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THE ASSOCIATION OF TRIGGER FINGER WITH CARPEL TUNNEL SYNDROME IN PREGNANT WOMEN

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ABSTRACT

Background: *Carpal tunnel syndrome (CTS) and trigger finger (stenosing tenosynovitis) are two common hand conditions that frequently occur during pregnancy due to hormonal fluctuations, fluid retention, and increased intracarpal pressure. While both conditions share similar pathophysiological mechanisms, their association in pregnant women remains underexplored.*

Objective: *The objective of this study is to evaluate the association of trigger finger and carpel tunnel syndrome among pregnant women.*

Methods: *A cross-sectional study was conducted on 114 pregnant women aged 18–40 years recruited from gynecology wards of government and private hospitals. Participants were selected using non-probability purposive sampling. Data collection tools included the Boston Carpal Tunnel Questionnaire (BCTQ) for symptom severity and functional status, and the Numeric Pain Rating Scale (NPRS) for pain intensity. Data were analyzed using SPSS version 27.0.*

Results: *The mean age of participants was 32.10 ± 4.77 years. Most women were in their third trimester, with 36.8% at eight months of gestation. Regarding parity, 43% had 2–3 previous pregnancies. BCTQ results showed moderate symptom severity for night pain (3.11 ± 1.20), numbness (3.04 ± 1.15), and tingling (3.00 ± 1.28). Functional difficulties were moderate for activities including buttoning clothes (3.07 ± 1.29) and opening jars (3.07 ± 1.18). Mean NPRS score was 2.90 ± 0.76, with 41.2% reporting moderate pain. Normality testing confirmed non-parametric distribution ($p < 0.05$). A significant negative correlation was found between night pain severity and daytime pain frequency ($p = 0.023$), supporting the progressive nature of CTS during pregnancy.*

Conclusion: *Carpal tunnel syndrome is highly prevalent among pregnant women, particularly during the third trimester, with moderate symptom severity and functional impairment. A significant association exists between CTS and trigger finger, suggesting shared underlying mechanisms including hormonal changes, fluid retention, and inflammation. Early screening and conservative management should be integrated into routine antenatal care.*

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Keywords: *Carpal tunnel syndrome, trigger finger, pregnancy, pregnant women, Boston Carpal Tunnel Questionnaire, median nerve compression.*

INTRODUCTION

Carpal Tunnel Syndrome is a frequently occurring peripheral nerve disorder that mainly affects the thumb, index finger, and middle finger. It occurs when the median nerve becomes compressed while passing through the carpal tunnel in the wrist, leading to symptoms such as pain, numbness, tingling sensations, and reduced hand function. [1] Carpal Tunnel Syndrome commonly occurs during pregnancy and may affect up to 70% of pregnant women, particularly after 30 weeks of gestation. It can cause symptoms such as discomfort, numbness, tingling, burning sensations, reduced sensation, and sleep disturbances. If the condition persists for a prolonged period, it may lead to thenar muscle atrophy and impaired hand function. CTS is especially prevalent during the third trimester due to hormonal changes and fluid retention, which increase swelling around the carpal tunnel and compress the median nerve. This compression results in pain, tingling, numbness, and weakness, mainly in the thumb, index, and middle fingers, with symptoms often worsening at night. [2] Trigger Finger is a condition in which a finger or thumb becomes locked, catches during movement, or produces a clicking sensation, often accompanied by pain. It occurs when the flexor tendon responsible for bending the finger becomes inflamed or forms a small nodule, making its movement through the tendon sheath pulley difficult.

Although Carpal Tunnel Syndrome and trigger finger are separate conditions, they are both commonly observed hand disorders. CTS results from compression of the median nerve at the wrist, whereas trigger finger is related to inflammation of the flexor tendons in the palm. In some cases, the inflammation and swelling associated with CTS may spread from the wrist into the palm along the tendons, leading to tendon thickening that contributes to the development of trigger finger. [1] Carpal Tunnel Syndrome and Trigger Finger are generally considered idiopathic conditions, although they may be associated with physiological changes such as pregnancy and menopause. The severity of symptoms can vary from mild to severe and may affect one or both hands. In the early stages, symptoms commonly occur at night and may awaken patients from sleep. As the condition progresses, symptoms can persist throughout the day and are often aggravated by repetitive or strenuous hand and wrist activities. Chronic nerve compression may eventually result in nerve degeneration and thenar muscle wasting. Additionally, pain or discomfort may radiate proximally to the forearm, upper arm, and shoulder. [3, 4]

Trigger finger and carpal tunnel syndrome are caused by hormonal fluctuations such as increased estrogen and fluid retention. [2, 5] Approximately 80% of pregnant women develop peripheral edema, which is often caused by hormonal fluid retention and decreased venous return. [2, 6] . Approximately 62% of pregnant women experience urinary retention, which may aggravate symptoms of Carpal Tunnel Syndrome and Trigger Finger. In addition, the hormone relaxin may contribute to the progression of these conditions by increasing fluid retention, reducing blood supply to the median nerve, and thickening the carpal ligament, thereby intensifying nerve compression. Relaxin is mainly secreted by the corpus luteum of the ovaries; however, during pregnancy, it is also produced by the placenta, chorion, and decidua. In males, relaxin is secreted by the prostate gland into semen. The primary function of this hormone is to relax ligaments and muscles, especially within the pelvic region, in preparation for childbirth. [2]

However, the cause of CTS and trigger finger during pregnancy remains unknown. Peripheral edema, which affects around 80% of pregnant women and is particularly severe in the third trimester, can be a decisive factor. [8] According to a local study, carpal tunnel syndrome affects 34% of pregnant women. The study also found that multigravida women had a higher prevalence than primigravids. On the numeric pain rating scale, the majority of patients reported severe pain. [3, 8]

The pathogenesis of CTS and trigger finger during pregnancy is complex and believed to be linked to physiological changes throughout the pregnancy. This includes increased maternal blood volume and stable systemic blood pressure despite increased cardiac output and metabolism. Hormonal variations cause fluid retention and edema, aggravating the compression of the median nerve.[9, 10] The purpose of this study is to ascertain the prevalence of carpel tunnel and trigger finger weakness in expectant mothers and assess its association with clinical manifestations of carpal tunnel syndrome[2]. It is the most prevalent mononeuropathy and can be caused by tendinitis, synovial thickening of ligaments and tendon sheaths. Neuropathy compression of the median nerve, which can appear or exaggerate during pregnancy and sometimes needs surgical procedure to relive its compression. When diagnosed early, it leads to simpler and less risky treatments.[8] Up to 70% of pregnant women experience CTS and trigger finger which can cause pain, numbness, tingling, burning, reduced sensation, and disturbed sleep. Prolonged CTS and trigger finger can result in thenar muscle atrophy, which impairs hand function. Common pregnancy conditions like peripheral edema and fluid retention exacerbate CTS and trigger finger symptoms.[2, 6]

