias de Oliveria at al conducted research on carpal tunnel syndrome during third trimester of pregnancy, prevalence and risk factors in

2019. They reported that out of 482 women CTS was diagnosed in 111, prevalence rate was 23.03%. They concluded that women with gestational diabetes mellitus or left-handed women are more prone to the development of sign and symptoms of CTS. (Oliveira et al., 2019)

Saeid khosrawi et al conducted research on prevalence and severity of carpal tunnel syndrome during pregnancy in 2012. Their prevalence rates during first trimester was 11%, second trimester was 26% and third trimester was 63%. Pregnant women showed high prevalence of CTS. They find out that CTS in all cases can't be diagnosed only by history taking or clinical examination so electrodiagnostic studies must be conducted during third trimester. (Khosrawi and Maghroui, 2012) Ran Atzmon et al conducted research on carpal tunnel syndrome in pregnancy in 2014. In PRCTS, the reported incidence rate ranges from 0.8% to 70% which depend on method used for diagnosis. They suggested that EMG Examination is controversial during pregnancy. Surgical interventions cannot be conducted during gestational period. (Atzmon et al., 2014)

Misbah waris et al conducted research on Carpal tunnel syndrome in pregnant women in 2021. Their sample size consists of 200 pregnant women out of which 80 were diagnosed with CTS. CTS pain frequency reported in 1st trimester was 22.5%, 2nd trimester was 34.6% and in third trimester was 47.0%. In Third trimester 55 patients were reported with CTS, out of which 38 were multigravida and 17 were primigravida. (Waris et al., 2021)

Research on carpal tunnel syndrome and its prevalence in Faisalabad, Pakistan pregnant women was done by SR. Bukhari et al. 103 of 300 pregnant women were found to have CTS, according to the diagnosis. The prevalence of PRCTS was 34.3% with multigravida women demonstrating higher prevalence 72.8%, than primigravida women 27.2%. The majority of women reported experiencing severe pain, according to numeric pain rating scale. (Bukhari et al., 2018)

Jamari Sapuan et al conducted research on carpal tunnel syndrome in pregnancy in 2012. Their study was conducted on 333 pregnant women out of which 82 reported the symptoms of CTS. the common complain reported was day time numbness. Symptom severity varies from patient to patient with some patients reporting mild symptoms while other reported severe symptoms which affect their hand functions. (Sapuan et al., 2012)

A study on the prevalence of carpal tunnel syndrome in pregnancy in their middle years was undertaken in 2023 by Dr. Maryam Rehman et al. 260 pregnant women in total participated in the study. 64.5% of people with carpal tunnel syndrome were between the ages of 18 and 28. 27.7% were between the ages of 28 and 38. Women who reported CTS were 30% in their first trimester, 35.4% in their second trimester and 33.8% in their third trimester. According to the study findings, CTS is highly prevalent in pregnant women and increases as gestational age increases, whereas frequency on non-symptomatic patients decrease. (Rehman et al., 2023)

In Lahore city in 2022, Zaib un-Nisa et al did research on the carpal tunnel syndrome among pregnant women. According to the study finding's the prevalence of CTS was much higher in the third trimester (49.5%) than it was in the second and first trimesters for females (37.0% and 11.2%) respectively. The most popular test for diagnosing carpal tunnel were Phalen and Tinel sign and nerve compression test, which were also more frequently reported as positive in third trimester pregnant

women. The most often reported symptoms included swelling of hands, changes in hand sensation, and pain in the wrist joint.(un Nisa et al.)

A study on the incidence and severity of carpal tunnel syndrome during pregnancy, was undertaken in 2021 by Rahim khan et al. According to their findings, CTS is very common in pregnant women, and the majority of the patients had mild to severe cases of this condition. Patients with severe discomfort in the third trimester are more likely to have it.(KHAN et al.)CHAPTER 3

## **MATERIALS & METHODS**

**Study Design: -**

The study design was observational cross-sectional survey.

**Study Setting: -**

Data was collected GOVERNMENT MATERNITY HOSPITAL SATELLITE TOWN GUJRANWALA, AMNA POLY CLINIC GUJRANWALA, SHEHNAZ MATERNITY

CLINIC and some other maternity care centres.

**Study Duration: -**

This study was completed within 6 months after approval of synopsis.

**Sampling Techniques: -**

Non probability convenient sampling technique.

**Selection Criteria: -**

**Inclusion Criteria:**

Pregnant women visiting gyne ward for consultation, without the prior symptoms of CTS.

Both educated and uneducated women were included.

The Pregnant Females of age group 20-45 years was included.

**Exclusion Criteria:**

Women with Cervical radiculopathy.

Injuries trauma or fracture of wrist or hand.

Osteoarthritis.

Chronic diabetes mellitus.

**Method Used for Data Analysis: -**

Statistical package for social sciences SPSS was used to analyze data

**Tools for Data Collection: -**

Symptom severity scale

Functional status scale

Carpal tunnel diagnostic questionnaire.

**Diagnostic Criteria: -**

Diagnostic criteria is based on Boston Questionnaire and Carpel Tunnel Diagnostic Questionnaire which is verified by

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Positive Wrist Pain.  
Positive Phalen's Test.  
Positive Tinel's Sign.

## CHAPTER 4:

### RESULTS

Frequency Table and Bar Chart: -

#### Age

| Frequency |       |     | Percent | Valid Percent | Cumulative Percent |
|-----------|-------|-----|---------|---------------|--------------------|
| Valid     | 20-25 | 82  | 32.8    | 32.8          | 32.8               |
|           | 25-30 | 93  | 37.2    | 37.2          | 70.0               |
|           | 30-35 | 49  | 19.6    | 19.6          | 89.6               |
|           | 35-40 | 18  | 7.2     | 7.2           | 96.8               |
|           | 40-45 | 8   | 3.2     | 3.2           | 100.0              |
|           | Total | 250 | 100.0   | 100.0         |                    |

82 Frequency in age 20-25

93 Frequency in age 25-30

49 Frequency in age 30-35

18 Frequency in age 35-40

8 Frequency in age 40-45

#### Do you have wrist pain?

| Frequency |       |     | Percent | Valid Percent | Cumulative Percent |
|-----------|-------|-----|---------|---------------|--------------------|
| Valid     | Yes   | 102 | 40.8    | 40.8          | 40.8               |
|           | No    | 148 | 59.2    | 59.2          | 100.0              |
|           | Total | 250 | 100.0   | 100.0         |                    |

- 102 Pregnant females out of 250 reported having wrist pain.

