Psychiatria Danubina, 2012; Vol. 24, Suppl. 3, pp 377–383 *Conference paper*

CHANGES IN INTELLECT AREA IN WAR VETERANS WIH DEVELOPED PTSD

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SUMMARY

Introduction: *The previous neuropsychological studies have pointed to a significant understanding of the neurobiological correlates of Post Traumatic Stress Disorder with deficits in the functions of the intellect.*

Aim: *To establish the existence of intellectual changes in war veterans with developed PTSD and their relationship to PTSD.*

Methods: *War veterans are divided into two groups: Group A, war veterans with PTSD and "B" groups, veterans without PTSD. Were used:*

- *Wechsler's Adult Intelligence Scale (WB-F2)*
- *Trauma Questionnaire (UT-PTSD)*

Questionnaire-socio-biographical data

Results: *The severity of stress and severity of post-traumatic stress disorder is directly associated with the intellectual functions. War veterans, who had more severe traumatic experience, with a strong and destructive PTSD compared to veterans without PTSD had significantly lower ratio of general, verbal and non-verbal intelligence quotient of mental efficiency, a high level of mental deterioration with significantly pronounced oscillations in intratest and insidetest variability. Veterans with PTSD showed significantly lower scores in the immediate memory capacity, efficient attention, concentration under conditions of mental activity, visual perceptual skills predicted exactly bit of trivial things, of associative elasticity of thinking and short-term learning abilities.*

Conclusions: *These results suggest that deficits in the intellect, are not primarily the result of low intelligence, of premorbid states, but it occurs under the devastating impact of PTSD, which influencing changes in certain centers in the brain and changes in intellectual functioning.*

Key words: *PTSD - intelligence neuroscience - neuroimaging*

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INTRODUCTION

Theory view

War is a dreadful experience, burdening every physical and psychological resource and leaving indelible trace in human psyche long after fighting is over. It differs from many other traumatic events by its extended intensity and by the fact that it erases difference between victim and perpetrator. Psychological breakdown if followed by several psychological disturbances like cognitive and emotional disorders. Therefore besides symptoms characterizing PTSD, other disturbances occur as following effects in persons suffering from PTSD, like: anxiety, depression, feeling of guilt, homicidal and suicidal ideas, aggression, memory disorders, disorders of concentration and learning, etc.

Traumatic experiences, directly influencing organism functioning, are experienced in four mutually connected levels: psychological, biological, social and cultural. Many researches conducted so far, have confirmed negative influence of PTSD on every of these four mutually connected levels of human adaptive behavior (Wilson 1993).

According to Van der Kolk i Saport (1993) widely spreading acknowledgments on trauma and central nervous system connection are leading to awareness that nerve functions are in the core of psychological destruction in PTSD and are making psycho-biology of trauma the area of psychiatry that if most promising. Neuropsychological research lead to significant achievements in knowing neurobiological correlates in Posttraumatic stress disorder implicating irregular functioning of frontal lobe nerve area (Bremner et al. 1999, Friedman et al. 1995).

Bremner et al. (1996); Bremner, (2000), Bremner et al. (1996, 1997), Arnsten (1998) are investigating changes in memory functions, as well as its connection to traumatic experience, that is its connection to brain functions in psychiatric disorders caused by traumatic stress. In framework of these researches they elaborate the influence of stress on those brain areas participating in memory functions and PTSD. Gained results were in correlation with deficits in short term verbal memory. Markowitsch et al. (1998), connect psychological trauma to reduce in brain metabolism and cognitive deterioration, concluding that psychological shock may cause permanent brain metabolism damage resulting severe intellectual dysfunctions.

Researches of Vasterling et al. (2002), on a sample of treated Vietnam war veterans with PTSD show connections between PTSD symptoms and attention

disorders, learning capability, memory and intellectual resources. At the same time they imply that there is yet no reliant conclusion if the cognitive deficits are consequence of PTSD, exposure to stress or they are consequence of pre-morbid cognitive condition.