Clinical examination of Carpal Tunnel Syndrome commonly includes Tinel's test, Phalen's test, and the median nerve compression test, which help identify or reproduce symptoms associated with the condition and related disorders such as Trigger Finger. Among the available diagnostic methods, electrodiagnostic studies performed by a qualified electromyographer are considered the most accurate, with a sensitivity ranging from 49% to 84% and a specificity of approximately 95%.[9]

sssThis study aims to determine the prevalence of carpal tunnel syndrome and trigger finger in pregnant women, which can cause nerve and vascular compression due to fluid accumulation and ligament relaxation in the hand and wrist. Early detection and non-invasive treatment are crucial, especially given the recurrence of CTS and trigger finger in subsequent pregnancies. Pregnant women were selected because they are particularly susceptible to CTS and trigger finger due to hormonal changes, ligamentous laxity, and fluid retention during pregnancy, which raise intracarpal pressure and median nerve compression.

LITERATURE REVIEW

Mateen et al. conducted a cross-sectional study in 2024 investigating the prevalence of Carpal Tunnel Syndrome during pregnancy. The study concluded that pregnancy is a significant risk factor for CTS because of hormonal changes, fluid retention, and musculoskeletal adaptations that increase pressure within the carpal tunnel. Common symptoms reported included numbness, tingling, weakness, and pain along the distribution of the median nerve, with symptoms frequently worsening at night and during the later stages of pregnancy.The authors also noted considerable variation in the reported prevalence of CTS during pregnancy across previous studies. Some research documented prevalence rates as high as 62%, indicating that both symptomatic and subclinical CTS are common among pregnant women. In contrast, studies from regions such as Iran and Southeast Asia reported lower prevalence rates ranging from 19% to 35%, reflecting possible regional and methodological differences in diagnosis and reporting. Despite these variations, most studies consistently identified the third trimester as the stage of pregnancy with the highest frequency of CTS symptoms. [11]

In 2025, Liaqat et al. conducted a cross-sectional observational study examining the association between Trigger Finger and Carpal Tunnel Syndrome among industrial workers. The study concluded that both conditions are common occupational musculoskeletal disorders, especially among individuals involved in repetitive and forceful hand activities. CTS results from compression of the median nerve within the carpal tunnel, producing symptoms such as pain, numbness, and reduced hand function, whereas trigger finger develops due to inflammation and thickening of the flexor tendon sheath, leading to pain and finger locking.

The researchers reported that both disorders share several occupational risk factors, including

repetitive hand movements, prolonged gripping, and inadequate ergonomic practices. Earlier studies have also indicated a possible association between CTS and trigger finger because of shared pathophysiological mechanisms, such as inflammation, elevated intracarpal pressure, and restricted tendon or nerve gliding. However, the available evidence remains inconsistent, with some studies demonstrating a strong coexistence while others suggest only a weak or indirect relationship. Therefore, the authors emphasized the need for further research to better understand the relationship between CTS and trigger finger in occupational environments and to support the development of effective ergonomic and preventive interventions. [1]

In 2024, Yaseen et al. conducted a cross-sectional study on the prevalence of Carpal Tunnel Syndrome among pregnant women at Akhtar Saeed Trust Teaching Hospital and Farooq Hospital, Lahore, involving 121 participants. The study concluded that pregnancy is an important risk factor for the development of CTS. Hormonal changes, particularly elevated estrogen and progesterone levels, contribute to fluid retention and edema, which increase pressure within the carpal tunnel and compress the median nerve. Furthermore, increased blood volume and ligament laxity during pregnancy may also play a role in the onset of CTS symptoms. These physiological changes become more prominent as pregnancy progresses, especially during the third trimester.The study also highlighted the influence of ethnic and demographic factors on the occurrence of CTS. Previous research by Sapuan et al. reported a higher prevalence of CTS among Malay pregnant women, suggesting that genetic and lifestyle factors may affect susceptibility to the condition. In addition, Rozali et al. investigated the impact of CTS on quality of life and found that, although symptoms were generally mild, they significantly interfered with daily activities and sleep, particularly during the third trimester of pregnancy. [9]

Studies have shown that Durkan's test may have higher sensitivity compared to Phalen's test, although electrodiagnostic studies remain the gold standard for diagnosis. However, due to the transient nature of pregnancy-related CTS and trigger finger conservative diagnostic approaches are generally preferred. [9]

Sajjad et al., in 2025 conducted a cross-sectional study on correlation of carpal tunnel syndrome with hand grip strength among pregnant females. They highlighted that Pregnancy is associated with substantial physiological and musculoskeletal changes that influence functional capacity and quality of life. Hormonal fluctuations, fluid retention, ligament laxity, and weight gain during pregnancy alter biomechanics and increase pressure within confined anatomical spaces, predisposing women to musculoskeletal disorders such as Carpal Tunnel Syndrome. Hand Grip Strength (HGS) is a reliable and objective indicator of overall musculoskeletal health and functional performance. It reflects muscle strength, nutritional status, and neural integrity. Previous research has shown that pregnant women demonstrate significantly lower HGS compared to non-pregnant women, with reductions attributed to hormonal influences (elevated estrogen and relaxin), increased fat mass, and neuromuscular alterations. Studies have reported that approximately 74–85% of pregnant women experience reduced grip strength, particularly in the dominant hand. Despite the documented prevalence of CTS and reduced HGS during pregnancy, much of the existing literature has focused primarily on sensory symptoms of CTS, often overlooking its functional consequences such as grip weakness. [2]

In 2024, Atlihan et al. conducted a retrospective case-control study investigating risk factors associated with pregnancy-related Carpal Tunnel Syndrome. The study concluded that CTS affects nearly 4% of the general population and occurs more commonly in women than in men. Pregnancy is recognized as one of the major physiological conditions contributing to the development of CTS, although reported prevalence rates differ considerably depending on the diagnostic criteria and assessment methods used.