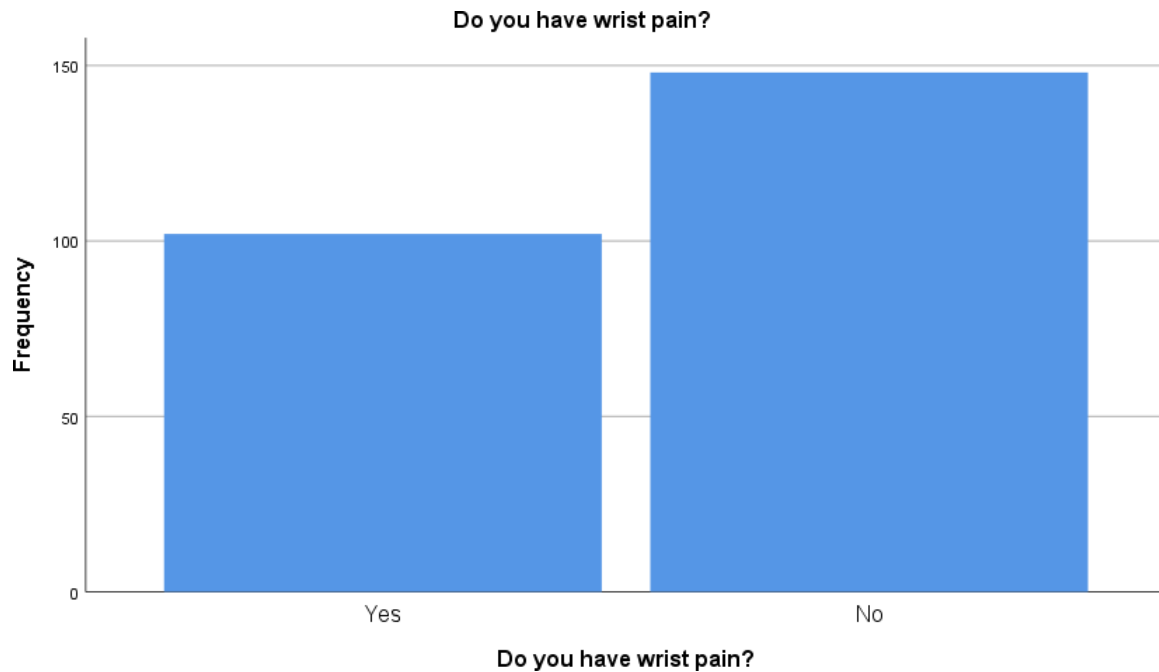
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## Phalen's Test

| Frequency |          |     | Percent | Valid Percent | Cumulative Percent |
|-----------|----------|-----|---------|---------------|--------------------|
| Valid     | Positive | 100 | 40.0    | 40.0          | 40.0               |
|           | Negative | 150 | 60.0    | 60.0          | 100.0              |
|           | Total    | 250 | 100.0   | 100.0         |                    |

Phalen's test was positive in 100 pregnant females while other 150 reported a negative Phalen's test.

## Reverse Phalen's Test

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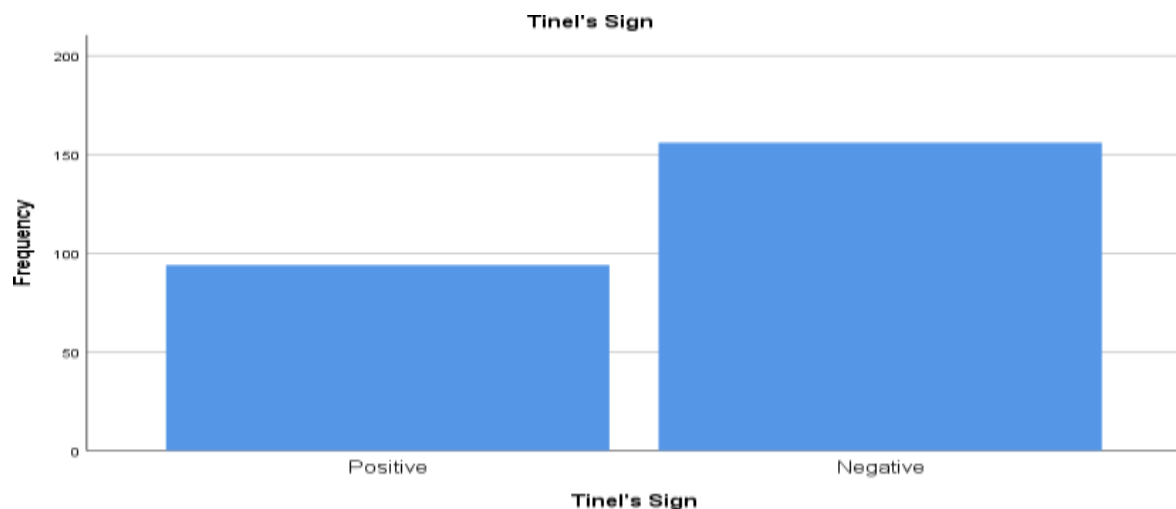
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| Frequency |          |     | Percent | Valid Percent | Cumulative Percent |
|-----------|----------|-----|---------|---------------|--------------------|
| Valid     | Positive | 100 | 40.0    | 40.0          | 40.0               |
|           | Negative | 150 | 60.0    | 60.0          | 100.0              |
|           | Total    | 250 | 100.0   | 100.0         |                    |

Reverse Phalen's test was positive in 100 pregnant women while negative in the remaining 150 pregnant women.



Tinel's sign was indicated positive in 94 pregnant females while tested negative in the rest.

## How severe is the hand or wrist pain that you have at night

| Frequency |        |     | Percent | Valid Percent | Cumulative Percent |
|-----------|--------|-----|---------|---------------|--------------------|
| Valid     | Normal | 130 | 52.0    | 52.0          | 52.0               |
|           | Slight | 36  | 14.4    | 14.4          | 66.4               |
|           | Medium | 42  | 16.8    | 16.8          | 83.2               |

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|              |     |       |       |       |
|--------------|-----|-------|-------|-------|
| Severe       | 38  | 15.2  | 15.2  | 98.4  |
| Very Serious | 4   | 1.6   | 1.6   | 100.0 |
| Total        | 250 | 100.0 | 100.0 |       |

250 people took part in the study; 130 had no wrist discomfort, 36 had minor wrist pain, 42 had medium wrist pain, 38 had severe wrist pain, and 4 had very severe wrist pain at night.

## How often did hand or wrist pain wake you up during a typical night in the past two weeks

| Frequency |                   |     | Percent | Valid Percent | Cumulative Percent |
|-----------|-------------------|-----|---------|---------------|--------------------|
| Valid     | Normal            | 135 | 54.0    | 54.0          | 54.0               |
|           | Once              | 2   | .8      | .8            | 54.8               |
|           | 2 to 3 times      | 70  | 28.0    | 28.0          | 82.8               |
|           | 4 to 5 times      | 29  | 11.6    | 11.6          | 94.4               |
|           | more than 5 times | 14  | 5.6     | 5.6           | 100.0              |
|           | Total             | 250 | 100.0   | 100.0         |                    |

Majority of pregnant women with CTS reported that in the previous 2weeks, hand or wrist pain would wake them up 2-3 times each normal night.

## Do you typically have pain in your hand or wrist during the daytime

| Frequency |         |     | Percent | Valid Percent | Cumulative Percent |
|-----------|---------|-----|---------|---------------|--------------------|
| Valid     | No Pain | 132 | 52.8    | 52.8          | 52.8               |
|           | Slight  | 37  | 14.8    | 14.8          | 67.6               |
|           | Medium  | 38  | 15.2    | 15.2          | 82.8               |

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|              |     |       |       |       |
|--------------|-----|-------|-------|-------|
| Severe       | 36  | 14.4  | 14.4  | 97.2  |
| Very Serious | 7   | 2.8   | 2.8   | 100.0 |
| Total        | 250 | 100.0 | 100.0 |       |

During the day, 37 pregnant women experienced mild wrist discomfort, 38 reported medium, 36 reported severe and 7 had very severe pain.

