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Stručni rad

THIRD TRIMESTER OF PREGNANCY: CARPAL TUNNEL SYNDROME, ANXIETY AND DEPRESSION

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Abstract: This study measured the frequency of carpal tunnel syndrome (CTS) and the levels of anxiety and depression in the third trimester of healthy pregnant women having regular prenatal visits. The study was performed at the Department of Neurophysiology Health Centre Tuzla in the period of January through April 2006. The group consisted of 40 pregnant women in the third trimester of pregnancy, age range of 25.6 ± 4.9 years. The control group consisted of healthy women, ages 31.1 ± 4.4 years. The electrophysiological parameters n. medians, the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) were measured. The diagnosis of CTS is neurophysiologically confirmed in 12 pregnant women (30%) and 75% showed clinical signs and symptoms of disease. Pain was measured by subjective pain scale ranked from 0 (absence of pain) to 10 (severe pain). The mean value of BAI in control group was 8.6 ± 6.5, while in the group of pregnant women was 12.9 ± 6.9, which was significantly higher (p = 0.011). The mean value of BDI in control group was 4.2 ± 4.4 and in the group of pregnant women was 8.7 ± 5.9. which was significantly higher (p = 0.0008), The mean value of BAI in the group of women with CTS was 12.25 ± 6.7 which was not significantly higher than the compared to the control group (p = 0.113). The mean value of BDI in the group of pregnant women with CTS was 7.9 ± 6.4,which was significantly higher when compared to the control group (p = 0.037). The subjective assessment of pain in the group of women with CTS was 2.4 ± 2.1. There was a slight correlation between pain intensity and degree of BAI (r = 0.289) and a negative correlation with the level of depression (r = – 0.297).

The conclusion is that pregnant women with normal risk should make an extra effort in the treatment of unpleasant conditions such as CTS, anxiety and depression, which may impair the quality of life and have physical and psychological side effects on the future mother.

Key words: pregnancy, carpal tunnel syndrome, anxiety, depression.

INTRODUCTION

Although pregnancy is a physiological condition, it is a big test for the health of women during pregnancy going through biological and psychological changes. For some neurological diseases, pregnancy presents an additional risk factor. Psychological problems that pregnant women experience could be due to a neurological disease, but specific problem, which should be taken into account in its assessment.

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy caused by pressure on median nerve and pregnancy is a risk factor. Pregnancy predisposes women to hormonal fluctuations, redistribution of fluids and musculoskeletal changes (1). Pregnant women are therefore predisposed to the development of CTS most often in the second half of pregnancy because in the later stages of pregnancy women retain more fluid which leads to swelling of the tissues. Prevalent rate of pregnant women in Iran is 3.4%, and those who are not pregnant 2.3% (2).

Various studies indicate that approximately one third of pregnant women experience symptoms that suggest CTS (3, 4). For example, an Italian study of the incidence of carpal tunnel syndrome in pregnancy shows clinical signs of CTS in 62% of women, and neurophysiologic indicators confirm the diagnosis in 43% of pregnant women. There is a clear correlation between the presence of edema and neurophysiologic findings (5). In fact, the incidence of CTS during pregnancy ranks in a wide range from 2 to 25% (4, 6). The syndrome is diagnosed most frequently in the second and third trimesters (6, 7).

Electrophysiological studies, including electromyography (EMG) and nerve studies conducted (Electroneurography) used in combination with specific signs and symptoms and create the criterion standard for the diagnosis of CTS and the exclusion of other neurological diagnoses.

Pregnancy can be viewed as a positive experience. Pregnancy leads to a feeling of self-fulfillment, but could initiate potential fears as well, such as, possible birth defects, and complications at birth or parental responsibilities. Psychological conditions of pregnant women could be affected by role and attitude of its partners and the integration of the relationships (8).