Indicated neuropsychological researches led to significant achievements in knowledge of neurobiological correlates in Posttraumatic stress disorder, together implicating disorders in frontal-limbic nerve regions functioning. Therefore, in many researches of neurobiological functioning in PTSD we have discoveries of expressed attention dysfunctions in anterograde memory, work memory, learning, recalling, remembering, intellectual functioning.

According to Lambrosio & Sapolsky (1998), psychological trauma with severe PTSD influences nervous system where chemical compositions that are occurring on the nerve cell level are damaging nerve cell function leading to "brain aging", to changes in emotional and cognitive functioning and that is reduce in physical and mental functioning.

Research goal

So far research results are becoming a challenge to assumption that PTSD induced intellectual deficits are consequence of Posttraumatic stress disorder and not pre-morbid condition. The goal of this research is based on analysis of relevant theory knowledge, results of prior empirical researches (van der Kolk & Saporta 1993, Macklin et al. 1998, Gurvist et al. 2000, Yehuda & Davidson 2000, Vasterling et al. 2002), analysis of their deficiencies (Knight 1997), clinical and preclinical knowledge point out that PTSD has long-term effects on memory functions and emotions as well as brain structures included in memory and emotional functioning.

Prime task, research goal was to determine: whether PTSD symptoms depend on quantity and frequency of exposure to traumatic (stress) events? Whether number and intensity of expressed PTSD symptoms influences intellectual deficits, changes in memory area, attention, learning, as well as general intellectual functioning? With how much certainty disorders in the area of intellectual functioning can be taken as the consequence of devastating PTSD and not as the consequence of pretrauma vulnerability? Whether there is a difference in intellectual functioning between war veterans with and without PTSD? In which level are given results consistent to previous researches?

Sample

Research is conducted on non comorbide war veterans that were in post war period employed as professional soldiers, and that were not at the time of research in acute phase of stress disorder, nor in negative phase of conduct referring to coping with trauma. In order to prove, to gain as relevant results as possible that changes in intellectual functioning in psychologically traumatized persons with developed PTSD, are a consequence of psychological trauma, devastating PTSD and not pre-traumatic vulnerability, in sample forming we set certain criteria (controlling variables). As controlling variables we considered everything that could have influenced deficits in intellectual abilities area (that at the time of research were not younger than 25 nor older than 51 year; that they finished at least primary school; that during schooling achieved at least average grades; that during childhood and later had no traumatic experiences; that had no significant neurotic disturbances; that were not in severe depressive state; that had no neurological or other somatic illness, that could have influenced on cognitive damages (severe and often headaches, long-term high blood pressure, severe heart illness, diabetes, brain tumor, epilepsy, muscle dystrophy, atrophy, multiple sclerosis, and similar); that were not chronic alcoholic or drug abusers; that had no previous or during the war, head injures with brain tissue damages; that were a members of combat units during the war; that were included in this research voluntarily).

Based on these set criteria, control variables, two groups were formed: «A» group, war veterans who experienced a large number of severe traumatic experiences with complete PTSD (N=50), with stress level larger than 3 (NS>3.0), and control «B» group, war veterans that also had large number of severe traumatic experiences without PTSD (N=50). All participants were male.

Psychological test battery

For determining intellectual abilities, intellectual functioning we used Wechsler intelligence scale for adults.

For determining stress level, symptoms of PTSD, we used Trauma questionnaire (Pavlović 2009), that has a high level of validity and reliability as well as inner consistency.

For collecting biographical data and data used as controlling variables we constructed a specified Questionnaire.

Statistical methods

In order for gained results to have its quantitive expression for mutual comparison and determination of mutual difference significance or correlation, we used following statistical methods: for consisting and summarizing results we used descriptive statistics, frequent distribution with arithmetic mean and standard deviation; difference significance between two arithmetic means was tested by t-test for small independed samples, and for data whose distribution deviated from normal results difference was tested by χ^2 test; correlation of different variables was tested by Pearson correlation coefficient.

For determining mentioned statistical pointers in this research we used statistical program SPSS 10.0 for Windows.