## How often do you have hand or wrist pain during daytime?

| Frequency |                   |     | Percent | Valid Percent | Cumulative Percent |
|-----------|-------------------|-----|---------|---------------|--------------------|
| Valid     | Normal            | 132 | 52.8    | 52.8          | 52.8               |
|           | 1-2 times per day | 43  | 17.2    | 17.2          | 70.0               |
|           | 3-5 times per day | 34  | 13.6    | 13.6          | 83.6               |
|           | more than 5 times | 34  | 13.6    | 13.6          | 97.2               |
|           | Continued         | 7   | 2.8     | 2.8           | 100.0              |
|           | Total             | 250 | 100.0   | 100.0         |                    |

132 pregnant women reported having no wrist pain during the day, whereas 43 had it ones or twice daily, 34 had it 3-5times daily, 34 reported more than 5times daily and 7 had persistent wrist pain during the day.

## How long on average does an episode of pain last during the daytime?

| Frequency |               |     | Percent | Valid Percent | Cumulative Percent |
|-----------|---------------|-----|---------|---------------|--------------------|
| Valid     | Normal        | 132 | 52.8    | 52.8          | 52.8               |
|           | 10 minutes    | 40  | 16.0    | 16.0          | 68.8               |
|           | 10-60 minutes | 29  | 11.6    | 11.6          | 80.4               |

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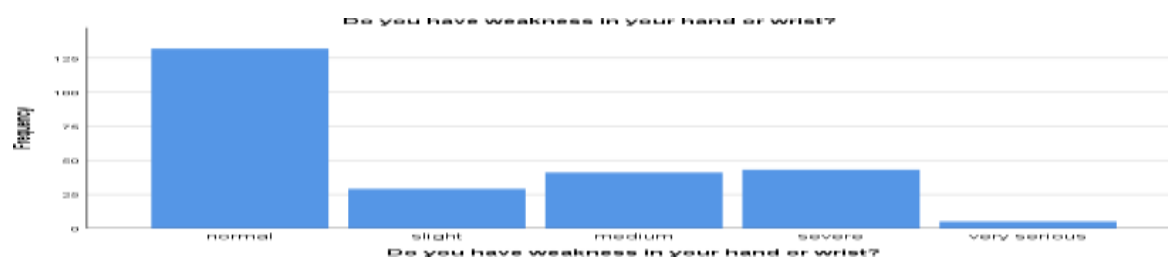
|                      |     |       |       |       |
|----------------------|-----|-------|-------|-------|
| Continued            | 37  | 14.8  | 14.8  | 95.2  |
| more than 60 minutes | 12  | 4.8   | 4.8   | 100.0 |
| Total                | 250 | 100.0 | 100.0 |       |

The majority of females who experienced wrist pain do so for almost 10minutes, in 12 women who are pregnant the pain last for more than 60minutes, whereas it continues in 29 pregnant women whose agony lasts for 10-60minutes.

## Do you have numbness (loss of sensation) in your hand?

| Frequency |              |     | Percent | Valid Percent | Cumulative Percent |
|-----------|--------------|-----|---------|---------------|--------------------|
| Valid     | Normal       | 130 | 52.0    | 52.0          | 52.0               |
|           | Slight       | 32  | 12.8    | 12.8          | 64.8               |
|           | Medium       | 45  | 18.0    | 18.0          | 82.8               |
|           | Severe       | 39  | 15.6    | 15.6          | 98.4               |
|           | very serious | 4   | 1.6     | 1.6           | 100.0              |
|           | Total        | 250 | 100.0   | 100.0         |                    |

Nearly 32 pregnant women had a mild tingling in their hand, medium numbness was experienced by 45 women. Only 4 reported extremely serious hand numbness compare to 39, who reported severe numbness.



According to data above, the majority of pregnant women with CTS symptoms also have moderate to severe hand or wrist weakness.

## Do you have tingling sensations in your hand?

| Frequency |              |     | Percent | Valid Percent | Cumulative Percent |
|-----------|--------------|-----|---------|---------------|--------------------|
| Valid     | Normal       | 131 | 52.4    | 52.4          | 52.4               |
|           | Slight       | 31  | 12.4    | 12.4          | 64.8               |
|           | Medium       | 48  | 19.2    | 19.2          | 84.0               |
|           | Severe       | 38  | 15.2    | 15.2          | 99.2               |
|           | very serious | 2   | .8      | .8            | 100.0              |
|           | Total        | 250 | 100.0   | 100.0         |                    |

- According to above data 48 pregnant females with symptoms of CTS have medium tingling in their hand, 38 pregnant females have severe ,31 pregnant females have slight and only 2 have very serious tingling sensations in their hand.

## How severe is numbness (loss of sensation) or tingling at night?

| Frequency |              |     | Percent | Valid Percent | Cumulative Percent |
|-----------|--------------|-----|---------|---------------|--------------------|
| Valid     | normal       | 132 | 52.8    | 52.8          | 52.8               |
|           | slight       | 32  | 12.8    | 12.8          | 65.6               |
|           | medium       | 45  | 18.0    | 18.0          | 83.6               |
|           | severe       | 39  | 15.6    | 15.6          | 99.2               |
|           | very serious | 2   | .8      | .8            | 100.0              |
|           | Total        | 250 | 100.0   | 100.0         |                    |

Majority of pregnant females about 45, having symptoms of CTS have medium loss of sensation or tingling at night.

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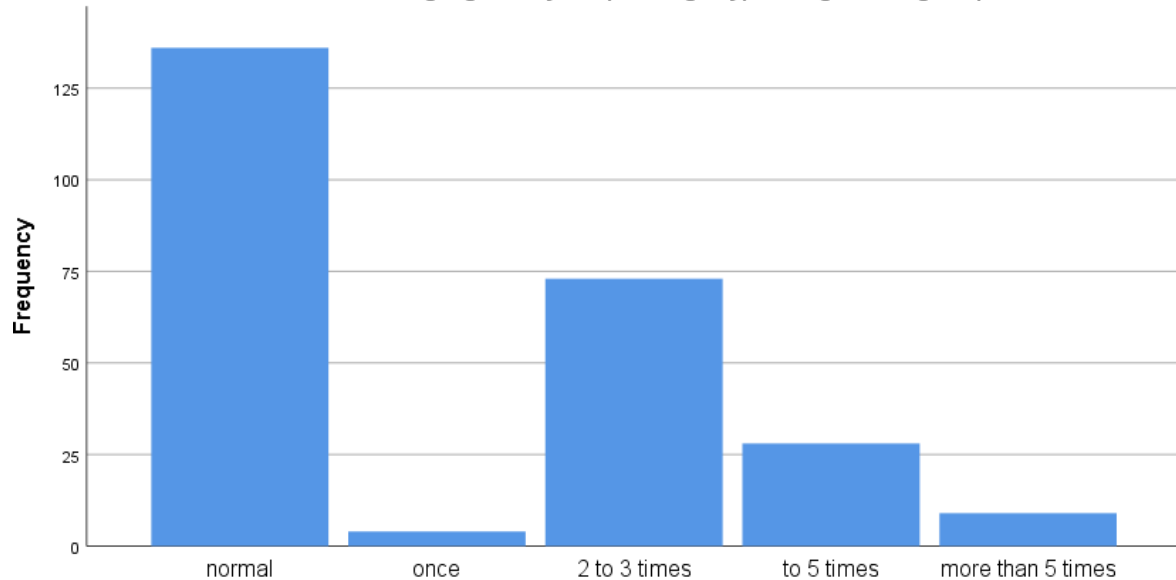
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-How often did hand numbness or tingling wake you up during a typical night during the past two weeks?



-How often did hand numbness or tingling wake you up during a typical night during the past two weeks?