Depression is manifested by pathological mood, reduction of energy and reduction in activities. Anxiety involves a general state of worry or fear before confronting something challenging. Normal anxiety is nothing but an emotion that accompanies the actual or expected flow of a person's life. (9). Up to 2/3 of pregnant women show some psychological symptoms, especially in the first and third trimester of pregnancy in the form of anxiety, irritability, labile mood and depression. Clinical depression is manifested and present in 10% of pregnant women. The risk is higher in pregnant women with a history of depression, abortion, unwanted pregnancy and marital disagreements and conflicts (10).

Although the symptoms of CTS in a larger number of women in the third trimester are mild, they still have repercussions on various aspects including the psychological state of women (11). The mental state of pregnant women is rarely associated with CTS discomfort. Studies in Poland show that the emotional symptoms are associated with objective symptoms of CTS and pain. And those could increase the intensity of the symptoms of CTS (12).

Since there are rare studies that connect CTS with anxiety levels and depression in pregnancy our goal is to at least shed some light on this problem.

The goals were to determine the level of anxiety and depression in pregnant women with and without carpal tunnel syndrome and to determine whether there is a mutual relationship of pain in patients with carpal tunnel syndrome with the degree of anxiety and depression. They are compared with a control group of healthy women who are not pregnant.

SUBJECTS AND METHODS

The study was conducted at the Department of Neurophysiology Health Centre Tuzla in the period of January-April 2006. The control group consisted of young healthy women, mean age 31.1 ± 4.4 (24-40) years. 19 of them (63.3%) had a history of previous births. The group consisted of 40 pregnant women; mean age 25.6 ± 4.9 (17–39) years, of which 26 (65%) nullipara. The average length of pregnancy was 34.65 ± 3.5 (27–39) weeks. The "random sample" of pregnant women were referred to the regular gynecological examination and agreed to neurophysiologic analysis at the Department of Women's Health and pregnant Health Center Tuzla. First, they gave their short medical history, then they were clinically examined and all of that was followed by neurophysiologic processing. The requirement for testing was that women were not suffering from polyneurophathy or any other disease that could affect the speed of nerve conduction. Testing was carried out at room temperature and the "physiological" body temperature of the subjects in the supine position.

For the measurement of neurological parameters were used the EMNG machine and Medelec Synergy (EMG and EP Systems OXFORD INSTRUMENTS 2004). There were also used the superficial exhilarating and registration bipolar (Large Touchproof) electrodes. After that the selection of the patients with CTS were done and processed to differentiate their neurophysiologic and psychological parameters.

Pregnant women with CTS were determined using the subjective pain scale (0 = absence of pain, 1 = minimal pain to 10 = the most intense pain ever experienced). In the analysis of anxiety and depression were used the Beck's scale for anxiety (Beck Anxiety Inventory, BAI) and the Beck's Scale for depression (Beck Depression Inventory, BDI). BAI is ranked in the following range: none- minimal anxiety (0–9), mild anxiety (10–16), moderate anxiety (17–29), severe anxiety (30–63). BDI is ranked in the following range: normal ups and downs (0–10), mild mood disturbance (11––16), borderline clinical depression (17–20), moderate depression (21–30), severe depression (31–40) and extreme depression (over 40).

Analysis of the level of pain and its correlation with anxiety and depression was performed only in patients with verified electrographic diagnosis of CTS.

For the analysis of the results were used standard statistical parameters: mean value and standard deviation using T-test, χ^2 test, and linear correlation test. Differences are recognized as well as significant for $p < 0.05$.

RESULTS

Twelve pregnant women had positive signs and symptoms of CTS. Nine of the 12 (75%) had a verified electroneurographic diagnosis of CTS, three of the people tested (10.7%) didn't have symptoms but they met the criteria for the CTS. Therefore 12 patients had CTS, 7 of which were bilateral and 5 unilateral.

Anxiety level of the women in their third trimester

Average values BAI totaled 8.6 ± 6.5 (0–21). The largest number, a total of 19 patients in control group was manifested minimal anxiety or no anxiety at all (score 0–9), followed by mild anxiety (score 10–16) 6, and moderate anxiety (score 17–29) 5. There was no severely anxious patients (score 30–63) (Figure 1).

