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Incidence of carpel tunnel syndrome in antenatal period of third trimister women in Navi Mumbai

Bhorge Sonal Anand, Dr. Anushree Gawde
Department of Physiotherapy, Lokmanya Tilak College of Physiotherapy, Mumbai, Maharashtra, India

Abstract
Background: Pregnancy involves various physiological, psychological and hormonal alterations. Due to hormonal changes, mobility of joints is reduced due to progression of pregnancy and the hormonal changes. These changes lead to compression of median nerve in carpel tunnel.
However, limited studies have focused on wrist-related problems among ANC women in Navi Mumbai.
Objective: To assess the carpel tunnel syndrome among ANC women in Navi Mumbai using the Boston carpel tunnel questionnaire (BCTQ).
Methodology: A cross-sectional study was conducted on 154 female ANC Women aged 15–45 years. Participants were selected using convenience sampling. Data were collected using the Nordic Musculoskeletal Questionnaire, Numerical Pain Rating Scale (NPRS), Superficial Sensations and Boston Carpel Tunnel Questionnaire. Demographic details and work-related factors were recorded. Data were analysed using descriptive statistics.
Results:
Conclusion: The present study was conducted to determine the incidence of Carpal Tunnel Syndrome (CTS) among antenatal women in the third trimester in Navi Mumbai. Among 154 antenatal women in Third trimester from Navi Mumbai reporting presence of carpel tunnel syndrome,41 women among 154 (27%) are positive and 113 women among 154 (73%) are negative.

List of abbreviations
1. NMQ – Nordic Musculoskeletal Questionnaire
2. NPRS – Numerical Pain Rating Scale
3. BCTQ- Boston Carpel Tunnel Questionnaire
4. CTS- Carpel Tunnel Syndrome

Keywords: BCTQ, Superficial sensations, CTS, Physiotherapy

Introduction

Pregnancy involves various physiological, psychological and hormonal alterations. Due to hormonal changes, mobility of joints is reduced due to progression of pregnancy and the hormonal changes. These changes lead to compression of median nerve in carpel tunnel [1].
Osteofibrous canal present in lower part of wrist is called carpel tunnel. It consists of flexor pollicis longus, four flexor digitorum superficialis and four flexor digitorum profundus and median nerve. Due to fluid retention, swelling, hormonal changes median nerve is compressed [1] even though the etiology of carpel tunnel syndrome remains idiopathic. Another possible cause is relaxation of carpel ligament due to secretion of relaxin, leading to its fattening and compression of median nerve.
However, in 80% of pregnant women peripheral edema is seen, especially in third trimester. This oedema is caused by a decrease in venous return associated with hormonal changes favored by fluid retention.
In third trimester large number of pregnant women get affected by Carpel tunnel syndrome, but only in 50% of women`s carpel tunnel syndrome vanishes one year after the delivery [2].
Two clinical tests utilized for assessment-

Phalen's maneuver

Holding of maximum flexion of wrist continuously for 60sec, If the sensation of tingling was found over the distribution of median nerve. Response will be positive [4].

Tinel's sign

Tapping over the carpel tunnel at wrist. A positive test cause tingling or paresthesia into the thumb, index finger, middle and lateral half of the right finger (over median nerve distribution) [7].
The Nordic Musculoskeletal Questionnaire (NMQ) was explicitly designed to evaluate the prevalence and consequences of MSK pain, it has high reliability and validity, and is the most widely used questionnaire to assess MSK pain in the Nordic countries [6].
Boston carpel tunnel questionnaire is used specially for the patients of carpel tunnel syndrome; it is reliable consistent and satisfactory.

BCTQ is divided in two parts

1. symptoms severity (11 questions)
2. functional limitation (8 questions) [1].

Methodology

- This study adopted a cross-sectional study design and was conducted in navi Mumbai. A convenience sampling method was used to recruit participants. A total sample size of 154 ANC women in 3rd trimester was selected for the study.
- ANC women who fall into our criteria will be screened with Nordic Musculoskeletal Questionnaire for wrist pain.

- ANC Women with wrist pain will be assessed by Tinel's sign and Phalen's test. 6) If the tests are positive, we further assess the sensations.
- If the tests are positive and the subject has paresthesia then this Women will also be assessed by Boston Carpel Tunnel Questionnaire SCALE.