According to above data, majority of pregnant females about 73 females wake up 2 to 3 times during a typical night during the past two weeks.

**Do you have difficulty with the grasping and use of small objects such as keys or pens?**

| Frequency |                     |     | Percent | Valid Percent | Cumulative Percent |
|-----------|---------------------|-----|---------|---------------|--------------------|
| Valid     | without difficulty  | 136 | 54.4    | 54.4          | 54.4               |
|           | little difficulty   | 34  | 13.6    | 13.6          | 68.0               |
|           | moderate difficulty | 38  | 15.2    | 15.2          | 83.2               |
|           | very difficult      | 42  | 16.8    | 16.8          | 100.0              |
|           | Total               | 250 | 100.0   | 100.0         |                    |

About 42% of female patients had extreme trouble holding and using small things, including keys or pens.

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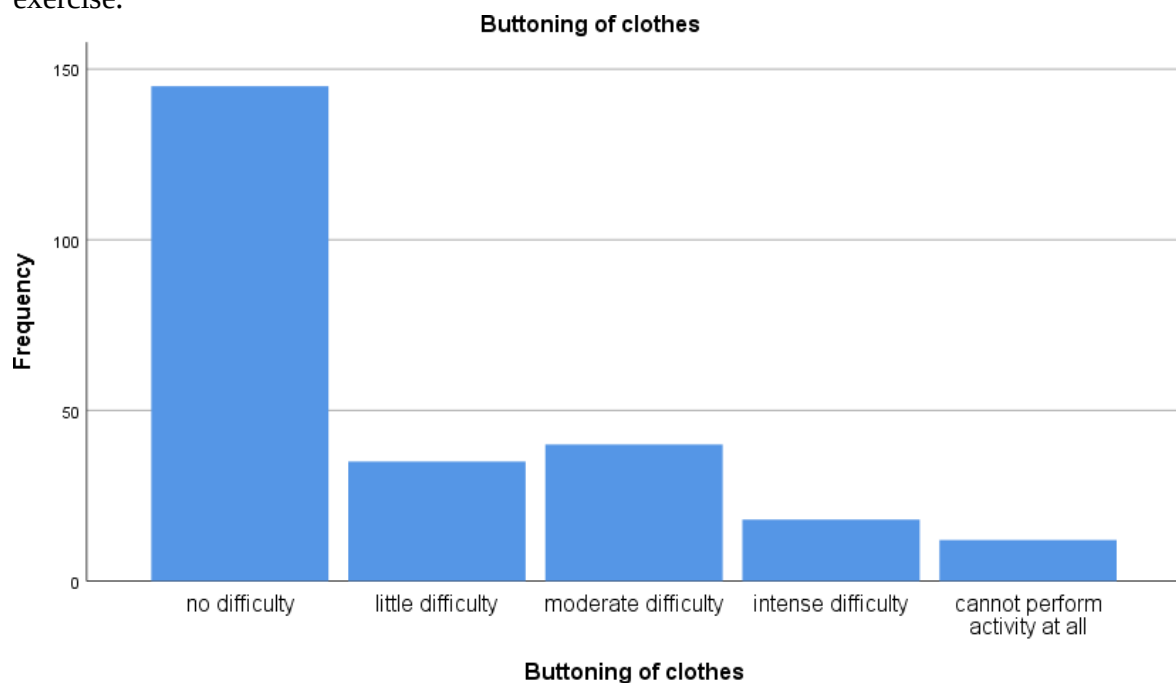
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## Writing

| Frequency |                                |     | Percent | Valid Percent | Cumulative Percent |
|-----------|--------------------------------|-----|---------|---------------|--------------------|
| Valid     | no difficulty                  | 136 | 54.4    | 54.4          | 54.4               |
|           | little difficulty              | 38  | 15.2    | 15.2          | 69.6               |
|           | moderate difficulty            | 39  | 15.6    | 15.6          | 85.2               |
|           | intense difficulty             | 34  | 13.6    | 13.6          | 98.8               |
|           | cannot perform activity at all | 3   | 1.2     | 1.2           | 100.0              |
|           | Total                          | 250 | 100.0   | 100.0         |                    |

136 pregnant women out of 250 had no trouble writing, 38 women had little trouble, 39 had greater, 34 had severe difficulty and 3 were completely unable to conduct any exercise.



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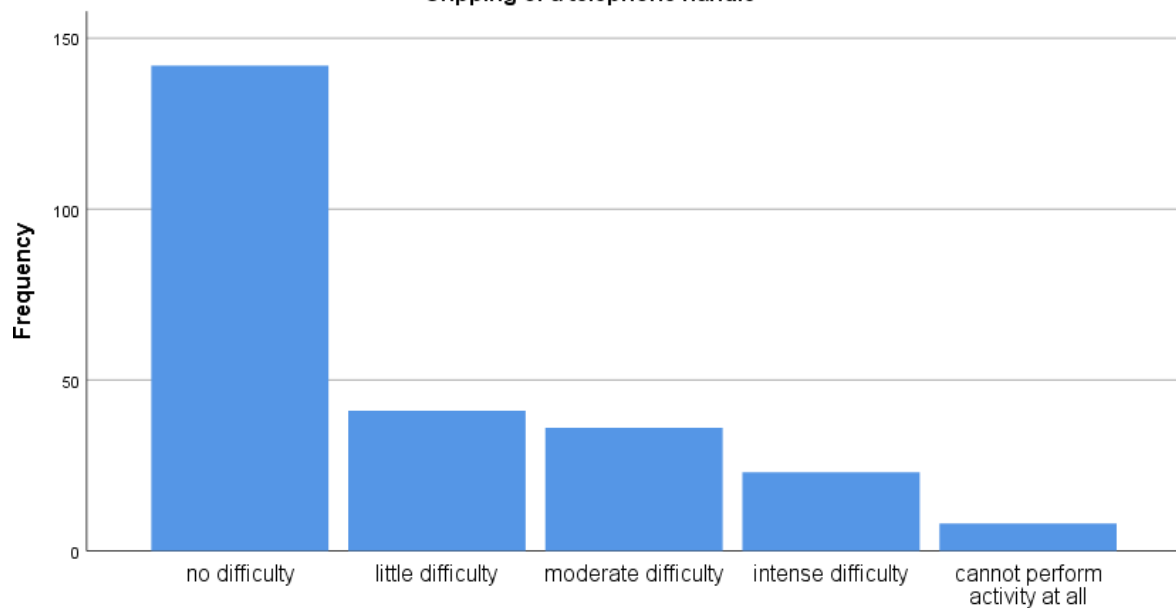
Out of 250 pregnant women, 145 had no trouble buttoning their garments. 35 pregnant women had minimal difficulty, 40 had average difficulty, 18 had severe difficulty and 12 were completely incapable of performing any exercise.

## Holding a book while reading

| Frequency |                                |     | Percent | Valid Percent | Cumulative Percent |
|-----------|--------------------------------|-----|---------|---------------|--------------------|
| Valid     | no difficulty                  | 141 | 56.4    | 56.4          | 56.4               |
|           | little difficulty              | 44  | 17.6    | 17.6          | 74.0               |
|           | moderate difficulty            | 31  | 12.4    | 12.4          | 86.4               |
|           | intense difficulty             | 29  | 11.6    | 11.6          | 98.0               |
|           | cannot perform activity at all | 5   | 2.0     | 2.0           | 100.0              |
|           | Total                          | 250 | 100.0   | 100.0         |                    |

Out of 250, 141 pregnant females had no difficulty in holding a book while reading. 44 pregnant females had little, 31 had moderate difficulty, 29 had intense difficulty and 5 cannot perform activity at all.