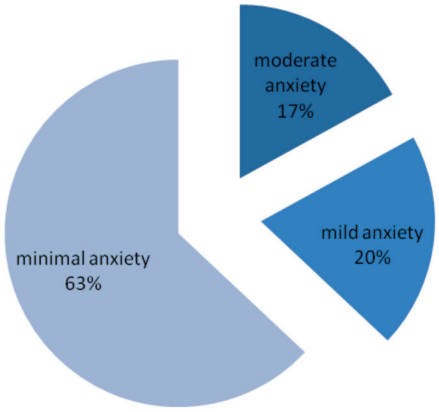

***Figure 1**. Percentile level of anxiety measured with the Beck Anxiety in the control group of healthy subjects*

Anxiety level of subjects in the third trimester of pregnancy

The BAI mean values were 12.9 ± 6.9 (3–29), which is significantly more than the control group (p = 0.011). The larger number of women in the third trimester of pregnancy manifested minimal anxiety or no anxiety at all (score 0–9), 17 of them, followed by moderate anxiety (score 10–16) 10 and slightly anxious (score 17–29) 13, while there were no severely anxious patients (score 30–63) (Figure 2). The distribution is significantly different from the control group (p < 0.0001). There was no significant correlation between age and the degree of anxiety (r = 0.145). There was no significant correlation between the duration of the pregnancy with the degree of anxiety (r = – 0.170).

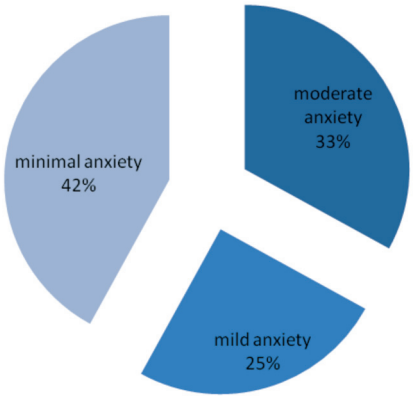

***Figure 2.** Percentile level of anxiety measured with the Beck Anxiety in pregnant women in the third trimester of pregnancy*

Anxiety level of subjects in the third trimester of pregnancy with pressure on the median nerve (CTS)

The mean BAI in pregnant women with CTS was up to 12.25 ± 6.7 (3–22). These results are not significantly different from the control group (p = 0.113).

A large number of subjects developed minimal anxiety or no anxiety (score 0–9) 5, followed by mild anxiety (score 10–16) 3, and moderate anxiety (score 17–29) 4. There were no severely anxious subjects (score 30–63) (Figure 3). These results were significantly different from the control group (p < 0.0001).

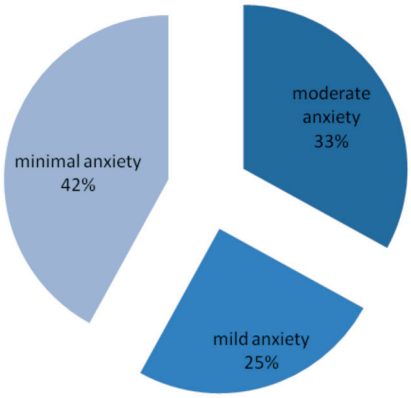

***Figure 3.** Percentile level of anxiety measured with the Beck Anxiety in pregnant women in the third trimester of pregnancy with CTS*

The level of depression in patients in the control group

Average values of BDI in healthy subjects were 4.2 ± 4.4 (0–20). Normal ups and downs (0–10) were

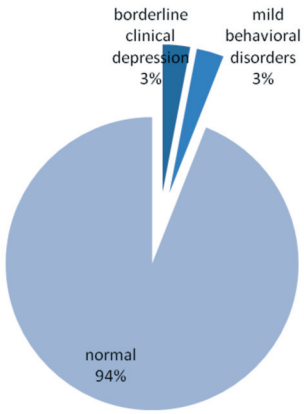

***Figure 4.** Percentile for depression as measured with the Beck Depression in the control group of healthy subjects*

present in 28 patients, mild behavior disorders (11–16) at 1, borderline clinical depression (17–20) in 1 patient, and there were none with moderate depression (21–30 high), severe (31–40) or extreme depression (over 40) (Figure 4).