RESULTS AND DISCUSSION

Social - biographical data

According to results, we determined that war veterans with and without PTSD were average age of 34 years – 58.0% of war veterans with PTSD and 72.0% without PTSD were in age group 26 to 41 year. If considering that research was conducted 5 years after the war (started in 1998. And finished in 2002), we can conclude that the largest number of war veterans in both groups at the beginning of war (year of 1992.) was between 18 and 43 years of age, meaning they were all in full mental strength. Between groups we determined significant statistical result difference ($p<0.05$).

Largest number of war veterans with PTSD (72.0%) and without PTSD (90.0%), had completed high school, on the level of qualified workers or technicians. Among groups there was a significant result difference ($p<0.01$). During education all had average grades (score 3, 4 or 5; 68.0% in the group with PTSD and 64.0% in the group without PTSD), that is 32.0% with PTSD and 36.0% without PTSD completed grades with score 4 or 5. Among groups, according to school achievement, no significant statistical result difference was determined ($p>0.05$).

Most war veterans with PTSD (94.0%), and without PTSD (72.0%) lived in marriage community. Among groups we determined significant statistical result difference ($p<0.01$). Also, it is important to emphasize that most of war veterans with PTSD (74.0%) and without PTSD (72.0%) lived in rural areas. According to family structure in which they grew up, family size, numbers of siblings, no significant statistical result difference was determined ($p>0.05$), most of them grew up in complete and multi members families (98.0% with PTSD and 94.0% without PTSD).

Results of addiction dependences show that addiction for cigarettes was significantly more expressed in war veterans with PTSD (72.0%), in comparison to war veterans without PTSD (60.0%). War veterans expressed more addiction for cigarettes, significant results differrence was determined ($p<0.01$). Also, most war veterans with PTSD (90.0%) and without PTSD (98.0%) expressed no addiction for consuming large amounts of alcohol drinks, that is frequent drinking, they do it only sometimes in certain situations (holidays). War veterans with PTSD expressed more addiction for alcohol ($p<0.05$). War veterans with and without PTSD had no addiction for drugs.

According to time they spent on the battle field, 94.0% of war veterans with PTSD and 82.0% without PTSD spent more than 37 months, and among groups no statistically significant result difference was determined ($p>0.05$). They were engaged in the army as volunteers. Among groups there was no statistically significant result difference ($p>0.05$).

Most of war veterans (95%), before research started had no diagnosed PTSD, nor turned for help due to psychological crisis. Many war veterans during the war had no psychological breakdown. PTSD symptoms developed later, when need to mobilize emotional – cognitive functions in direction of survival, staying alive, stopped. When that ended, and the end of the war came, with no social support and in the presence of new frustrate experiences (unsolved large numbers of basic life needs) "storage" contents of traumatic experiences started to emerge influencing development of PTSD. In that matter, in non- comorbide sample of war veterans employed after the war as professional soldiers, 37% expressed conditions for complete PTSD. On wide prevalent of psychological trauma after the war also pointed in researches of Kleber and Brom (1993), and Figley (1987), suggesting that damage effects of stress during the combat were widely ranged, deep and long – term. Nature of happening (Dizdarević 2003), social circumstances and personality characteristics were basic factors causing occurrence, strength, longitude of psychological trauma and pain. When and what will be "the trigger" for those "concealed" psychological disturbances to emerge in painful PTSD in many terms depends on social - economic, surrounding and cultural factors.

Traumatic experiences

During the war, veterans with or without PTSD, were exposed to multiple trauma, different dangerous, stressors, and stressful situations. One traumatic event came after another, or happened at the same time. According to given results 40-90% of war veterans with PTSD had in average 7 severe traumatic experiences to whom they were exposed frequently, 84.0% had a diagnosis of complete and strong PTSD, 75.0% of war veterans expressed symptoms of PTSD often or even on every day basis. 60.0% of war veterans with PTSD were in situations when their fellows soldiers died in their arms, 94.0% of them watched fellow soldiers die, 62.0% collected body parts, 92% directly participated in combat activities, 68% experienced granate detonations without head injures, while war veterans without PTSD experienced significantly less frequency of traumatic events, 42% experienced fellow soldiers die on their arms, 51% seen them die, 68% directly participated in combat, attack activities, 18% in close fighting, 30% were blast by detonations… That proves that trauma was multiple and a large number of veterans with no previous treatment, carried within unopened traces of severe psychological trauma, with expressed psychological consequences, given the picture of complete and strong PTSD. Among groups, considering traumatic experience, statistically significant result difference was determined ($p<0.01$). War veterans with PTSD had large number of severe traumatic experiences.

