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Effect of Conservative Treatment on Alleviation of Symptoms in 36 cases of Carpal Tunnel Syndrome in Pregnancy: A Prospective Study

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Abstract

Background: Carpal Tunnel Syndrome (CTS) is the most common upper extremity compression neuropathy which is a common entrapment neuropathy seen in pregnant women. **Objective:** The purpose of the present study was to assess presentation and severity of various symptoms among women with CTS in pregnancy and to see the effect of conservative management protocols in alleviation of symptoms of the disease and restoration of functional capability of the affected hands. **Methodology:** This interventional study was included 36 pregnant women attended in the Outpatient Department of Physical Medicine and Rehabilitation Specialist in the Hi-Tech Multicare Hospital, Dhaka during the period from January 2015 to January 2016 for a period of one year and one month. Detail history was taken and examined physically by a specialist in physical medicine to ascertain the clinical diagnosis. Out of 48 referred cases, 42 pregnant women were identified clinically as CTS cases based on symptoms and signs. However, 2 cases were not enrolled because of severe form of pain and referred to other hospital for admission and 6 patient dropped out. Therefore, 36 cases with CTS symptoms included in this study. All the patients were given conservative treatment (Wrist splint, Exercise and activity modification) for 8 weeks. All patients were followed up at 4 weeks interval. Treatment outcome were measured by Boston carpal tunnel questionnaire (BCTQ). **Result:** The mean age of the patients is 30±3.5 years. 26 (78%) patients mild to moderate type of CTS symptoms showed improvement in conservative management. Before treatment the mean symptoms severity scale (SSS) of BCTQ) was 2.32±0.4 and for functional status scale (FSS) was it was 1.99±0.43. After treatment for SSS 1.86±0.47 and for FSS 1.53±0.42. And in SSS the p value<.05 and in FSS p value is <.05 which was statistically significant. **Conclusion:** In conclusion conservative management protocols are sufficient enough in alleviation of symptoms of the disease and is effective for the restoration of functional capability of the affected hand or hands. *[Journal of National Institute of Neurosciences Bangladesh, 2018;4(2): 101-107]*

Keywords: Carpal Tunnel Syndrome; CTS; pregnant women; Boston carpal tunnel questionnaire

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Introduction

Carpal tunnel syndrome (CTS) has been first described by Paget in 1854 and is the most common upper extremity compression neuropathy and results from median nerve compression within the carpal tunnel[1]. There are numerous causative factors of CTS. Any

condition that causes increased pressure within the carpal canal or depress nerve function can cause CTS. CTS are more prevalent in diabetes, pregnancy, arthritis of hand in hypothyroidism, acromegaly and amyloidosis[2].

Common symptoms are tingling, pain and numbness feeling in the first three fingers and the radial side of the fourth finger. It is a common compressive neuropathy seen in pregnant women[3]. These symptoms are intermittent and typically worse at night where the patient is awakened from sleep and relieves the discomfort by vigorously shaking the hand called Flick sign[4]. Physical examination findings in CTS vary according to the severity. Sensory changes such as hypoesthesia involve the first three digits and the radial half of the fourth digit and wasting of thenar muscles may be seen in severe cases of carpal tunnel syndrome[4]. Flick sign was reported specific and sensitive as high as 93.0% of those with CTS[5]. Nocturnal symptoms are sensitive and specific as high as 77.0% and 68.0% respectively[6].

According to a recent study, CTS is found among 3.46 cases per thousand persons[4] while it is likely to complicate more the pregnant women. Prevalence rates of CTS in pregnancy vary from less than 1.0% to 62.0%[7-10]. CTS in pregnancy is often bilateral[11] and commonly occurs during third trimester[12].

Physical findings include provocation tests like Tinel's sign, Phalen's sign and Durkan test. Phalen's wrist flexion test has sensitivity of 22.2% and specificity of 94.6%. Durkan test, a carpal compression test, in which direct compression is applied to the median nerve for 30 seconds with the thumb which was found to be more specific and more sensitive[1]. The gold standard for the diagnosis of CTS is the combination of the clinical findings and electrophysiological study[13]. Boston carpal tunnel questionnaire (BCTQ) provide an information regarding pain discomfort due to severity of symptoms from the patient's point of view[14]. BCTQ is frequently used in reporting the outcome from trials interventions for carpal tunnel syndrome.