Level of depression in pregnant women in the third trimester of pregnancy

BDI mean values were 8.7 ± 5.9 (1–24), which was significantly more than the control group (p = 0.0008). Normal ups and downs (0-10) were found in 29 patients, mild behavior disorders (11–16) 7, marginal clinical depression (17–20) 1, moderate depression (21–30) in three female subjects, and there were no patients with severe depression (31–40) or extreme depression (over 40) (Fig. 5). These results are significantly different from the control group (p < 0.0001).

There is a minor correlation between age and depression in pregnant women (r = 0.239). There is no correlation between the duration of the pregnancy and the degree of depression (r = – 0.010).

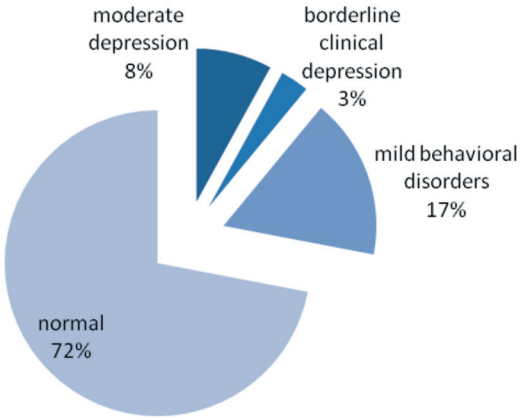

***Figure 5**. Percentile for depression as measured with the Beck Depression in pregnant women in the third trimester of pregnancy*

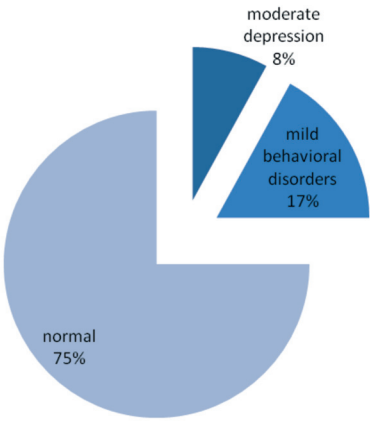

***Figure 6.** Percentile of the depression as measured with the Beck Depression in pregnant women in the third trimester of pregnancy with CTS*

Level of depression in women in the third trimester of pregnancy with CTS

The mean BDI was 7.9 ± 6.4 (1–22), which was significantly more than the control group (p = 0.037). Normal ups and downs (0–10) had 9 patients, mild behavior disorders (11–16) 2, there were no patients with borderline clinical depression (17–20), while moderate depression (21–30) had only one patient. There were no patients with severe depression (31–40) or extreme depression (over 40) (Figure 6). These results were significantly different from the control group (p < 0.0001).

The average value of pain in patients with electrophysiological diagnosis of CTS was 2.4 ± 2.1 (0–7). There was a minor positive correlation with the subjective feeling of pain and BAI (r = 0.289), there was a minor negative correlation between pain and depression (r = – 0.297).

DISCUSSION

With the prevailing rate of 3 to 6% of the adult population, CTS is the most common entrapment neuropathy where pregnancy is one of the most important risk factors for its occurrence (13). In our sample of pregnant women in the third trimester of pregnancy, 30% of pregnant women had CTS. Published rates of incidence confirmed neurophysiologic CTS associated with pregnancy ranging from 7% to 43%, while the incidence of clinically diagnosed CTS associated with pregnancy ranked from 31% to 62% (14).

In the study published in Malaysia, 82 women (24.6%), out of 333 pregnant women, were diagnosed with CTS (11).The prevalence of CTS in the third trimester of pregnancy in the studies of Atisook and al. (1995) was very similar to our study and it was 28% (15).