The researchers found that obesity and excessive gestational weight gain may increase pressure within the carpal tunnel, thereby raising the risk

of median nerve compression. Previous studies, including those conducted by Wright et al., demonstrated a strong association between higher body mass index (BMI) and the development of CTS during pregnancy, suggesting that both mechanical and metabolic factors contribute to disease onset. Metabolic abnormalities, particularly impaired glucose metabolism, were also identified as important contributors to CTS. Elevated HbA1c levels and diabetes mellitus are established risk factors for peripheral neuropathies, including CTS. Earlier research has indicated that even mild or subclinical hyperglycemia may increase the susceptibility of nerves to compression through mechanisms such as edema formation, microvascular ischemia, and accumulation of advanced glycation end-products. However, evidence regarding the role of fasting blood glucose and insulin resistance during pregnancy remains inconsistent across studies.The study further highlighted thyroid dysfunction, especially hypothyroidism, as another significant risk factor for CTS. In hypothyroid conditions, the accumulation of mucopolysaccharides and glycosaminoglycans may narrow the carpal tunnel and compress the median nerve. Meta-analyses have also reported a strong association between elevated thyroid-stimulating hormone (TSH) levels and CTS, even in cases of subclinical hypothyroidism. [6]

In 2021 waris et al., conducted a cross-sectional study on carpal tunnel syndrome in pregnant women. They explained that Carpal Tunnel Syndrome (CTS) is the most common compression neuropathy of the median nerve and is frequently observed during pregnancy due to physiological and hormonal changes. The condition is characterized by pain, numbness, tingling, and functional limitation of the hand and wrist, often worsening at night. Pregnancy-related CTS is considered transient in many cases, but its prevalence and severity vary across populations.

Functional limitation is an important consequence of Carpal Tunnel Syndrome during pregnancy, as it can significantly interfere with daily activities and reduce quality of life. de Oliveira et al. reported that nearly 48% of pregnant women affected by CTS experienced functional impairment, particularly during the early third trimester. Because of the potential risks associated with surgical procedures during pregnancy, conservative approaches such as wrist splinting and physiotherapy are generally recommended as first-line management strategies.In addition, Bukhari et al. observed that 72.8% of CTS cases occurred in multigravida women, suggesting that repeated pregnancies and cumulative physiological stress may contribute to the development of the condition. Wright et al. further supported this finding by identifying parity and gestational weight gain as significant factors associated with increased CTS risk. Moreover, Meems et al. explained that venous congestion and hormonal changes during pregnancy can elevate intracarpal pressure, resulting in compression of the median nerve. Similarly, Zyluk emphasized the important role of fluid retention and ligament laxity in the pathophysiology of CTS among pregnant women.[8]

2.1: OBJECTIVE

The objective of this study is to evaluate the association of trigger finger and carpel tunnel syndrome among pregnant women.

2.2: HYPOTHESIS

2.2.1: NULL HYPOTHESIS

There will be significant association of trigger finger and carpel tunnel syndrome among pregnant women.

2.2.2: ALTERNATE HYPOTHESIS

There will be significant association of trigger finger and carpel tunnel syndrome among pregnant women.

MATERIALS AND METHODS

3.1: STUDY DESIGN

The study design will be Cross Sectional.

3.2: STUDY SETTING

The study setting will be Gyne ward of government and private Hospitals in Layyah, Punjab Pakistan.

3.3: DURATION OF STUDY

The study duration will be 6 months after approval of synopsis.

3.4: SAMPLE SIZE

The sample size will be 114 calculated by epitool. [2]


EPITOOLS

Inputs

inp1	0.92
inp3	0.05
inp2	0.95
inp4	N/A

Results

Sample size required for specified inputs

Large population	114

3.5: SAMPLING TECHNIQUE

The sampling technique will be non-probability purposive sampling technique.

3.6: SAMPLE SELECTION

3.6.1: INCLUSION CRITERIA

- Age 18-40 years. [2]
- Gestational Age. [2]
- Parity in pregnancy. [2]
- Hormonal changes.[2]
- Primary gravida and multi gravida. [9]

3.6.2: EXCLUSION CRITERIA

- comorbidities such as diabetes, hypertension, thyroid, cardiovascular, or neurological disorders.[2]
- History of hand trauma or fractures.[9]
- Diagnosed neuropathy.[9]
- Chronic medical illness like cancer. [11]

3.7: DATA COLLECTION TOOL

3.7.1: BOSTON CARPEL TUNNEL QUESTIONNAIRE

The Boston Carpal Tunnel Syndrome Questionnaire (BCTSQ) is designed specifically for people with carpal tunnel syndrome (CTS) and provides insight into the symptoms and severity of the symptoms when performing specific actions. Normal 24-hour periods over the past 2 weeks are measured.

The BCTSQ comprises two separate scales: the Symptom Severity Scale (SSS), which consists of 11 questions and the Functional Status Scale (FSS), which consists of 8 items and requires respondents to score the difficulty of each item on a five-point scale. A final score is calculated for each scale (the sum of the individual scores divided by the number of items) and ranges from 1 to 5, with a higher score indicating a more severe handicap.[1]

3.7.2: NUMERIC PAIN RATING SCALE

The Numeric Pain Rating Scale (NPRS) (an outcome measure) that is a unidimensional measure of pain intensity in adults, including those with chronic pain due to rheumatic diseases.

The NPRS is a segmented numeric version of the visual analog scale (VAS) in which a respondent selects a whole number (0–10 integers) that best reflects the intensity of his/her pain. The common format is a horizontal bar or line. Similar to the VAS, the NPRS is anchored by terms describing pain severity extremes. [1]

3.8: DATA COLLECTION PROCEDURE

The subject who meets the inclusion criteria will be included in this study. The nature and purpose of study along with questionnaires will be explained to each and every subject. Consent will be taken and Boston carpel tunnel questionnaire and numeric pain rating scale will be performed to confirm the condition, after this data will be filled, analyzed and interpreted accordingly.

3.9: ETHICAL CONSIDIRATIONS

1. The rights of the research participants will be protected, and the ethical guidelines established by the GCUF Layyah ethical committee will be adhered to.
2. All participants will be required to sign written informed consent forms, which are attached.
3. All data collecting information will be kept private.
4. All study participants will remain anonymous.
5. The participants will be made aware that there will be no danger or drawbacks to the study's methodology.
6. Participants will be made aware that they are free to leave the study at any time.