As regard management of CTS in pregnancy, the conservative one is effective in majority of the cases. The conservative managements include NSAIDs, wearing of wrist splint in neutral or in extension position, electrotherapy, ultrasound or LASER and exercise[15-16]. The current study explored to assess presentation and severity of various symptoms among Bangladeshi women with CTS in pregnancy. It also examined the effect of conservative management protocols in alleviation of symptoms of the disease and restoration of functional capability of the affected hand or hands.

Methodology

Study Population & Settings: This non-randomized, single group, clinical trial study included 48 pregnant women attended the Outpatient Department of Physical Medicine and Rehabilitation Specialist in the Hi-Tech Multicare Hospital, Dhaka, Bangladesh from January 2015 to January 2016 for a period of one year and one month. All the cases were referred by a number of Obstetricians, Medicine and Orthopaedic specialists who were serving an urban or peri urban population of about half million around that facility in private sector. On arrival, detail history was taken and was examined physically by a specialist in physical medicine to ascertain the clinical diagnosis. The excluded cases were any form of psychiatric disease or any neurological deficit, cervical spondylosis with radiculopathy and brachial plexopathy. In this study two cases were not enrolled because of severe form of pain and referred to other hospital for admission. All cases were pregnant women between age 20 to 40 years with symptoms of CTS willing to participate in the study and had more than three of the following symptoms and signs like having the symptoms unilateral or bilateral, onset of symptom started during first trimester (<12 weeks), second trimester (12 to 27 weeks) or in third trimester (28 to 32 weeks of pregnancy), presence of night pain which was secondary to paresthesia and pain causing awaken from sleep, paresthesia, Flick test in which patient got relief from pain by shaking her hands in air, Phalen's test, paresthesia in the three radial fingers provoked by maximal palmar flexion of the wrist for at least one minute and Durkan test, a carpal compression test, in which direct compression was applied to the median nerve for 30 seconds with the thumb.

Intervention: The Boston Carpal Tunnel Questionnaire (BCTQ)[17-18] was applied to collect data by interviewing each case and assessed the severity of symptoms and the functional status of the patients with CTS. The symptom severity scale (SSS)[18] was evaluated symptoms regarding severity, frequency, time and kind. The functional status scale (FSS)[18] was evaluated how this syndrome affects daily life. Close ended questionnaire[18] was used for SSS that was consisted of 11 questions related to the severity nocturnal pain and paresthesia, frequency of wakening at night due to pain, intensity during day time, presence of numbness or weakness in the hand and difficulty manipulating small

objects. The scores for each question was calculated as 1 for no symptom, 2 for mild, 3 for moderate, 4 for intense and 5 for severe form. The scores for each questions were then added and were divided by 11. The reported mean scores was a number out of a total of 5.00. Similarly, FSS questions was composed of 8 questions and each was related to different category expressing the functional activity like writing, buttoning clothes, holding a phone, carrying groceries, holding a book to read opening jar, household chores and bathing and dressing. To quantify severity, a similar scoring scale (1-5) like SSS questionnaire was used for FSS.

Follow up & Outcome Measures: All patients were managed using a conservative management protocol and was followed up for 4 weekly for subsequent two follow up to see the effectiveness of the treatment protocol. Treatment outcome was measured by using Boston Carpal Tunnel questionnaire. All findings were recorded in a structured patient record file. The conservative management protocol was included beside the general, obstetric care and counseling. Use of the splint for 4 weeks most of the time of a day, then after 2nd follow-up for only usage at night for 4 weeks[4]. Muscle strengthening exercise such as barbell or tubing exercise, wrist flexion and extension exercise were given[4]. Regarding the modification of activities of daily living (ADLs) activity modification consists of avoidance of both extreme flexion and extension as well as prolong exposure to vibration. Example of prolong vibration exposure like driving, lawn mowing[4].