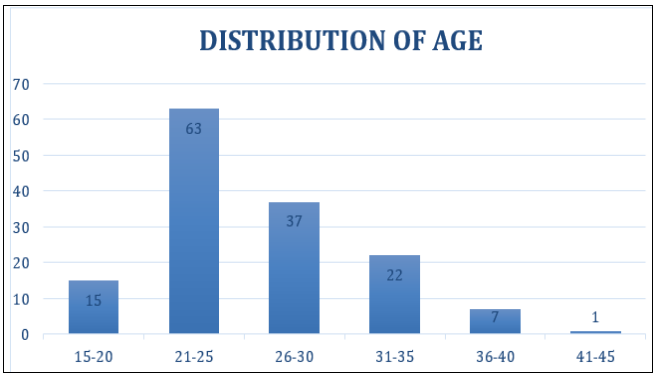
The result will be interpreted as per the calculations of questionnaire.

- All collected data were recorded systematically and analyzed to determine the prevalence and severity of wrist-related musculoskeletal disorders among the participants.

Data analysis and results

Data analysis was done using microsoft excel for windows, the frequency distribution and percentage values were calculated and reported.

Demographic Data Analysis

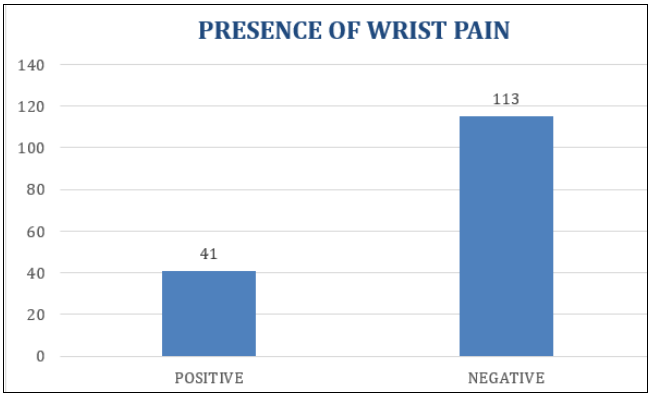


Graph 1: Represents the age range of the participants

Table 1: Distribution of age of participants

Age Groups	No. of participants
15-20	15
21-25	63
26-30	37
31-35	22
36-40	7
41-45	1

The mean age of participants is 26.09 ± 5.36 years



Graph 2: Represents presence of wrist pain.

Interpration

In my population 15 women of 154 are between the age group of 15-20 years, and 63 out 154 women range between the age group of 21-25years, where's 37 out 154 players range between the age group of 26-30 years. 22 women out of 154 ranges between 31-35 years,7 out of 154 women ranges between 36-40, 1 out of 154 women ranges between 41-45 years.

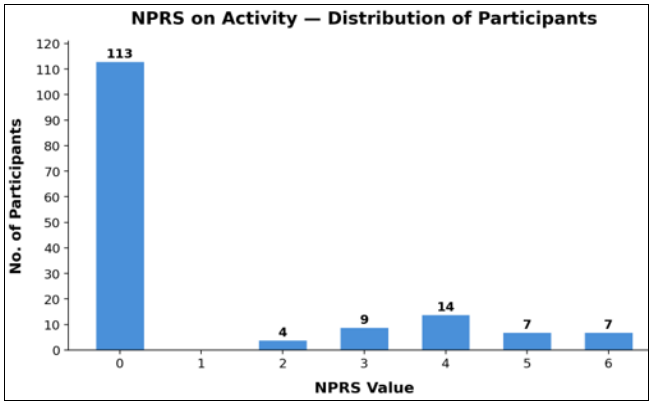
Table 2: Distribution of presence of wrist pain

No. of participants	Presence of wrist pain
41	Positive
113	Negative

The mean value for presence of wrist pain is 0.27 ± 0.44

Interpretation

In my population 41 women out of 154 are positive in presence of wrist pain and 113 out of 154 are negative in presence of wrist pain.



Graph 3: Represents nprs on activity.

Table 3: Distribution of participants on the basis of nprs score on activity.