It is interesting however, that none of the patients had previously sought help from a neurologist, with reminder that this study was conducted on a random sample of patients coming for routine prenatal visits. According to one study, women with symptoms of CTS had the function of the affected hand, and sleep patterns disrupted in 75% cases, and only 46% of them ("with symptoms") mentioned to the physician their symptoms (4).

The largest number of patients in control group manifested minimal anxiety, followed by mild anxiety, and then moderate anxiety. Pregnant women tested in the third trimester of pregnancy were on average significantly more anxious, but distribution of the patients was also significantly different in the percentage of minimal anxiety from mild and moderate anxiety.

In our sample, 35% of the patients had no previous experience with childbirth. A greater degree of anxiety

had nullipara women and that could be explained by previous experience of pregnancy uni/multiparous, and greater uncertainty that nullipara experienced pregnancy is totally new experience for her. Of course, anxiety depends on many other factors. Note that in this study we did not analyze whether previous pregnancies (uni/multiparous) were complicated. That could certainly have impacted BAI and BDI scores.

The average value of BAI, although it was higher in the group with CTS, was not significantly different from the one in the control group. Of course, it is difficult to make exact analysis of this kind, with a relatively small sample size (for 12 subjects) with CTS, although it is likely that other factors in this group have a decisive influence on the level of anxiety. However, the distribution of patients with CTS was almost identical to all pregnancies in the third trimester of pregnancy, and is significantly different from the control group. This imposes the need for further research on a larger sample of pregnant women with CTS.

There is no correlation between the length of the pregnancy and the degree of anxiety but this was a group with a relatively similar length of pregnancy (third trimester). Interestingly, although milder, there is a positive correlation with age of pregnant women and depression. But the question is whether advanced age, regardless of pregnancy, increases the degree of depression. Interestingly, it is described the temporal relationship of pain and depression in the elderly population (16).

Normal ups and downs were present in 28 patients of the control group, mild behavior disorders in 1 patient, borderline clinical depression in 1 patient, and there were no patients with moderate, severe or extreme depression. However, pregnant women in the third trimester of pregnancy did exhibit a significantly higher average rate of depression compared to the control group. And the degree of depression in the third trimester is significantly different from the control group. The distribution of the degree of depression is significantly different by reducing the number of subjects with normal ups and downs, and the appearance of patients with moderate depression.

The mean BDI of the women in the third trimester of pregnancy with compression of median nerve at the wrist (CTS) was significantly higher than the control group. Normal ups and downs were found in 9 patients, mild behavior disorders in 2, and there were no patients with borderline clinical depression and one patient with moderate depression. There was a small number of people with normal ups and downs, so the overall sample of women in the third trimester was significantly different in comparison to the control group.

These kinds of analyses justify observation that high levels of anxiety and depression, according to a study in the Netherlands, carry high risks for pregnancy outcome (17). On the other hand, according to research in Germany, there is no evidence of an association of subclinical symptoms of depression and anxiety with poor pregnancy outcome (18).

There was a minor positive correlation with the subjective feeling of pain with BAI, while there was also a minor negative correlation of pain with depression. As predictors of the intensity of the pain in patients with CTS, the dominant behavioral factors in the disease are described as an increase in depression and misinterpretation of nociception (19). The scale of pain therefore is slightly correlated with the degree of anxiety. A possible explanation is that the subjective experience of pain is a growing concern for their own health and pregnancy outcomes. The absence of correlations with depression, however, suggests that other factors have a dominant influence on depression rather than the pain of CTS.

The fact that none of the pregnant women previously sought medical help because of pain and numbness in the hands and three pregnant women with unilateral CTS had a history of pain in the hands before pregnancy says a lot about poor awareness of health personnel and patients themselves. But an equally important issue that is rarely thought of in pregnancy is increased anxiety and depression, in this case of pregnant women in the third trimester. Neither one of the pregnant women in the study group was previously offered adequate psychological assessment and support. Undoubtedly, any help with reducing anxiety and depression would ease the burden of pregnancy and childbirth on women.