Gripping of a telephone handle



Gripping of a telephone handle

Out of 250, 142 pregnant females had no difficulty in gripping of a telephone handle. 41 pregnant females had little, 36 had moderate difficulty, 23 had intense difficulty and 8 cannot perform activity at all.

## Household chores

| Frequency |                                |     | Percent | Valid Percent | Cumulative Percent |
|-----------|--------------------------------|-----|---------|---------------|--------------------|
| Valid     | no difficulty                  | 135 | 54.0    | 54.0          | 54.0               |
|           | little difficulty              | 24  | 9.6     | 9.6           | 63.6               |
|           | moderate difficulty            | 45  | 18.0    | 18.0          | 81.6               |
|           | intense difficulty             | 24  | 9.6     | 9.6           | 91.2               |
|           | cannot perform activity at all | 22  | 8.8     | 8.8           | 100.0              |
|           | Total                          | 250 | 100.0   | 100.0         |                    |

Out of 250, 135 pregnant females had no difficulty in household chores. 24 pregnant females had little, 45 had more difficulty, 24 had intense difficulty and 22 cannot perform activity at all.

## Carrying of grocery basket

| Frequency |                                |     | Percent | Valid Percent | Cumulative Percent |
|-----------|--------------------------------|-----|---------|---------------|--------------------|
| Valid     | no difficulty                  | 136 | 54.4    | 54.4          | 54.4               |
|           | little difficulty              | 25  | 10.0    | 10.0          | 64.4               |
|           | moderate difficulty            | 41  | 16.4    | 16.4          | 80.8               |
|           | intense difficulty             | 21  | 8.4     | 8.4           | 89.2               |
|           | cannot perform activity at all | 27  | 10.8    | 10.8          | 100.0              |
|           | Total                          | 250 | 100.0   | 100.0         |                    |

Out of 250, 136 pregnant females had no difficulty in carrying grocery basket. 25 pregnant females had little, 41 had more difficulty, 21 had intense difficulty and 27 cannot perform activity at all.

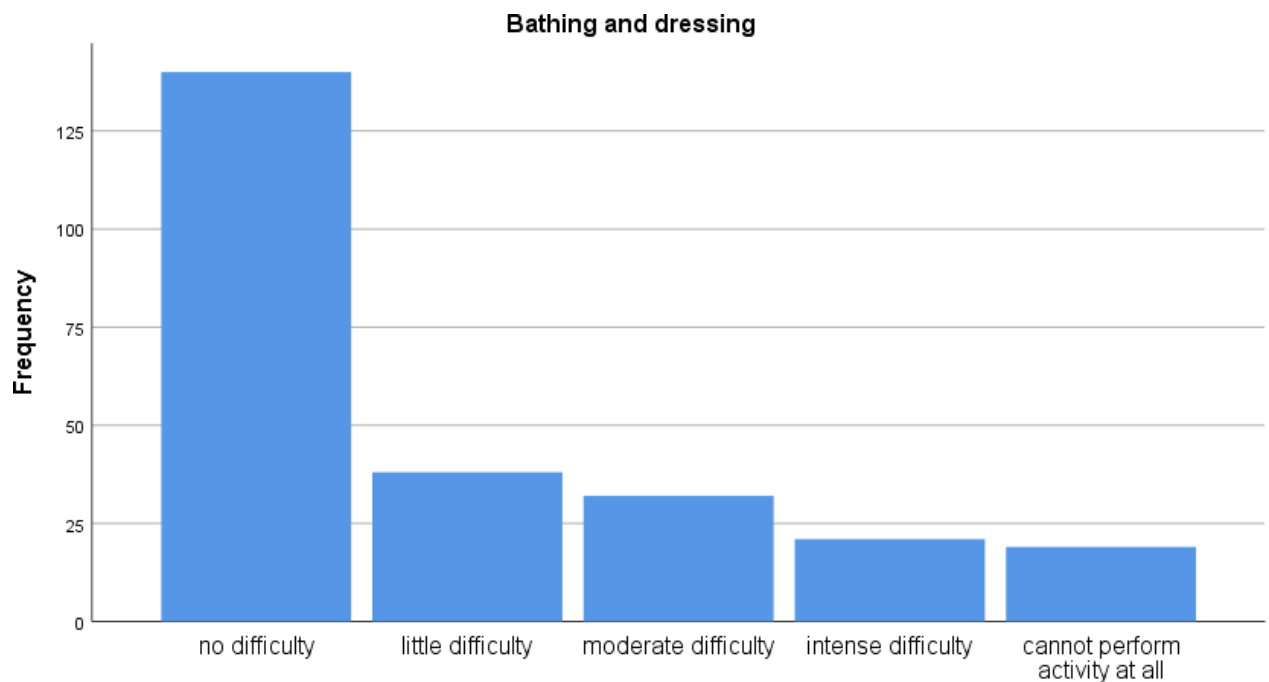
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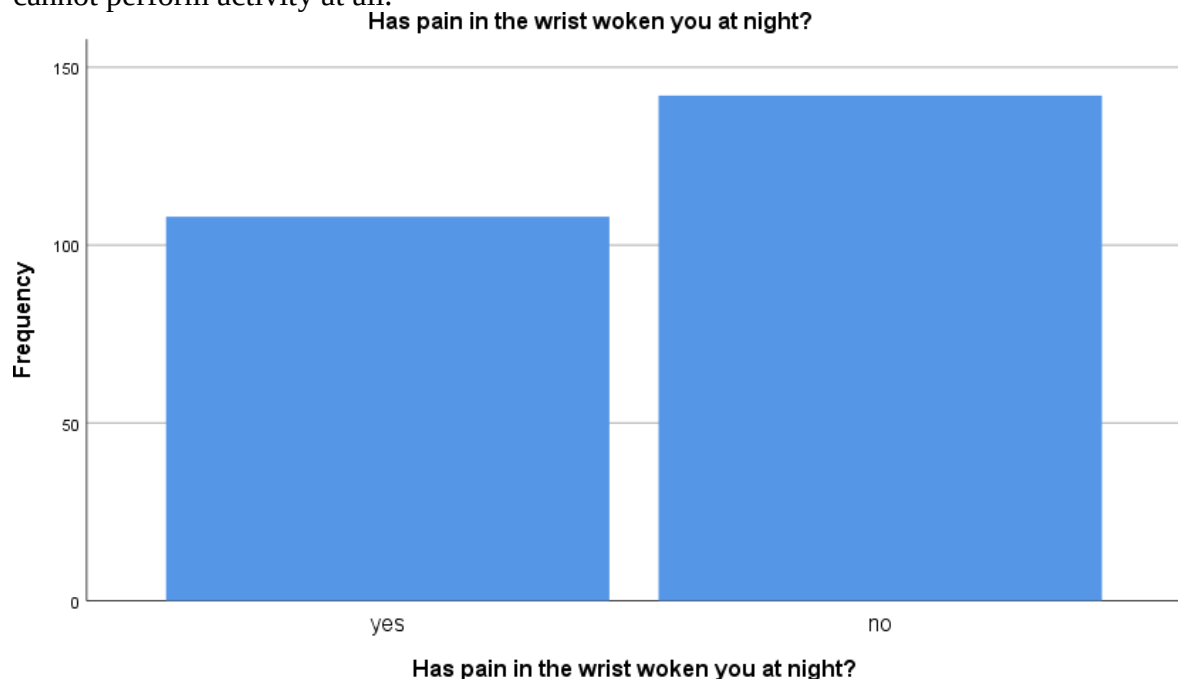
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**Bathing and dressing**

Out of 250, 140 pregnant females had no difficulty in bathing and dressing. 38 pregnant females had little, 32 had more difficulty, 21 had intense difficulty and 19 cannot perform activity at all.