Statistical Analysis: All statistical analyses were performed using the SPSS version 22.0 for windows computer software package. Descriptive data were presented as frequencies, percentages or means with standard deviations. Differences between groups were analyzed using t-tests for continuous variables. A level of p value <0.05 was considered statistically significant

Results

Out of 48 referred cases, 42 pregnant women were identified clinically as CTS cases based on symptoms and signs. 2 cases were not enrolled because of severe form of pain and referred to other hospital for admission and 6 patient dropped out. So, 36 cases with CTS symptoms included in this study. A total 40 pregnant women were included in this study while six patient delivered early before completion of treatment protocol and could not attend two follow up visits. So a total of 36 patient's data were analyzed and presented here below (Table 1-3). The mean age of the patients is 30±3.5 years. The patients were either house wife (56%) or service holder (44%). Of all, 60% were primigravida women and rests were multi grvida (14, 40%). Mean BMI was 26.3±3.9 kg/m2 while 64% of the affected women had obesity (BMI over 25).

Table 1: Characteristics of the patients.

Characteristic	n (%)	Mean ± SD
Age (in years)		30 ± 3.5
• 20-25	5(14%)	
• 26–29	9(25%)	
• 30–34	14((39%)	
• 35-39	6(16%)	
• >40	2(6%)	
Educational level		
• Higher secondary and above	28 (78%)	
• Secondary and below*	8(22%)	
Profession		
• House wife	20 (56%)	
• Service holder	16 (44%)	
Gravida		
• Primi gravida	22(60%)	
• Multi gravida	14(40%)	
BMI in-pregnancy		26.3 ±3.9
• <20	4 (12%)	
• 20-24.9	9 (27%)	
• 25.0–29.9	16 (44%)	
• 30-35	7 (20%)	
Gestational age at first reported the symptoms of CTS		29.3 ±2.7
• < 12 weeks	5(13%)	
• 13-27 weeks	11(31%)	
• 28-32 weeks	20(56%)	
Clinical Signs		
• Flick test positive in	31(86%),	
• Phalen's test positive	28 (78%)	
• Durkan test positive	32 (88%)	

*No one was illiterate

CTS symptoms were reported in all trimesters among the study cases with 31% of them in second trimester and 56% in third trimester. Most of the cases presented with majority of the symptoms (Symptom severity scale=SSS) of mild to moderate grade (Figure 3); only 17% cases presented severe form of night pain and 11% reported to wake up for severe form of pain. Commonest symptoms at enrolment were pain at day (94%) and night (86%) time, wake up for pain (100%), pain felt only at day time, tingling sensation in hand (100%), tingling sensation at night (92%), wake up for tingling sensation and difficulty in using small objects. In smaller proportions, there were weakness (67%) and