No. of participants	NPRS score
113	0
0	1
4	2
9	3
14	4
7	5
7	6

The Mean ± Standard NPRS score during activity is 1.09 ± 1.91

Interpretation

113 women out of 154 reported no pain during activity (score 0). 0 number out of 154 experienced NPRS score 1,4 out of 154 experienced NPRS score 2,9 out of 154 experienced NPRS score 3, 14 out of 154 experienced NPRS score 4, 7out of 154 experienced NPRS score 5, 7 out of 154 experienced NPRS score 6.

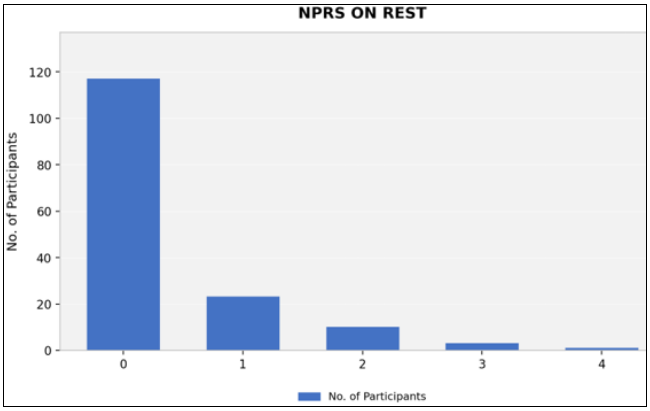
Table 4: Distribution of the participants on the basis of NPRS score on rest.

No. of participants	NRPS score
117	0
23	1
10	2
3	3
1	4

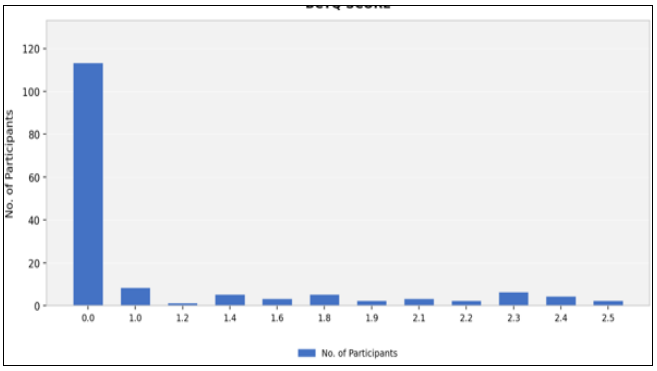
The Mean ± Standard NPRS score at rest is 0.36 ± 0.75

Interpretation

In my population 117 women out of 154 have 0 score in NPRS scale,23 women out of 154 have 1 score, 10 women out of 154 have 2 score, 3 women out of 154 have 3 score and 1 woman out of 154 have score 4.



Graph 4: Represents nprs on rest



Graph 5: Represents the distribution of bctq score

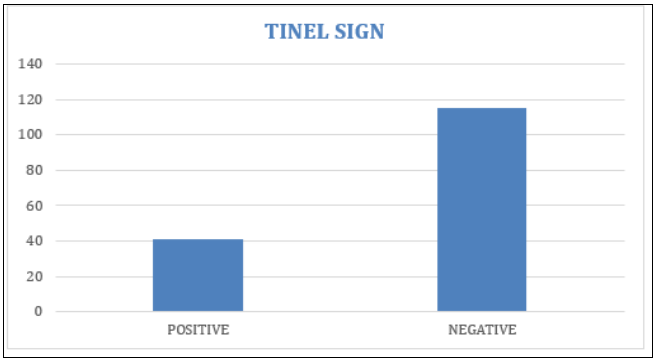
Table 5: Distribution of participants on the basis of BCTQ score

No. of participants	BCTQ Score	No. of participants	BCTQ score
113	0	2	1.9
8	1	3	2.1
1	1.2	2	2.2
5	1.4	6	2.3
3	1.6	4	2.4
5	1.8	2	2.5

The Mean ± Standard BCTQ score was 0.47 ± 0.83

Interpretation

In my population 113 women out of 154 have BCTQ score 0,8 women out of 154 have score 1,1 women out of 154 have score 1.2, 5 women out of 154 have score 1.4,3 women out of 154 have score 1.6, 5 women out of 154 have score 1.8,2 women out of 154 have score 1.9, 3 women out of 154 have score 2.1, 2 women out of 154 have 2.2 score, 6 women out of 154 have 2.3 score, 4 women out of 154 have 2.4 score, 2 women out of 154 have 2.5 score.