3.10: Consort Flow Diagram

3.11: DATA ANALYSIS PROCEDURE

Data will be analyzed by using The Statistical Package for Social Science Software (SPSS) version 27.0 for window Microsoft, also Microsoft word and excel will be used to generate graphs, tables etc. The quantitative data will be presented in the form of mean and standard deviation. The categorical data will be presented in the form of frequency and percentage.

RESULTS

4.1: Sociodemographic:

demographic	Mean	SD
What is your age?	32.0965	4.76523
What is your occupation?	2.6140	4.76523
What is your current duration of pregnancy	2.0351	.79745
How many times have you been pregnant?	1.9737	.75797

This table shows sociodemographic statistics of participants. The mean age of participants was 32.10 years (SD=4.77), while the mean duration of pregnancy was reported as 2.04 (SD=0.80), and mean gravidity was 1.97 (SD=0.76). Overall, most participants were in their early thirties and in their second trimester/second pregnancy, showing that the study sample consisted primarily of young adult pregnant women.

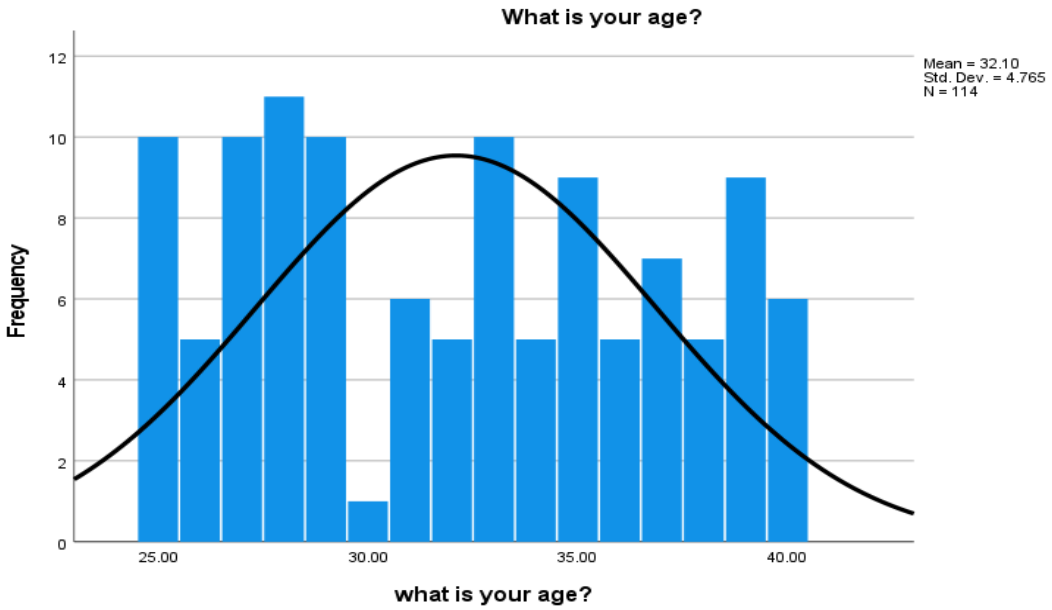


Figure 4.1 Histogram of age statistics

4.2. Descriptive statistics of occupation

	frequency	Percent	Valid Percent	Cumulative Percent
Health care professionals	23	20.2	20.2	20.2
Teachers	31	27.2	27.2	47.4
Officer workers	27	23.7	23.7	71.1
Housewife	33	28.9	28.9	100.0
Total	114	100.0	100.0	

Table 4.3 shows the statistics of frequency and percentage occupation of pregnant women. A total number 114 pregnant women of participated of which 23(20.2) of health care professionals 31(27.2) of teachers 27(23.7) of officer worker 33(28.9) of housewife in pregnant women.

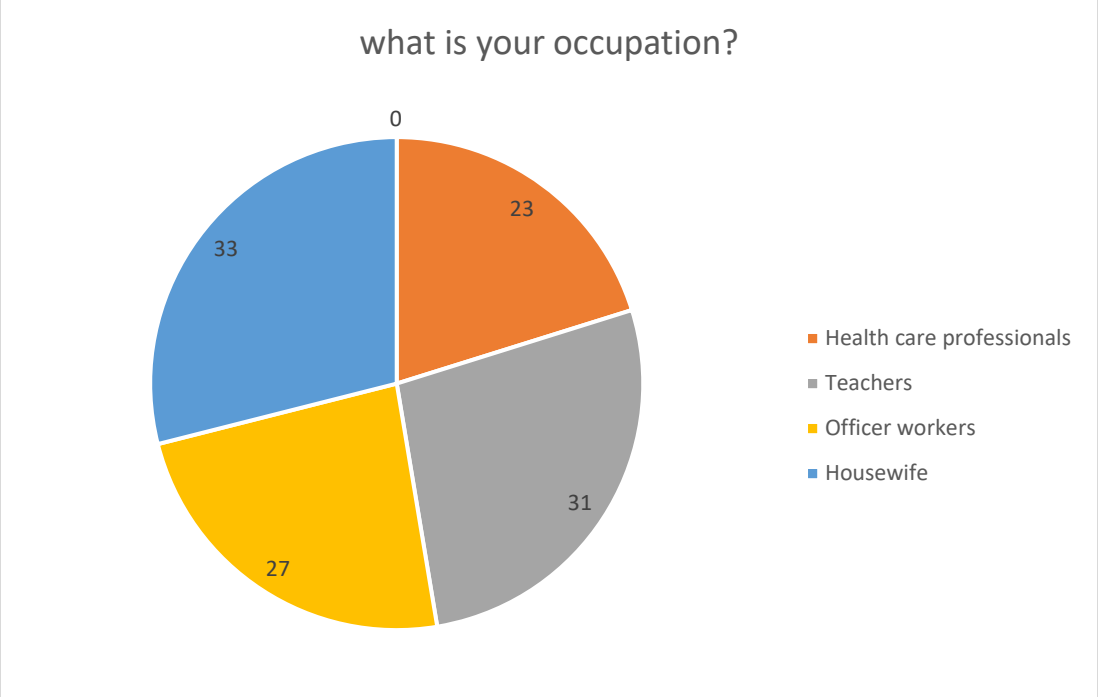


Figure 4.2 pie chart showing statistics of occupation

4.3. Descriptive statistics of gestational period

	Frequency	Percent	Valid Percent	Cumulative Percent
7 months	34	29.8	29.8	29.8
8 months	42	36.8	36.8	66.7
9 months	38	33.3	33.3	100.0
Total	114	100.0	100.0	

Table 4.3 shows the statistics of frequency and percentage duration of pregnant women. A total number of 114 participated of which 34(29.8) of 7-month pregnant women 42(36.8) of a 8-month pregnant women 38 (33.3) of 9-month pregnant women.