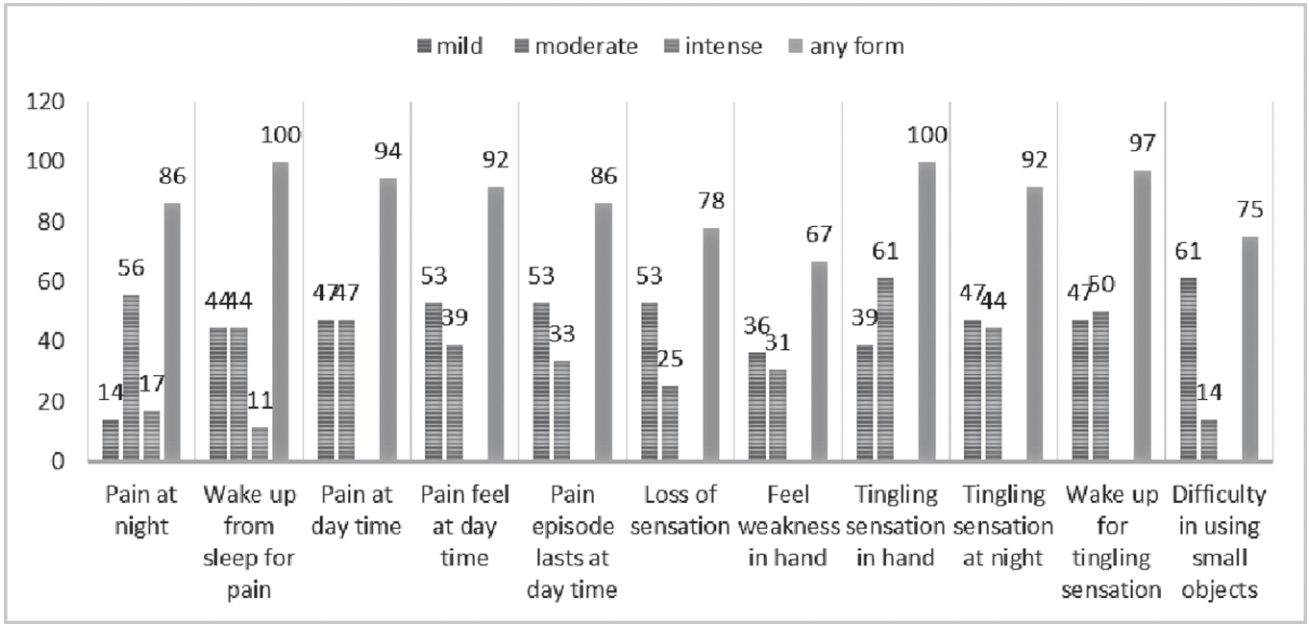

Figure I: Distribution of patients by CTS Symptoms and clinical findings

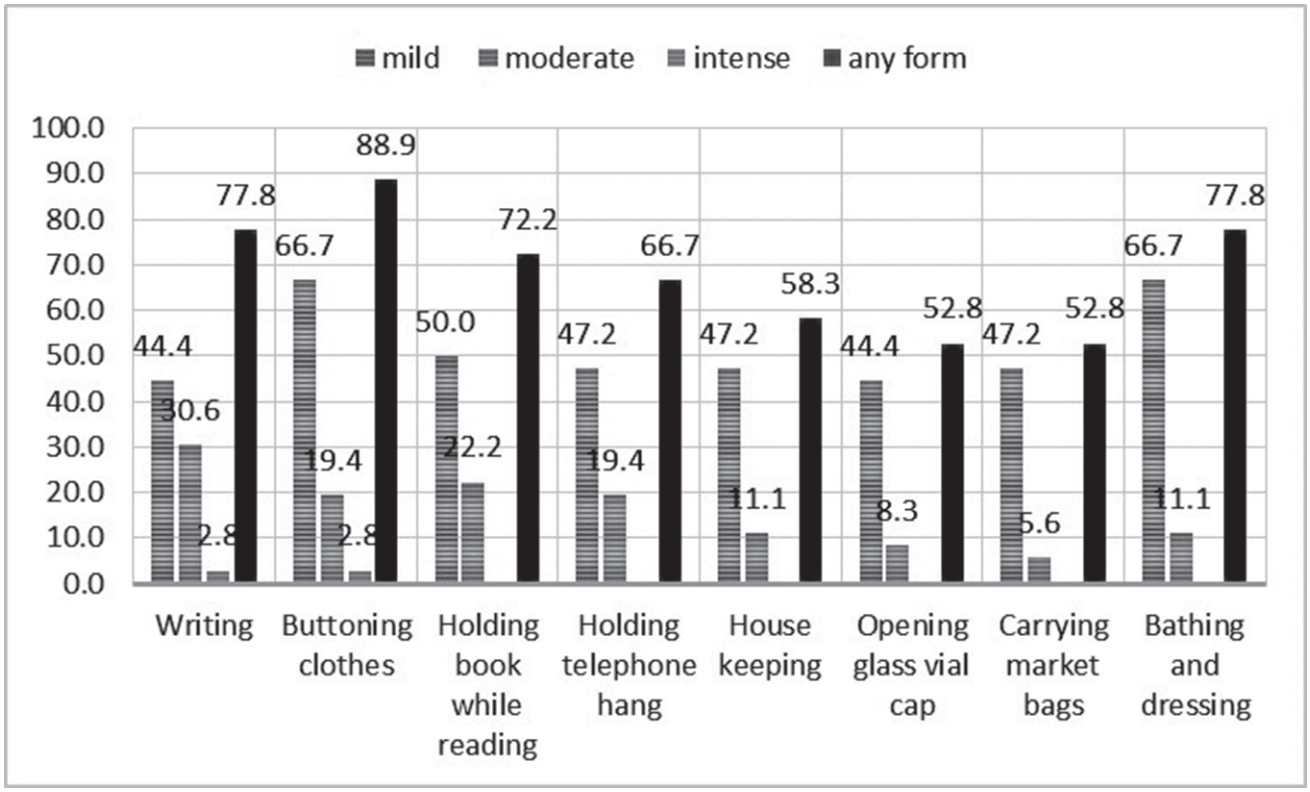

Figure 2: Distribution of functional abilities according to FSS by severity (n=36)

loss of sensation (67%). Moreover, pain was reported to be bilateral in 62% of the cases studied.

Figure 2 shows the proportion of cases presented with the Function status scale by categories and severity (mild, moderate, intense and any form). Only few cases (2.8%) had intense disability in writing and buttoning clothes. Almost three fourth of cases had problem in writing (77.8%), buttoning (88.9%), holding book for reading (72.2%) and bathing and dressing (77.8%). Rests of the FSS components were present in over half of the cases (52.8-66.7%).