Family members, fellow soldiers getting killed, extracting their bodies, collecting body parts, watching while fellow soldier dies in their arms, were the most difficult experiences, with deepest imprint in consciousness and that even 5 years after the war were hard to endure. Nature and the quality of relations existing between the diseased and survivor (Kleber &

Brom 1993), were very significant in overcoming psychological pain. As that relation were more deeper, closer, survivors had difficulties coping with the pain.

If we accept every traumatic event as a frustrating situation experienced by the soldier, and considering its cumulative effect, one can say that every soldier in the war was confronted with a number of severe traumatic savors (Pavlović 1998), where traumatic experiences acted as shrapnel (Moro 1996) consistently walking all over the body and destroying everything in front of them.

Intensity of PTSD symptoms

Number of traumatic events and their frequency were basic factors for PTSD development. According to results, 50.7% of war veterans had no expressed symptoms of PTSD, 47% expressed symptoms of complete or incomplete PTSD, that is 37% had intensive symptoms of complete PTSD where the level of stress as indicator of PTSD symptoms frequency in past month (before research); 17.0% were on the level of extremely low level of stress where symptoms occurred once in a month; 8.7% expressed low level of stress where symptoms occurred 2-3 times in a month; 9.0% had moderate stress level where symptoms occurred once in a week while 9.3% had high level of stress with symptoms occurring 2-4 time a week; 5.3% expressed extremely high level of stress where symptoms occurred 5-7 times a week in the past month.

As stated before, research of disorders in intellectual functioning of war veterans with PTSD, included war veterans with stress level that was moderate to extremely high. Based on that, sample was consisted with 76.0% of war veterans with high or extremely high stress level, meaning that PTSD symptoms occurred often or every day, and with 24.0% with moderate stress level meaning that PTSD symptoms occurred 1-2 times a week in the past month.

Severity of psychological trauma, traumatic event was in a significant correlation ($p<0.01$) with the level of stress and the PTSD index of positive sign, strength of PTSD. The more severe traumatic events were meant more frequent PTSD symptoms were, that is higher stress level, strength of PTSD, where PTSD symptoms occurred frequently or event everyday.

Given results on severity and frequency of exposure to traumatic experiences, with significant result differrences between war veterans with and without PTSD, confirm the assumption that severity of traumatic event and longitude of exposure to traumatic event increases PTSD symptoms.

Intellectual functioning of war veterans with and without PTSD

Intelligence is not a simple entity, but a very complicated function, a collection of different complicated sources of behavior, capabilities, that can be quantitatively expressed by using suitable measure instruments (tests). That resulting effect depends on interaction, mostly certain number of qualitatively different but summarized components or factors, as well as non – intellectual factors like interests, endurance in work, pleasure. Wechsler scale of intelligence for adults combines intellectual (memory, learning, perception, abstract opinion and non – intellectual (motivation, pleasure, endurance), that gives it special quality.

Interpretation of results on Wechsler scale (WB) is based on clinical – psychological method, that is on analytic – synthetic, quantitative – qualitative norms and free interpretations of indicators stated in this scale. Using methods of differential interpretation we have an explanation of inner relations between certain factors of mind structure and aspects of mental functioning. Differential – diagnostic assessment includes: 1) a global indicator, general intelligence factor (IQ); 2) partial indicators of intelligence levels, verbal coefficient (VIQ) and non – verbal coefficient (NIQ) of intelligence; 3) a global indicator of mind efficacy, mind efficacy coefficient (SQ); and 4) indicators of mental functioning, based on inter – testate and inner – testate variability.