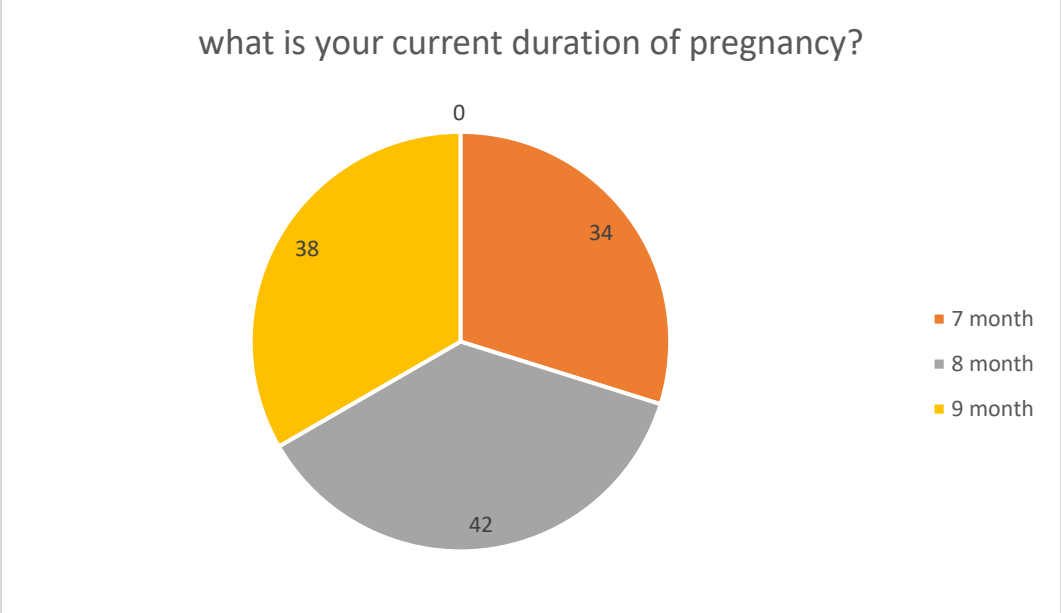


Figure 4.3 pie chart showing statistics of gestational period

4.4 Descriptive statistics of primary and multigravida

	frequency	Percent	Valid Percent	Cumulative Percent
first pregnancy	34	29.8	29.8	29.8
2 to 3 times pregnancy	49	43.0	43.0	72.8
more than 3 times pregnancy	31	27.2	27.2	100.0
Total	114	100.0	100.0	

Table 4.4 shows the statistics of frequency and percentage of how many times of pregnancy .A total number of 114 participated of which 34(29.8) of a first pregnancy 49(43.0) of 2 to 3 time pregnancy 31(27.2) of more the three times of pregnancy.

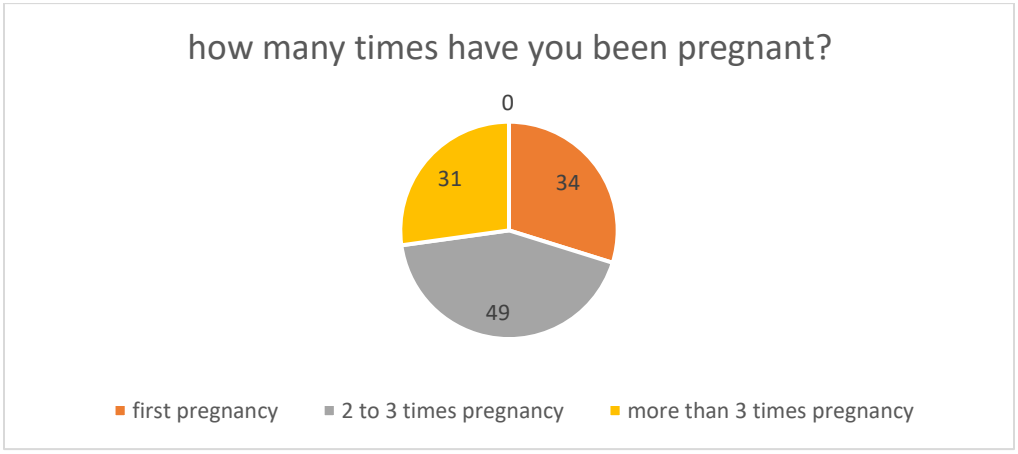


Figure 4. 4 pie chart showing statistics of primary and multigravida

Table 4.5. Descriptive statistics of BCTQ

	Mean	Std. Deviation
how severe is the hand or wrist pain that you have at night ?	3.1053	1.20006
how did often hand and wrist pain wake you up during the night?	3.0614	1.25709
do you have a pain in your hand and wrist during daytime ?	2.9737	1.26533
how often do you have hand or wrist pain?	3.0965	1.33681
do you have a numbness in your hand?	3.0439	1.15514
do you have weakness in your hand?	2.9298	1.25310
do you have a tingling senstionin your hand?	3.0000	1.28297
how severe is numbness or tingling at night?	3.00000	1.255078
how often did numbness or tingling wake up at night?	2.9211	1.29768
do you have difficulty with fine finger movement ?	3.0702	1.16527
How severe is your overall hand or wrist discomfort?	3.0877	1.27994

This table shows the mean and standard deviation of CTS symptom severity responses. "Medium severity" was reported for "night pain severity" (M=3.11, SD=1.20) and "frequency of hand/wrist pain" (M=3.10, SD=1.34), while "hand weakness" was largely assessed as "slight to medium difficulty" (M=2.93, SD=1.25) and "frequency of night awakening due to numbness" (M=2.92, SD=1.30). Overall, most pregnant women reported slight to medium severity across all CTS symptoms such as night pain, daytime pain, numbness, and tingling, showing that pregnancy has a significant effect on carpal tunnel syndrome symptom burden

Part 2: Functional status scale

Variables	Mean	Std. Deviation
Writing?	2.9035	1.23352
Buttoning clothes?	3.0702	1.29478
Holding a book while reading?	3.0789	1.24903
Gripping a telephone handle?	2.7456	1.32245
Opening jars?	3.0702	1.18037
Performing household chores?	2.9386	1.31220
Carrying grocery bags?	2.9737	1.29301
Bathing and dressing yourself?	2.9035	1.33681

This table shows the mean and standard deviation of functional difficulty responses. "Moderate difficulty" was reported for "holding a book while reading" (M=3.08, SD=1.25) and "buttoning clothes" (M=3.07, SD=1.29), while "gripping a telephone handle" was largely assessed as "slight to moderate difficulty" (M=2.75, SD=1.32) and "writing" (M=2.90, SD=1.23). Overall, most pregnant women reported slight to moderate difficulties with daily activities such as opening jars, household chores, and bathing/dressing, showing that CTS symptoms have a significant effect on hand function during pregnancy.