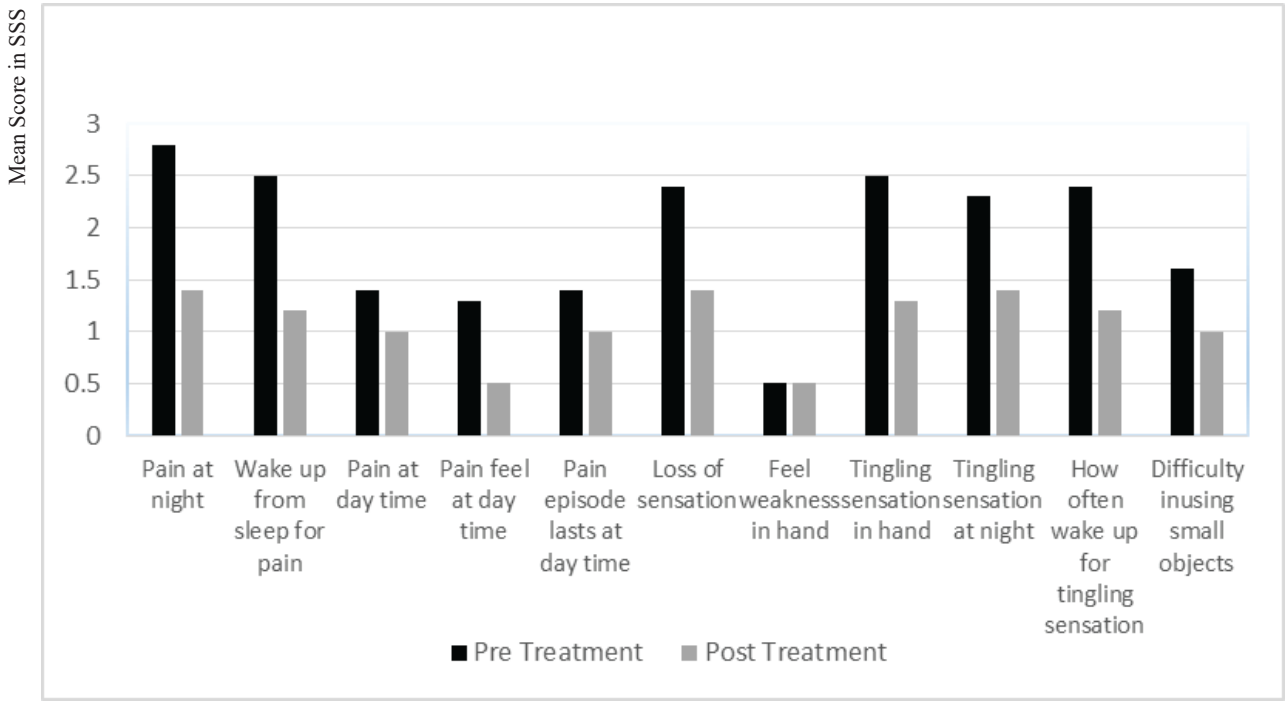

Figure 3: Mean score by CTS symptom between pretreatment and post treatment (symptoms and SSS score 1= nil, 2= mild & 3= moderate)

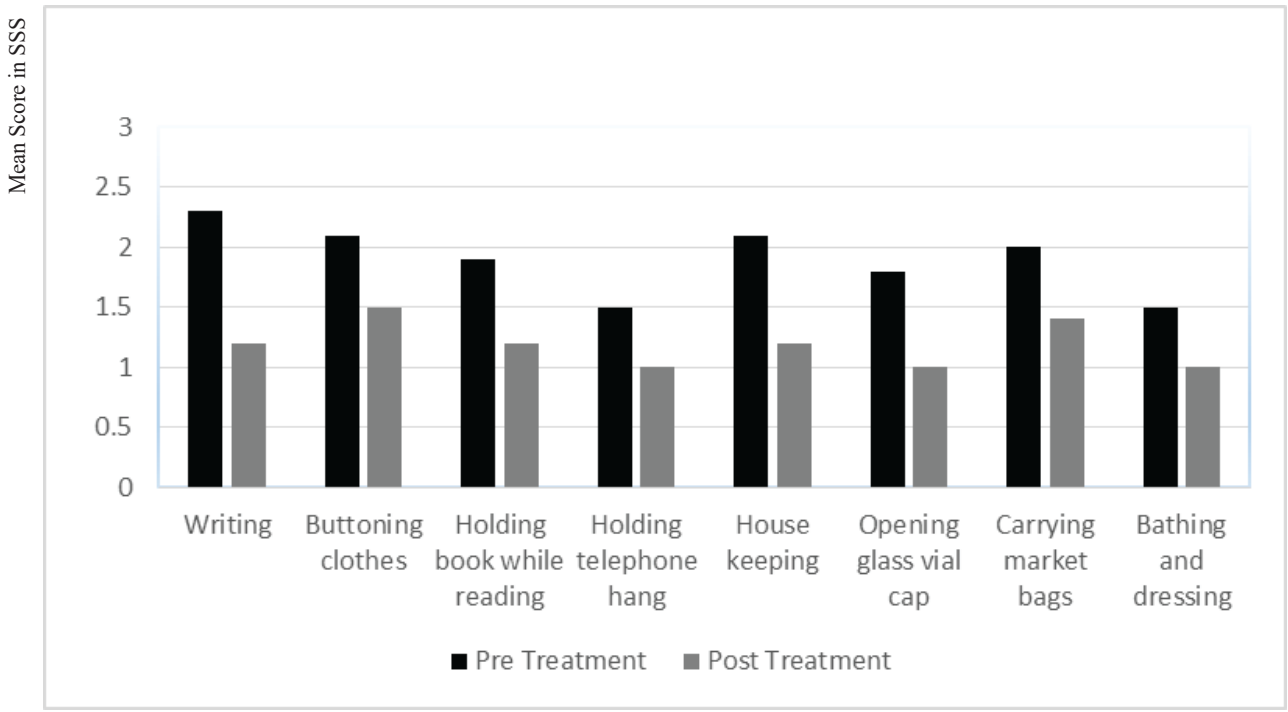

Figure 4: Mean score by CTS symptom between pretreatment and post treatment (symptoms and FSS score 1= nil, 2= mild & 3= moderate)

Among elicited signs, 86% (n=31) cases presented with Flick test positive (i.e. patient got relief of pain by shaking hand in air), 78% had Phalen's test positive (i.e. paresthesia in the three radial fingers provoked by maximal palmar flexion of the wrist for at least one minute) and 88% cases had Durkan test positive.