From this it follows that the previous efforts of health workers mainly focused on the proper growth and development of the fetus, while indeed unconsciously pregnant women are moved to second place. But a woman's health dictates the health and proper development of the newborn. Therefore, these problems should not be ignored. We should offer ways to prevent and educate health workers (especially those employed in counseling for pregnant women) and the patients to identify these problems and if possible to get properly treated which is of equal importance for the mother and for her offspring.

CONCLUSION

Frequency of the neurophysiologic diagnosed carpal tunnel syndrome in pregnant women in the third trimester of pregnancy was 30%.

The average score of anxiety in women in the third trimester of pregnancy was significantly higher from the one in the control group, but the score of anxi-

ety in pregnant women with carpel tunnel syndrome was not significantly different from the control group.

Average depression scores of subjects in the third trimester of the pregnancy were significantly higher from the control group, which was noted for pregnant women with carpal tunnel syndrome as well.

There was a minor positive correlation of the subjective feeling of pain to the degree of anxiety.

For the problems such as carpal tunnel syndrome, anxiety and depression in pregnant women should be continuously pointed out and ways should be offered to prevent and educate health workers (especially those employed in counseling for pregnant women), and the patients to identify these problems, and if possible to get properly treated, which is of equal importance for the mother and for her offspring.

Abreviation

CTS — Carpal tunnel syndrome
EMG — electromyography
EMNG — electromyoneurography
BAI — Beck Anxiety Inventory
BDI — Beck Depression Inventory

Sažetak

TREĆI TRIMESTAR TRUDNOĆE: SINDROM KARPALNOG TUNELA, ANKSIOZNOST I DEPRESIVNOST

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U studiji je merena frekvenca karpal tunel sindroma (KTS), te nivo anksioznosti i depresivnosti u trećem trimestru zdravih, redovno kontrolisanih trudnica. Studija je izvedena u Kabinetu za neurofiziologiju Doma zdravlja Tuzla, u periodu januar-april 2006. Ispitivanu grupu je činilo 40 trudnica u trećem trimestru trudnoće, sa prosečnom starosti od 25,6 ± 4,9 godina. Kontrolnu grupu su činile zdrave žene prosečne starosti 31,1 ± 4,4 godina. Mereni su neurofiziološki parametri n. medainus-a, Bekova skala depresivnosti (BDI) i Bekova skala anksioznosti (BAI). Dijagnoza KTS je neurofiziološki potvrđena kod 12 trudnica (30%), a 75% je pokazalo kliničke simptome i znakove oboljenja. Bol je meren subjektivnom skalom bola rangiranom od 0 (odsustvo bola) do 10 (najjači bol koji osoba može doživeti). Srednja vrednost BAI u kontrolnoj grupi je bila 8,6 ± 6,5, dok je u grupi trudnica bila signifikantno veća (p = 0,011) ili 12,9 ± 6,9. Srednja vrednost BDI je u kontrolnoj grupi bila 4,2 ± 4,4, a u grupi trudnica signifikantno veća (p = 0,0008), ili 8,7 ± 5,9. Srednja vrednost BAI u grupi trudnica sa KTS je bila 12,25 ± 6,7, nesignifikantno veća od one koja je merena u kontrolnoj grupi (p = 0,113). Srednja vrednost BDI u grupi trudnica sa KTS je bila 7,9 ± 6,4, signifikantno veća nego u kontrolnoj grupi (p = 0,037). Srednja vrednost subjektivne procene bola u grupi trudnica sa KTS je bila 2,4 ± 2,1. Uočena je lakša korelacija intenziteta bola i stepena BAI (r = 0,289), te negativna korelacija sa nivoom depresivnosti (r = – 0,297).

Nameće se zaključak da je kod trudnica sa normalnim rizikom neophodno uložiti dodatni napor u tretmanu neprijatnih stanja kao što su KTS, anksioznost i depresivnost, koja mogu narušiti kvalitet života i imati fizičke i psihičke posledice na buduću majku.

Ključne reči: trudnoća, sindrom karpalnog tunela, anxioznost, depresivnost.