4.6 Descriptive statistics of NPRS

Results show that mean and SD of NPRS is 2.9035 ± 0.76389

variables	Mean	SD
NPRS	2.9035	.76389

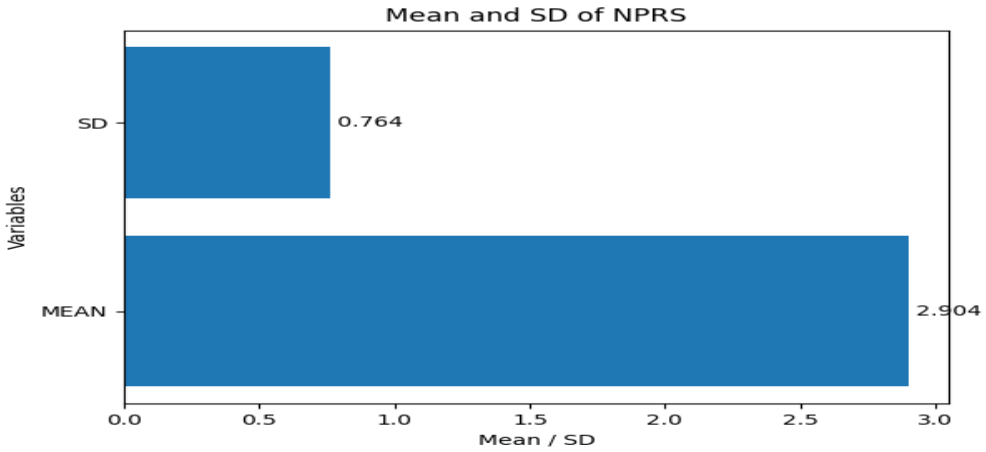


Figure 4.5 showing statistics of NPRS

4.7. Frequency and percentage distribution of BCTQ

	Normal	Slight	Medium	severe	Very serious
how severe is the hand or wrist pain that you have at night?	11 (9.6%)	25 (21.9%)	37 (32.5%)	23 (20.2%)	18 (15.8%)
how did often hand and wrist pain wake you up during the night?	15 (13.2%)	24 (21.1%)	31 (27.2%)	27 (23.7%)	17 (14.9%)
do you have a pain in your hand and wrist during daytime?	16 (14.0%)	26 (22.8%)	35 (30.7%)	19 (16.7%)	18 (15.8%)
how often do you have hand or wrist pain?	17 (14.9%)	23 (20.2%)	28 (24.6%)	24 (21.1%)	22 (19.3%)
do you have a numbness in your hand?	10 (8.8%)	28 (24.6%)	38 (33.3%)	23 (20.2%)	15 (13.2%)
do you have weakness in your hand?	17 (14.9%)	27 (23.7%)	32 (28.1%)	23 (20.2%)	15 (13.2%)
do you have a tingling sensation in your hand?	17 (14.9%)	25 (21.9%)	30 (26.3%)	25 (21.9%)	17 (14.9%)

how severe is numbness or tingling at night?	13 (11.4%)	32 (28.1%)	29 (25.4%)	22 (19.3%)	18 (15.8%)
how often did numbness or tingling wake up at night?	19 (16.7%)	27 (23.7%)	28 (24.6%)	24 (21.1%)	16 (14.0%)
do you have difficulty with fine finger movement ?	9 (7.9%)	29 (25.4%)	38 (33.3%)	21 (18.4%)	17 (14.9%)
How severe is your overall hand or wrist discomfort?	14 (12.3%)	27 (23.7%)	27 (23.7%)	27 (23.7%)	19 (16.7%)

This table shows the mean and standard deviation of CTS symptom severity responses. "Medium severity" was reported for "night pain severity" (M=3.11, SD=1.20) and "frequency of hand/wrist pain" (M=3.10, SD=1.34), while "hand weakness" was largely assessed as "slight to medium severity" (M=2.93, SD=1.25) and "frequency of night awakening due to numbness/tingling" (M=2.92, SD=1.30). Overall, most pregnant women reported slight to medium severity across all CTS symptoms such as night pain, daytime pain, numbness, tingling, and overall discomfort, Showing that pregnancy has a significant effect on carpal tunnel syndrome symptom burden.

	No difficulty	**Mild**	**Moderate**	**Severe**	**Cannot perform**
Writing?	17 (14.9%)	27 (23.7%)	34 (29.8%)	22 (19.3%)	14 (12.3%)
Buttoning clothes?	15 (13.2%)	26 (22.8%)	29 (25.4%)	24 (21.1%)	20 (17.5%)
Holding a book while reading?	13 (11.4%)	26 (22.8%)	33 (28.9%)	23 (20.2%)	19 (16.7%)
Gripping a telephone handle?	24 (21.1%)	31 (27.2%)	23 (20.2%)	22 (19.3%)	14 (12.3%)
Opening jars?	10 (8.8%)	29 (25.4%)	34 (29.8%)	25 (21.9%)	16 (14.0%)
Performing household chores?	18 (15.8%)	28 (24.6%)	30 (26.3%)	19 (16.7%)	19 (16.7%)
Carrying grocery bags?	16 (14.0%)	29 (25.4%)	30 (26.3%)	20 (17.5%)	19 (16.7%)
Bathing and dressing yourself?	20 (17.5%)	27 (23.7%)	31 (27.2%)	16 (14.0%)	20 (17.5%)

This table shows the frequency and percentage distribution of functional difficulty responses. "Moderate difficulty" was reported for "opening jars" (29.8%) and "writing" (29.8%), while "gripping a telephone handle" was largely assessed as "mild difficulty" (27.2%) or "no difficulty" (21.1%). Overall, most pregnant women reported mild to moderate difficulties with daily activities such as buttoning clothes, holding a book, and household chores, showing that CTS symptoms have a significant effect on hand function during pregnancy.