Graph 6: Represents the presence of tinel sign, phalen test and superficial sensation

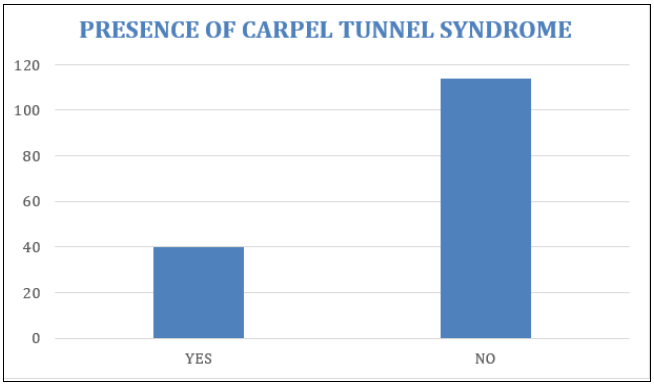
Table 6: Distribution of participants on the basis of presence of tinel sign.

NO. of participants	Presence of Tinel sign, Phalen test and superficial sensation
41	positive
113	Negative

The Mean ± Standard value for Tinel's sign, Phalen test, superficial sensation is 0.27 ± 0.44

Interpretation

In my population 41 women out of 154 are positive in presence of Tinels sign, Phalen's test and Superficial sensation and 113 womens out of 154 are negative.



Graph 7: Represents presence of carpel tunnel syndrome

Table 7: Distribution of participants on the basis of presence of carpel tunnel syndrome.

No. of participants	Presence of carpel tunnel syndrome
41	Yes
113	No

The Mean ± Standard value for presence of carpal tunnel syndrome is 0.27 ± 0.44j

Interpretation

In my population 41 out of 154 women have Carpel Tunnel Syndrom3 of which 113 women out 154 are not affected, 23 women out of 154 have minimal symptoms or functional impairement,18 women out of 154 have mild symptoms or functional impairment.

Discussion

The present study was conducted to determine the incidence of Carpal Tunnel Syndrome (CTS) among antenatal women in the third trimester in Navi Mumbai. Pregnancy is associated with various physiological and hormonal changes which may contribute to musculoskeletal problems, including compression neuropathies such as CTS. Fluid retention, hormonal imbalance, and increased tissue pressure during pregnancy can lead to compression of the median nerve within the carpal tunnel (1).

The present study was conducted to determine the incidence of carpal tunnel syndrome (CTS) among antenatal women in the third trimester in Navi Mumbai. A total of 154 participants were assessed using clinical tests and standardized questionnaires. The statistical analysis included calculation of mean and standard deviation to understand the central tendency and variability of the collected data.

The age distribution of participants showed a Mean ± Standard age of 26.09 ± 5.36 years, indicating that most antenatal women were in their mid-twenties with moderate

variability (graph no.1). This suggests that CTS symptoms were assessed in women belonging to early reproductive age, which is consistent with the commonly observed age group of pregnancy.

The presence of wrist pain showed a Mean ± Standard of 0.27 ± 0.44 (graph no.2), indicating that approximately one-fourth of the participants reported wrist pain. The relatively low mean with moderate standard deviation reflects that wrist pain was not uniformly distributed among all participants but was present in a subset of the population.

Pain intensity during activity assessed using NPRS showed a mean of 1.09 ± 1.919 (graph no.3), suggesting overall low pain levels during activity. However, the relatively higher standard deviation indicates variability in pain perception, with some participants reporting moderate pain while the majority had no pain. Similarly, NPRS at rest showed a mean of 0.36 ± 0.75 (graph no.4), indicating minimal pain at rest among most participants, with very few reporting mild discomfort.

The Boston Carpal Tunnel Questionnaire (BCTQ) score distribution demonstrated a mean of 0.47 ± 0.83 (graph no.5), suggesting minimal symptom severity and functional impairment in the overall population. The low mean indicates that the majority of participants were asymptomatic, while the moderate standard deviation reflects that a small number experienced mild symptoms.