The severity score (1=nil, mild=2, moderate=3, intense=4 etc.) of the "Symptom Severit Score" (SSS) and "Function status score" (FSS) was recorded in all cases between pretreatment and post treatment of 8 weeks consof conservative treatment. The conservative treatment was found to be in almost all type of symptoms and function status score (figure 3 and 4).

Table 2: Outcome of conservative treatment in CTS cases (mean score of SSS and FSS)

	Pretreatment	Post treatment	t-value	df	p-value*
SSS	2.32±0.40	1.86±0.47	6.275	35	<0.001
FSS	1.99±0.43	1.53±0.42	4.092	35	<0.001

*P value was calculated from Paired t-test.

Figure 3 and 4 presents the scores (SSS and FSS) for each symptoms. Compared to the pretreatment level, mean values for each complaint has been decreased. Although 28 (78%) patients showed remarkable improvement in conservative management and their symptom were mild to moderate type. Among these symptomatic women, mean score of Symptom Severity Scale (SSS) and Function Status Scale (FSS) was assessed before and after treatment. Before treatment the mean score SSS was 2.32±0.40 and FSS was1.99±0.43 and after conservative treatment the mean score was decreased to SSS 1.86±0.47 and FSS to 1.53±0.42. The improvement in mean scores for both protocols showed a significant improvement (p <0.001, paired test; table 2) in symptoms and functions of CTS cases. In both the scales the scores were mild to moderate in nature.

Discussion

In this current prospective study commonest symptoms at enrolment are pain at day (94.0%) and night (86.0%) time, wake up for pain (100.0%), pain felt only at day time, tingling sensation in hand (100.0%), tingling sensation at night (92.0%) which are quite similar to the study done by Sapuan et al[19]. They have found that the incidence of numbness tingling during daytime was slightly higher than at night among the women, which is at odds with the classical description of nocturnal paraesthesia in such patients in many orthopaedic text books.

In this study the Phalen's sign and Durkan's test have been served as a useful guide and enhanced the accuracy of CTS diagnosis in this present study as 78.0% have Phalen's test positive and 88.0% cases Durkan test positive. The severity of symptoms are mild to moderate of the patients where mean SSS=2.32±0.40 and mean FSS=1.99±0.43 which is lower than in a study Jarvik et al[20] reported a mean score of SSS=2.81 and mean FSS=2.32 in general population. Meems et al[21] have showed mean SSS=1.8 and mean FSS=1.4 showing severity of symptoms and functional impairment relatively mild. In this study most of the patient 20(56.0%) reported with onset of the symptoms in 28 to 32 weeks of pregnancy that is in third trimester. 34.0% fluid retention increased during gestation in all women, which is consistent with the normal physiological pattern during pregnancy. After 30 weeks, an increase in extravascular fluid leads to greater weight gain. This explains why CTS symptoms most commonly present in third trimester. In this present study, 28(78.0%) of patients got improved by the conservative management. In a study Ordebug et al[20] have showed conservative management is sufficient to manage pregnancy induced CTS (80%). No definite time of treatment was mentioned there. In this study the period (8 weeks) of treatment was given. In this study, the patients included were only clinically diagnosed.

There were some limitations of the study such as no confirm diagnosis was done by Eletrodiagnosis, another shortcoming as perhaps the questionnaire selected for use in the study, as BCTQ - being a subjective and patient-oriented questionnaire is associated with the possibility of patients overestimating or underestimating the severity of their disease. For instance, the perception of the intensity of symptoms, such as pain, may vary from person to person. And also the study was done in a small group of people and in a specific region in Dhaka city, who does not represent the whole population. So the study must carry out in a large population to see the actual scenario.

Conclusion

In this present study CTS symptoms were reported more in third trimaster and most of the cases presented with symptoms of mild moderate grade. Patients showed improvement in conservative management. So conservative management protocols are sufficient enough in alleviation of symptoms of the disease and restoration of functional capability of the affected hand or hands.

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