4.8. Frequency and percentage distribution of NPRS

Pain Category	Frequency (N)	Percentage (%)
Mild pain (1–3)	39	34.2%
Moderate pain (4–6)	47	41.2%
Severe pain (7–10)	28	24.6%
Total	114	100%

This table shows the frequency and percentage of pain category.

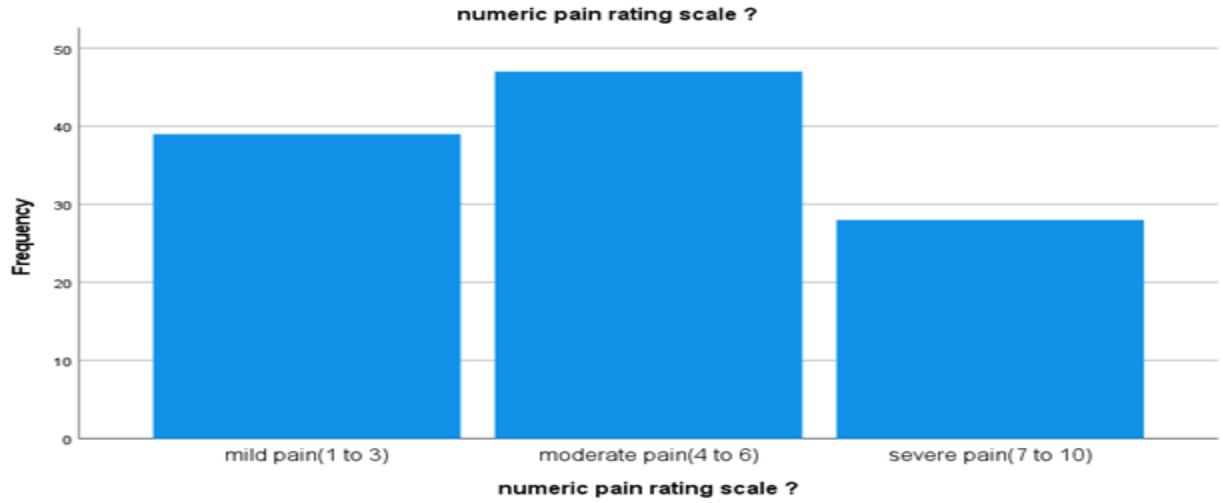


Figure 4.6 showing frequency of NPRS

4.8. Normality tests of NPRS and BCTQ

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
how severe is the hand or wrist pain that you have at night ?	.175	114	.000	.913	114	.000
how did often hand and wrist pain wake you up during the night?	.158	114	.000	.912	114	.000
do you have a pain in your hand and wrist during daytime ?	.167	114	.000	.908	114	.000
how often do you have hand or wrist pain?	.154	114	.000	.902	114	.000
do you have a numbness in your hand?	.182	114	.000	.914	114	.000
do you have weakness in your hand?	.157	114	.000	.912	114	.000
do you have a tingling senstionin your hand?	.151	114	.000	.910	114	.000
how severe is numbness or tingling at night?	.182	114	.000	.906	114	.000

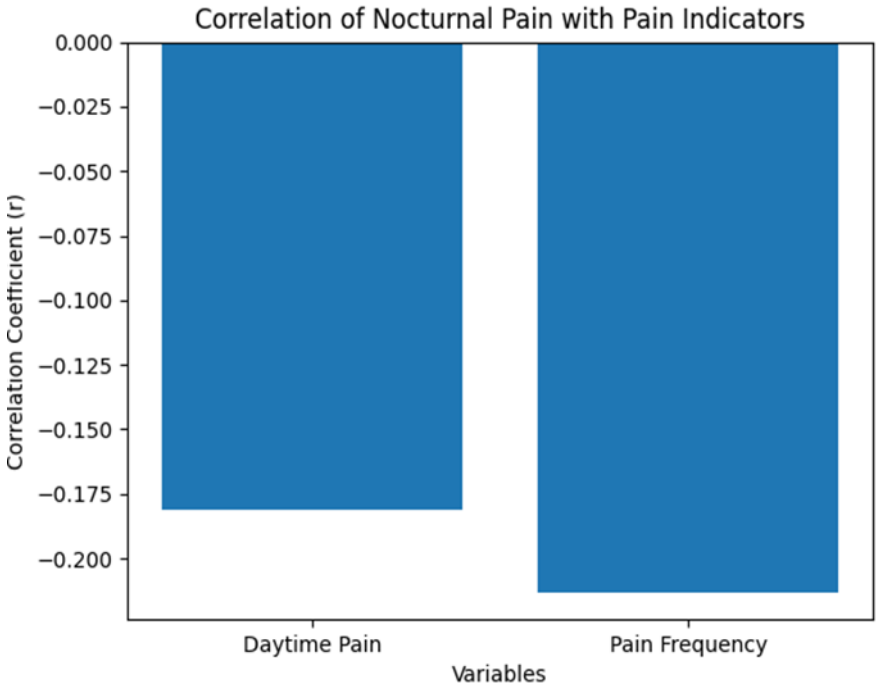
how often did numbness or tingling wake up at night?	.165	114	.000	.907	114	.000
do you have difficulty with fine finger movement ?	.191	114	.000	.910	114	.000
How severe is your overall hand or wrist discomfort?	.166	114	.000	.908	114	.000
Writing?	.154	114	.000	.913	114	.000
Buttoning clothes?	.155	114	.000	.907	114	.000
Holding a book while reading?	.157	114	.000	.911	114	.000
Gripping a telephone handle?	.196	114	.000	.895	114	.000
Opening jars?	.164	114	.000	.914	114	.000
Performing household chores?	.166	114	.000	.903	114	.000
Carrying grocery bags?	.169	114	.000	.905	114	.000
Bathing and dressing yourself?	.163	114	.000	.898	114	.000

Table 4.9 shows the results of the data normality test. All variables had p-values < 0.05, indicating that the data was not normally distributed.