REFERENCES

1. Osterman M, Ilyas AM, Matzon JL. Carpal tunnel syndrome in pregnancy. Orthop Clin North Am. 2012; 43(4): 515–20.

2. Yazdanpanah P, Aramesh S, Mousavizadeh A, Ghaffari P, Khosravi Z, Khademi A. Prevalence and severity of carpal tunnel syndrome in women. Iran J Public Health. 2012; 41(2): 105–10.

3. McLennan HG, Oats JN, Walstab JE. Survey of hand symptoms in pregnancy. Med J Aust. 1987; 147: 542–4.

4. Voitk AJ, Mueller JC, Farlinger DE, Johnston RU. Carpal tunnel syndrome in pregnancy. Can Med Assoc J. 1983; 128: 277–81.

5. Padua L, Aprile I, Caliandro P, Mondelli M, Pasqualetti P, Tonali PA. Carpal tunnel syndrome in pregnancy: multiperspective follow-up of untreated cases. Neurology. 2002; 59(10): 1643–6.

6. Ekman-Ordeberg G, Salgeback S, Ordeberg G. Carpal tunnel syndrome in pregnancy. A prospective study. Acta Obstet Gynecol Scand. 1987; 66: 233–5.

7. Massey EW. Carpal tunnel syndrome in pregnancy. Obstet Gynecol. 1978; 33: 145–8.

8. Marčinko D, Jakovljević M, Medjedović V. Psihijatrijski poremećaji u trudnoći i babinju. U: Djelmiš J i sar. Neurološke bolesti u trudnoći. Zagreb: Medias; 2002. str. 230–8.

9. Kaličanin P. Psihijatrija I-II. 2. izd. Beograd: Velarta; 2001.

10. Jakovljević M. Depresija — prepoznavanje i liječenje u primarnoj zdravstvenoj zaštiti. Zagreb: Pro Mente; 1998. str. 7–27.

11. Rozali ZI, Noorman FM, De Cruz PK, Feng YK, Razab HW, Sapuan J, Singh R, Sikkandar FM. Impact of carpal tunnel syndrome on the expectant woman's life. Asia Pac Fam Med. 2012; 11(1): 1–13.

12. Pogorzelski R, Ku³akowska A, Halicka D, Drozdowski W. Neurological and emotional profile of carpal tunnel syndrome patients. Przegl Lek. 2011; 68(5): 269–73.

13. LeBlanc KE. Cestia W Carpal tunnel syndrome. Am Fam Physician. 2011; 83(8): 952–8.

14. Padua L, Di Pasquale A, Pazzaglia C, Liotta GA, Librante A, Mondelli M. Systematic review of pregnancy-related carpal tunnel syndrome. Muscle Nerve. 2010; 42(5): 697–702.

15. Atisook R, Benjapibal M, Sunsaneevithayakul P, Roongpisuthipong A. Carpal tunnel syndrome during pregnancy: prevalence and blood level of pyridoxine. J Med Assoc Thai. 1995; 78(8): 410–4.

16. Hilderink PH, Burger H, Deeg DJ, Beekman AT, Oude Voshaar RC The temporal relation between pain and depression: results from the longitudinal aging study Amsterdam. Psychosom Med. 2012; 74(9): 945–51.

17. Loomans EM, van Dijk AE, Vrijkotte TG, van Eijsden M, Stronks K, Gemke RJ, Van den Bergh BR. Psychosocial stress during pregnancy is related to adverse birth outcomes: results from a large multi-ethnic community-based birth cohort. Eur J Public Health. 2012; 31 (In press).

18. Gawlik S, Waldeier L, Müller M, Szabo A, Sohn C, Reck C Subclinical depressive symptoms during pregnancy and birth outcome-a pilot study in a healthy German sample. Arch Womens Ment Health. 2012; 21(In press).

19. Nunez F, Vranceanu AM, Ring D. Determinants of pain in patients with carpal tunnel syndrome. Clin Orthop Relat Res. 2010; 468(12): 3328–32.

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