Out of 250, 108 pregnant females had woken up at night due to wrist pain.

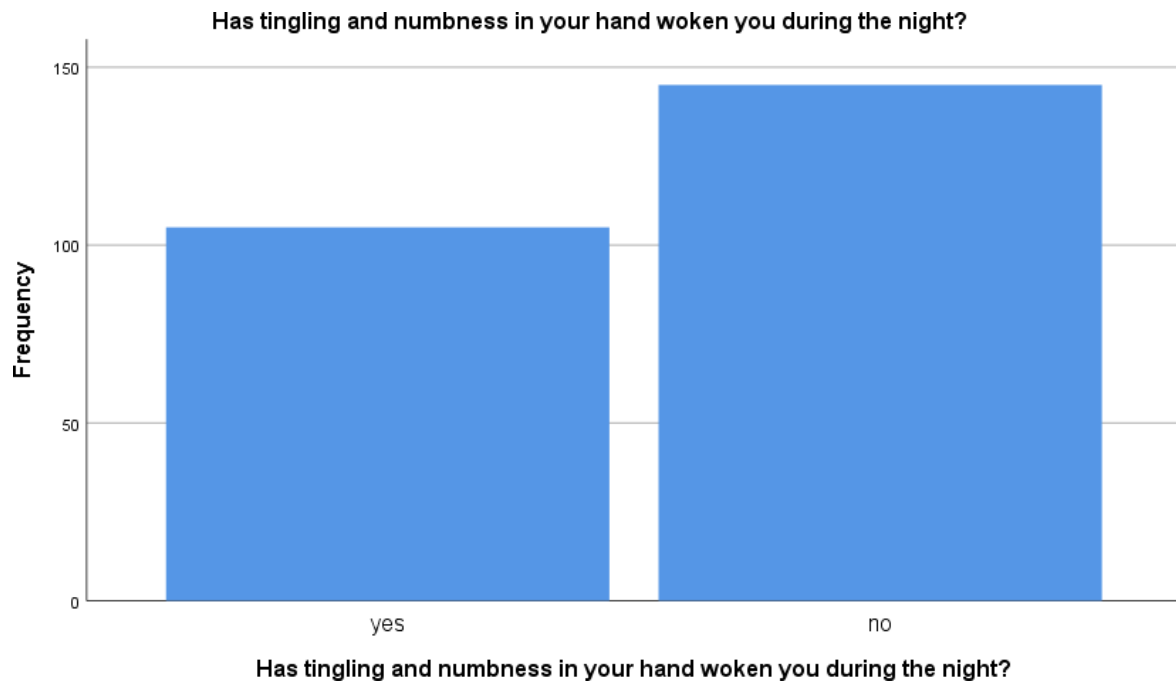
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Out of 250, 105 pregnant females have numbness and tingling sensation at night which had awoken them at night.

**Has tingling and numbness in your hand been more pronounced first thing in the morning?**

| Frequency |       |     | Percent | Valid Percent | Cumulative Percent |
|-----------|-------|-----|---------|---------------|--------------------|
| Valid     | Yes   | 101 | 40.4    | 40.4          | 40.4               |
|           | No    | 149 | 59.6    | 59.6          | 100.0              |
|           | Total | 250 | 100.0   | 100.0         |                    |

Out of 250, 101 pregnant females had tingling and numbness in their hand one of the most pronounced first thing in the morning.

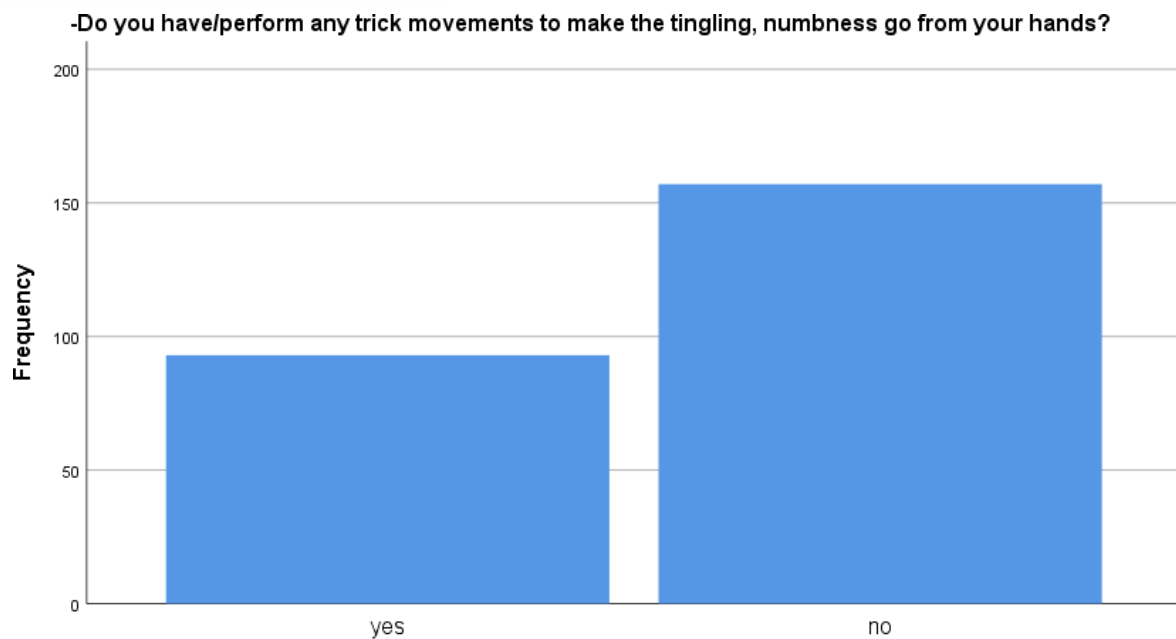
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-Do you have/perform any trick movements to make the tingling, numbness go from your hands?

Majority of pregnant females about 157 reported that they had not performed any trick movement to make the tingling, numbness go from your hands.

**Do you have tingling and numbness in your little finger at any time?**

| Frequency |       |     | Percent | Valid Percent | Cumulative Percent |
|-----------|-------|-----|---------|---------------|--------------------|
| Valid     | yes   | 99  | 39.6    | 39.6          | 39.6               |
|           | no    | 151 | 60.4    | 60.4          | 100.0              |
|           | Total | 250 | 100.0   | 100.0         |                    |

99 pregnant females out of 250 had tingling and numbness in their little finger.