4.9. Correlation between BCTQ and Trigger Finger Indicators (Functional Difficulty)

		Do you have a pain in your hand and wrist during daytime	How often do you have hand or wrist pain?
How severe is the hand or wrist pain that you have at night?	Correlation coefficient	-.181	-.213
	Sig. (2-tailed)	.050	.023
	N	114	114

This table shows the correlation between pain in your hand and wrist during daytime and do you have hand or wrist pain. This shows a week negative relationship was observed between night pain severity and both daytime pain and pain frequency.



5.1. DISCUSSION

This cross-sectional study was conducted to evaluate the association between trigger finger (stenosing tenosynovitis) and carpal tunnel syndrome (CTS) among pregnant women. The findings demonstrated that a considerable proportion of participants experienced symptoms consistent with CTS, with overall moderate severity affecting both symptom severity and functional status.

The demographic characteristics indicated a mean age of 32.09 ± 4.76 years, reflecting a population within the typical reproductive age group. This aligns with existing literature, which identifies women of childbearing age as being particularly susceptible to CTS due to hormonal and physiological changes during pregnancy (Yaseen et al., 2024; Mateen et al., 2024). Moreover, the majority of participants were in the third trimester, with 36.8% in the eighth month of gestation. This finding is consistent with previous studies reporting that CTS symptoms peak during the third trimester due to progressive fluid retention and increased intracarpal pressure (Waris et al., 2021).

The distribution of gestational age further supports this observation, as most participants were in advanced stages of pregnancy. Progressive venous congestion and reduced lymphatic drainage during late pregnancy contribute to increased pressure within the carpal tunnel, leading to median nerve compression and subsequent symptoms such as paresthesia, numbness, and nocturnal pain (Yaseen et al., 2024).

Parity distribution in the current study showed that most participants were multigravida (43%), followed by women with more than three pregnancies (27.2%). This align with earlier evidence suggesting that repeated pregnancies contribute to cumulative physiological stress, thereby increasing the likelihood of median nerve compression (Bukhari et al., 2018). Repeated exposure to elevated levels of estrogen, progesterone, and relaxin leads to ligamentous laxity and soft tissue swelling, which further narrows the carpal tunnel space and exacerbates nerve compression (Sajjad et al., 2025).

From a pathophysiological standpoint, CTS in pregnancy is multifactorial. Hormonal changes, particularly increased levels of estrogen, progesterone, and relaxin, result in fluid retention and generalized edema (Sajjad et al., 2025). This fluid accumulation increases intracarpal pressure,

compressing the median nerve and impairing its vascular supply. Additionally, venous congestion and reduced lymphatic drainage further exacerbate nerve compression (Waris et al., 2021). These mechanisms collectively explain the sensory disturbances and functional impairments observed in this study.

Trigger finger shares a similar pathophysiological basis, characterized by inflammation and thickening of the flexor tendon sheath, leading to impaired tendon gliding and mechanical locking (Liaqat et al., 2025). Previous research has also highlighted this overlap, indicating that both conditions may arise due to similar underlying mechanisms (Liaqat et al., 2025). This overlap strengthens the hypothesis that both conditions are interrelated rather than independent entities.

The symptom severity analysis based on the Boston Carpal Tunnel Questionnaire (BCTQ) revealed moderate mean scores for key symptoms, including nocturnal pain (3.10 ± 1.20), numbness (3.04 ± 1.15), and tingling (3.00 ± 1.28). These findings are in agreement with previous studies, which consistently report nocturnal exacerbation of symptoms as a characteristic feature of CTS (Yaseen et al., 2024). The predominance of night symptoms may be attributed to prolonged wrist flexion during sleep, leading to increased pressure within the carpal tunnel.

Functional assessment revealed moderate difficulty in activities such as buttoning clothes, opening jars, and holding objects. These findings highlight the significant impact of CTS on daily activities and quality of life. Similar results have been reported in previous studies, where CTS was associated with reduced hand function and decreased grip strength (Sajjad et al., 2025). The impairment in fine motor skills observed in this study further supports the involvement of the median nerve in motor as well as sensory dysfunction.

The mean NPRS score of 2.90 ± 0.76 indicates mild to moderate pain intensity; however, frequency data suggest that symptoms were persistent and recurrent. This suggests that symptom burden is influenced not only by intensity but also by duration and recurrence, which significantly impact quality of life and sleep patterns (Shah et al., 2015).

Statistical analysis revealed non-normal data distribution ($p < 0.05$), justifying the use of non-parametric tests. Furthermore, a statistically significant correlation was observed between night pain severity and pain frequency ($p = 0.023$), indicating that worsening symptoms are associated with increased occurrence. This finding reflects the progressive nature of CTS during pregnancy.

When critically compared with previous studies, the findings of this study are largely consistent. Mateen et al. (2024) and Yaseen et al. (2024) reported a high prevalence of CTS in pregnancy, particularly in the third trimester. Similarly, Liaqat et al. (2025) highlighted the association between CTS and trigger finger due to shared inflammatory and biomechanical mechanisms. However, some studies have reported variability in prevalence rates, which may be attributed to differences in diagnostic criteria, sample size, and population characteristics.

Overall, the present study provides evidence supporting a significant association between trigger finger and carpal tunnel syndrome in pregnant women. The combination of moderate symptom severity, functional impairment, and statistically significant relationships underscores the clinical importance of early identification and management of these conditions

5.2. CONCLUSION

The findings of this study conclude that carpal tunnel syndrome is a prevalent condition among pregnant women, particularly during the third trimester. The majority of participants exhibited moderate symptoms, including pain, numbness, tingling, and functional limitations.

Furthermore, a significant association between trigger finger and CTS was identified, suggesting that both conditions share common pathophysiological mechanisms such as hormonal changes, fluid retention, and inflammation.

Early screening and conservative management strategies are essential to reduce symptom severity and improve the quality of life of pregnant women. These findings emphasize the need for

increased clinical awareness and preventive care in antenatal settings.

5.3. LIMITATIONS

This study has several limitations:

- The cross-sectional design restricts causal inference between CTS and trigger finger.
- The sample size was limited and drawn from specific clinical settings, reducing external validity.
- Non-probability purposive sampling may introduce selection bias

5.4. RECOMMENDATIONS

- Larger multi-center studies should be conducted for improved generalizability.
- Clinical assessment and grading of trigger finger should be included in future studies.
- Preventive physiotherapy interventions, including splinting and hand exercises, should be promoted.
- Routine screening for CTS symptoms should be integrated into antenatal care.
- Further studies should explore hormonal, metabolic, and biomechanical contributors in detail.

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