Clinical diagnostic tests further supported these findings. The presence of Tinel's sign, Phalen's test, superficial sensations, and confirmed CTS all showed similar Mean ± Standard values of 0.27 ± 0.44 (graph no.6 and 7), indicating that approximately 27% of participants demonstrated positive findings. The consistent mean across these parameters suggests agreement between clinical tests and symptom reporting.

The interpretation of BCTQ categories showed a Mean ± Standard of 0.38 ± 0.69 (graph no.10), indicating that most participants were not affected, while a smaller proportion had minimal to mild symptoms. The standard deviation indicates mild variability in symptom severity across participants.

The findings of this study revealed that a portion of antenatal women reported wrist pain, which is one of the common qualities affecting daily life.

The findings of this study are consistent with previous literature. A study reported that a significant proportion of pregnant women experience symptoms of CTS, particularly during the third trimester, due to increased fluid retention and hormonal changes [(2).] Similarly, another study reported that the prevalence of CTS increases with gestational age and is more common in the third trimester [(3).]

Another study found that CTS symptoms were present in about 22% of pregnant women, with increasing severity as pregnancy progresses [(4)]. Wrist pain and paraesthesia were initially screened using the Nordic Musculoskeletal Questionnaire. Participants who reported wrist symptoms were further evaluated using clinical tests such as Phalen's test and Tinel's sign, which are widely used diagnostic screening tools for CTS [(5).]

The Boston Carpal Tunnel Questionnaire was used to evaluate symptom severity and functional limitations among participants with positive clinical findings. The results indicated that some participants experienced mild to moderate symptoms, which affected their daily functional activities such as holding objects, writing, and performing household work [(6).] This suggests that CTS during pregnancy can influence functional performance and supports the findings of the present study which also suggests that CTS symptoms are noticeable during the later stages of pregnancy.

The possible explanation for this increased incidence during the third trimester may be due to peripheral oedema, hormonal changes such as increased relaxin levels, and fluid retention, which can lead to narrowing of the carpal tunnel and compression of the median nerve [(7).] These physiological changes are common in pregnancy and may contribute to symptoms such as numbness, tingling, and pain in the wrist and hand.

Early identification of CTS in antenatal women is important because it allows healthcare professionals, especially physiotherapists, to implement early management strategies such as wrist splinting, ergonomic advice, and therapeutic exercises [(8).] These interventions may help reduce symptoms and improve functional ability during pregnancy.

Therefore, the present study highlights the importance of screening for CTS symptoms in antenatal women, particularly during the third trimester, as early recognition and management can help prevent worsening of symptoms and improve maternal comfort.

Limitations

1. The study used a convenience sampling method, which may limit the generalizability of the results to the wider population of antenatal women.
2. The study was conducted only in selected hospitals of Navi Mumbai, therefore findings may not represent antenatal women from other regions or rural settings.
3. The sample size was limited to 154 participants, which may not fully represent the entire population.
4. The study relied partly on self-reported questionnaires such as Nordic Musculoskeletal Questionnaire (NMQ) and Boston Carpal Tunnel Questionnaire (BCTQ), which may introduce response bias.
5. The recall-based nature of NMQ may lead to overestimation or underestimation of symptoms by participants.
6. No electrophysiological confirmation (e.g., nerve conduction study) was used to confirm diagnosis of Carpal Tunnel Syndrome.
7. The study focused only on third trimester antenatal women, therefore comparison with first and second trimester was not possible.
8. Possible confounding factors such as occupation, body mass index, oedema severity, and daily activity levels were not analysed.
9. The study did not include follow-up after delivery, so progression or resolution of symptoms could not be assessed.
10. The clinical tests (Phalen's and Tinel's) used for screening may have limited sensitivity and specificity.

Conclusion

The present study was conducted to determine the incidence of Carpal Tunnel Syndrome (CTS) among antenatal women in the third trimester in Navi Mumbai. Among 154 antenatal women in Third trimester from Navi Mumbai reporting presence of carpel tunnel syndrome,41 women among 154 (27%) are positive and 113 women among 154 (73%) are negative.

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