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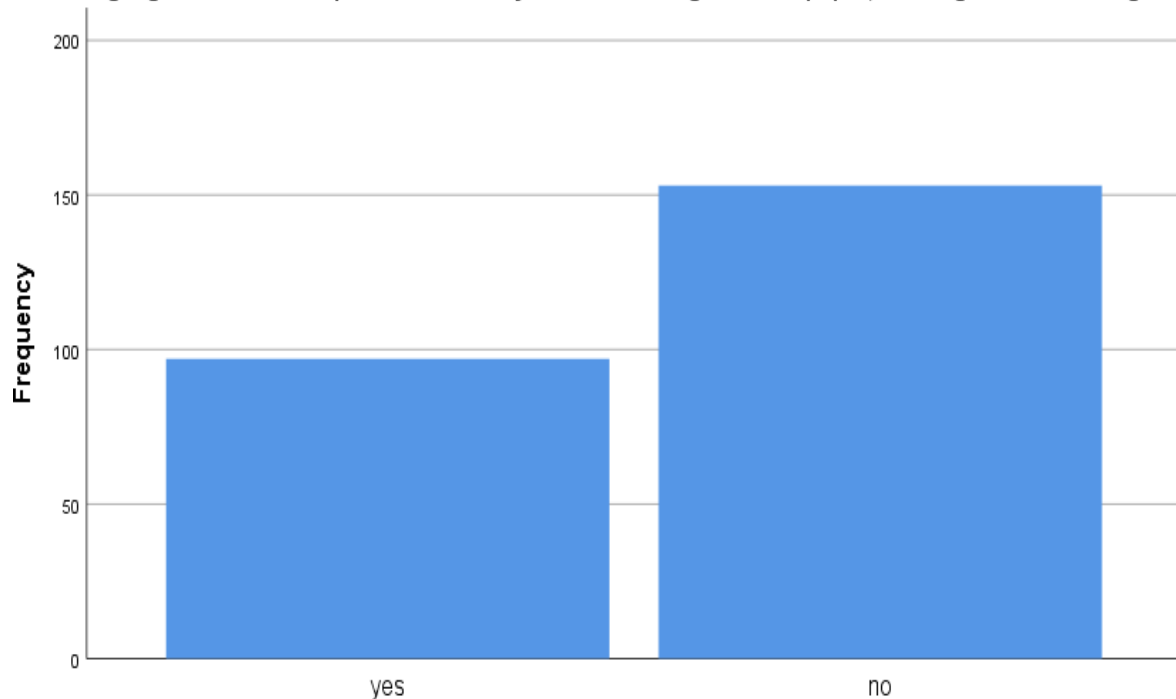
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-Has tingling and numbness presented when you were reading the newspaper, steering a car or knitting?



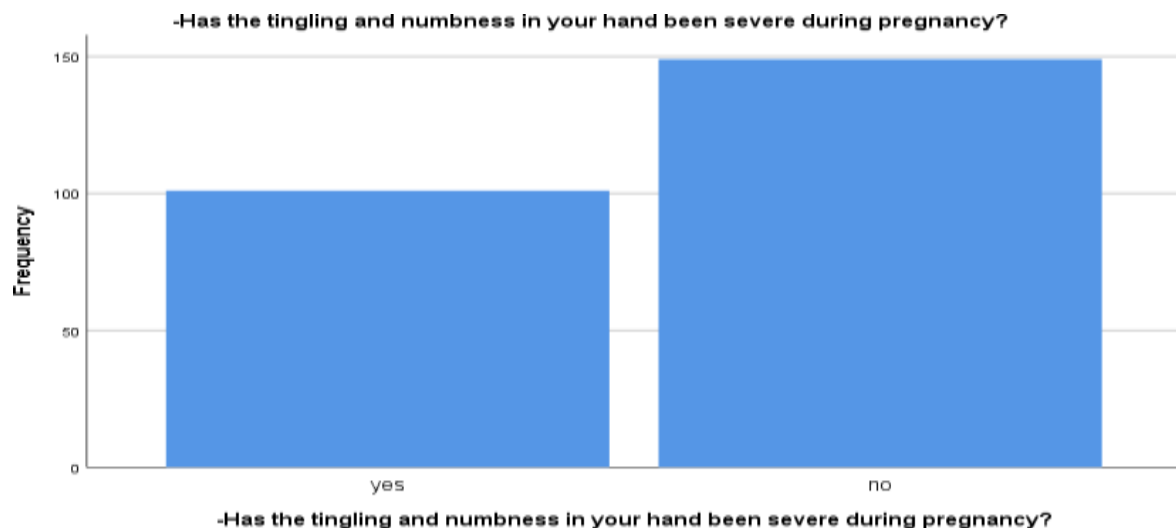
-Has tingling and numbness presented when you were reading the newspaper, steering a car or knitting?

97 pregnant females reported tingling and numbness when reading newspaper, steering a car or knitting.

**Do you have any neck pain?**

| Frequency |       |     | Percent | Valid Percent | Cumulative Percent |
|-----------|-------|-----|---------|---------------|--------------------|
| Valid     | yes   | 59  | 23.6    | 23.6          | 23.6               |
|           | no    | 191 | 76.4    | 76.4          | 100.0              |
|           | Total | 250 | 100.0   | 100.0         |                    |

Only 59 pregnant females out of 250 had neck pain.



Out of 250 pregnant females, 101 reported that they had severe tingling and numbness in their hand during pregnancy.

## Has wearing a splint on your wrist helped the tingling and numbness?

| Frequency |       |     | Percent | Valid Percent | Cumulative Percent |
|-----------|-------|-----|---------|---------------|--------------------|
| Valid     | yes   | 84  | 33.6    | 33.6          | 33.6               |
|           | no    | 166 | 66.4    | 66.4          | 100.0              |
|           | Total | 250 | 100.0   | 100.0         |                    |

Only 84 pregnant females reported that wearing a splint on their wrist had helped the tingling and numbness. CHAPTER 5

## DISCUSSION: -

To ascertain the prevalence of CTS in pregnant women, and observational cross-sectional study was conducted. In order to gather information, several maternity clinics in Gujranwala were visited. The assessment process used the carpal tunnel diagnostics questionnaire, the functional status scale and the symptoms severity scale. 250 pregnant women made up the sample size used to determine the prevalence rate. Prevalence rate is 34.4% according to our research. The prevalence percent, however was 34.3% in earlier study. To diagnose CTS in their study, they used Boston's Questionnaire BCTQ. We used symptoms severity, functional status scale and Carpel tunnel diagnostic questionnaire in our investigation.

Our investigation determined that the prevalence rate using Tinel's sign and Phalen's test was 37.6% and 40%. However, Tinel's test and Phalen's test, prevalence rates in

earlier studies were respectively 23.8% and 25%.

## Conclusion:

The overall incidence of CTS in pregnant ladies is 34.4% .86 out of 250 women had been identified with this circumstance on foundation of records and physical examination changes in hormonal and glucose level, accelerated weight advantage all through pregnancy, accelerated blood stress, fluctuation in glucose metabolism, alcoholism and hypothyroidism are enormously related to sign and symptoms of CTS.(Akalin et al., 2002)

## Limitations:

Many hospitals were hesitated to give us permission that causes difficulty in our research process.

Lack of cooperation of pregnant females was one of the major limitations.

Hesitation of pregnant females also causes hindrance in research process.

It is challenging to compare the study with other researches because there is no literature on CTS among pregnant women from the prospective of Gujranwala.Recommendations:

Data was only collected from Gujranwala, in order to determine more defined prevalence rate of disease data could have been collected from different cities of Pakistan.

In our research we used sample size of 250 pregnant females but it could be increased.

We used questionnaire in English language which causes difficulty for uneducated women to participate in our research efficiently. Questionnaire could have been in Urdu language.

For future studies, job nature of working women and household chores of pregnant women should be considered to find more about the causes of CTS.

## CHAPTER 6

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## CHAPTER 7

### Annexure

#### RESEARCH REPORT CONTRIBUTION FORM

| Name | Roll no. | Concept & Design | Literature Search | Data collection | Statistical Analysis | Drafting |
|------|----------|------------------|-------------------|-----------------|----------------------|----------|
|      |          |                  |                   |                 |                      |          |
|      |          |                  |                   |                 |                      |          |
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|      |          |                  |                   |                 |                      |          |
|      |          |                  |                   |                 |                      |          |
|      |          |                  |                   |                 |                      |          |

Please fill the above form according to the following criteria

No contribution = ×, Minimal contribution = √, Moderate contribution = √√, Significant contribution = √√√

#### Supervisor Name

Institute/College name

Sign

Date

Note:

- Include any questionnaires or other materials used in the research report as an annexure.

- Include Turnitin's report at the end of the annexure.

• NAME \_\_\_\_\_ AGE \_\_\_\_\_

GENDER \_\_\_\_\_ DATE \_\_\_\_\_ MARITAL S \_\_\_\_\_

#### Symptom severity scale: -

1- How severe is the hand or wrist pain that you have at night?

i) Normal

ii) Slight

iii) Medium

iv) Severe

v) Very serious

2- How often did hand or wrist pain wake you up during a typical night in the past two weeks? i) Normal

ii) Once

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- iii) 2 to 3 times
- iv) 4 to 5 times
- v) More than 5 times
- 3- Do you typically have pain in your hand or wrist during the daytime?
  - i) No pain
  - ii) Slight
  - iii) Medium
  - iv) Severe
  - v) Very serious
- 4- How often do you have hand or wrist pain during daytime? i)Normal
  - ii) 1-2 times / day
  - iii) 3-5 times / day
  - iv) More than 5 times v)Continued
- 5- How long on average does an episode of pain last during the daytime?
  - i) Normal
  - ii) < 10 minutes
  - iii) 10 – 60minutes iv) continued
  - v) > 60 minutes
  - vi) Continued
- 6- Do you have numbness (loss of sensation) in your hand? i)Normal
  - ii) Slight
  - iii) Medium
  - iv) Severe
  - v) Very serious
- 7- Do you have weakness in your hand or wrist? i)Normal
  - ii) Slight
  - iii) Medium
  - iv) Severe
  - v) Very serious
- 8- Do you have tingling sensations in your hand? i)Normal
  - ii) Slight
  - iii) Medium
  - iv) Severe
  - v) Very serious
- 9- How severe is numbness (loss of sensation) or tingling at night? i)Normal
  - ii) Slight
  - iii) Medium
  - iv) Severe
  - v) Very serious
- 10- How often did hand numbness or tingling wake you up during a typical night during the past two weeks?
  - i) Normal
  - ii) Once
  - iii) 2 to 3times iv)4 to 5 timesv) More than 5 times
- 11- Do you have difficulty with the grasping and use of small objects such as keys or pens?

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- i) Without difficulty
- ii) Little difficulty
- iii) Moderate difficulty
- iv) Very difficult
- v) Very difficult

## FUNCTIONAL STATUS SCALE: -

| Functional Status              | No Difficulty | Little Difficulty | Moderate Difficulty | Intense Difficulty | Cannot Perform Activity At All |
|--------------------------------|---------------|-------------------|---------------------|--------------------|--------------------------------|
| Writing                        | 1             | 2                 | 3                   | 4                  | 5                              |
| Buttoning of clothes           | 1             | 2                 | 3                   | 4                  | 5                              |
| Holding a book while reading   | 1             | 2                 | 3                   | 4                  | 5                              |
| Gripping of a telephone handle | 1             | 2                 | 3                   | 4                  | 5                              |
| Opening of jars                | 1             | 2                 | 3                   | 4                  | 5                              |
| Household chores               | 1             | 2                 | 3                   | 4                  | 5                              |
| Carrying of grocery basket     | 1             | 2                 | 3                   | 4                  | 5                              |
| Bathing and dressing           | 1             | 2                 | 3                   | 4                  | 5                              |

## DIAGNOSTIC QUESTIONNAIRE

- A score of <3 is unlikely to be indicative of Carpal Tunnel Syndrome
- A score of 3-4 suggests Carpal Tunnel Syndrome is possible cause of symptoms
- A score of 5 or more is strongly suggestive of Carpal Tunnel Syndrome

## CARPAL TUNNEL SYNDROME DIAGNOSTIC QUESTIONNAIRE

- 1- Has pain in the wrist woken you at night?  
Yes) 1 No) 0
- 2- Has tingling and numbness in your hand woken you during the night?  
Yes) 1 No) 0
- 3- Has tingling and numbness in your hand been more pronounced first thing in the morning?  
Yes) 1 No) 0
- 4- Do you have/perform any trick movements to make the tingling, Numbness go from your hands?  
Yes) 1 No) 0
- 5- Do you have tingling and numbness in your little finger at any time?  
Yes) 0 No) 3
- 6- Has tingling and numbness presented when you were reading the newspaper, steering a car or knitting?  
Yes) 1 No) 0
- 7- Do you have any neck pain?

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Yes) 1 No) 0

8- Has the tingling and numbness in your hand been severe during pregnancy?

Yes) 1 No) -1 N/A) 0

9- Has wearing a splint on your wrist helped the tingling and numbness?

Yes) 2 No) 0 N/A) 0

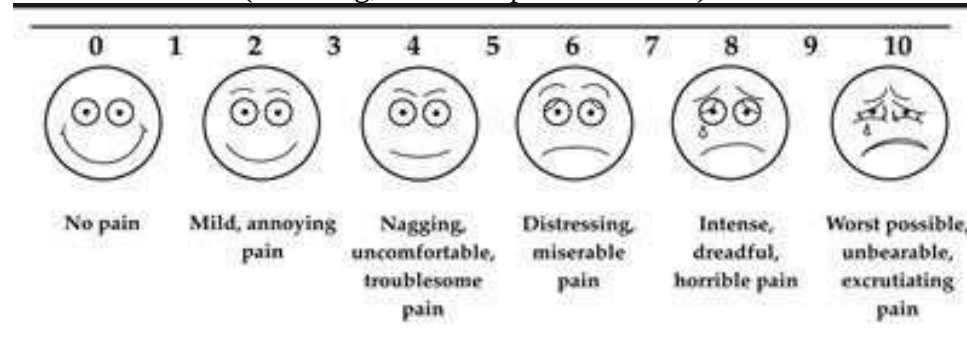
## VISUAL ANALOG SCALE: -

Adults and children 10 years old or older. The Numeric Rating Scale (NRS-11) is an 11-point scale for patient self-reporting of pain. It is for

Rating Pain Level 0 No Pain

1–3 Mild Pain (nagging, annoying, interfering little with ADLs) 4–6 Moderate Pain (interferes significantly with ADLs)

7–10 Severe Pain (disabling; unable to perform ADLs)



## TOPOGRAPHICAL ASSESMENT OF SYMPTOM RESOLUTION: -

|                            | RIGHT WRIST           | LEFT WRIST            | RIGHT HAND            | LEFT HAND             | RIGHT FINGERS         | LEFT FINGERS          |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Burning/ Pain              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Tightness/ Stiffness       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Soreness/ Cramping/ Aching | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Numbness/ Tingling         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please show on the diagram below where you have experienced numbness, tingling, burning, or pain by shading in the problem area.

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