War veterans with PTSD had significantly larger number of participants (60.0%) whose general intelligence abilities, global indicator (IQ) were below average values in heir age group, as well as significantly lower results than war veterans without PTSD ($p<0.01$), 50.0% of war veterans with PTSD had results on the level of physiological numbness (IQ=80-90), 10.0% were on level of border functioning (IQ=66-79), while 68.0% of war veterans without PTSD scored in limits of average values (IQ=91-110), that is 24.0% scored above average values (IQ=111-119). Given results implicated significant deficits in general intellectual functioning in war veterans with PTSD. Total coefficient on intelligence as a global indicator of general intelligence level representing an expression of strength, abilities, saturated with "G" factor in war veterans with PTSD is in significant negative correlation with the index of PTSD (PTSD strength) as well as symptoms classified according to categories for PTSD.

Significant correlation between intellectual functions and PTSD, that is between general intellectual abilities (IQ) and symptoms of PTSD, was determined by Vaesterling et.al. (1998), in war veterans of Gulf war.

According to results, considering methodological approach, by using large number of control variables, we conclude that reduce in general intellectual abilities in war veterans suffering from devastating PTSD, is not the consequence of pre – morbid intellectual insufficiency but resulting from deficits arising in effects of devastating PTSD on brain centers responsible also for development of PTSD symptoms.

Besides global indicators – general intelligence coefficient (IQ), Wechsler anticipated calculating partial indicators of intelligence, verbal coefficient (VIQ) and non – verbal coefficient (VIQ) of intelligence. Using those indicators founding showed how much is the participant able to "think rationally" (VIQ) and "act in purpose" (NIQ). Analyzing results of global indicators –

general intelligence coefficients, it is emphasized that war veteras with PTSD comparing to average values of age group and average values of war veterans without PTSD expressed significantly larger number of participants ($p<0.01$) with scores VIQ (50.0%) and NIQ (62.0%) below average values. Especially low result, war veterans with PTSD expressed on non – verbal scale where 18.0% of participants had result on the level of border values. These results point out ho much PTSD influenced on general intellectual functions (IQ, VIQ and NIQ).

High negative correlation ($p<0.01$) between frequency of PTSD symptoms expression, PTSD strength, intensity of PTSD symptoms according to diagnostic categories and global indicators of intellectual abilities (IQ, VIQ and NIQ), points out that in bottom of intellectual functions is psychological trauma with strong PTSD. Growth and strength of PTSD symptoms influences on significant damage of general, verbal and non – verbal intellectual abilities. Degree of intensive fear symptoms expression, presence of intrusion pictures of traumatic experience in thoughts and dreams, constant tendency to avoid recalling, conversations, and everything that can be reminding on traumatic experience as well as symptoms of increased arousal significantly influence devastation of general intellecttual abilities (IQ), abilities of verbal (VIQ) and manipulative (NIQ) intellectual functioning.

Results of this study are consistent to results of many researchers (according to Knaght 1997), that were using Wechsler scale of intelligence for adults and gained lower results on verbal and non – verbal scale connecting that to damages in frontal lobe region.

Also, war veterans with PTSD expressed signifycantly lower results ($p<0.01$) on mind efficacy coefficient (SQ) as indicator representing relation between total result on the test and suitable score of average individual age 20-24 years. That age interval according to Wechsler represents a period when individual achieves maximum of its mind abilities. War veterans with PTSD had significantly lower coefficient of mind efficacy than war veterans without PTSD as well as average, standard values of age group. That meant that 80.0% of war veterans with PTSD had decreased ability of mind efficacy, mental alert, on the level below average values (SQ=66-90). Based on those indicators we assumed that war veterans with strong PTSD had difficulties involving in programs requiring new skills and knowledge as well as mental alert.

Every human ability as it achieves its maximum starts to decrease. That decrease is slow at the beginning and becomes more rapid. Speed of ability decreasing is variant due to abilities. Reduce in mental, intellectual abilities with aging, is a part of general process of organism aging. For assessment of increased deterioration in intellectual abilities, Wechsler is using "Index of mental deterioration". That is a value gained from relation of stabile (slowly decreasing) and non – resistant (fast decreasing) test of Wechsler scale (1970). According to findings, mental deterioration is a pathological emersion mostly caused by pathological cerebral changes "organic" nature. Wechsler (according to Berger 1978) points out that intellectual abilities start to decrease as soon as they reach highest level (20-24 years of age), and after that period the rate of decrease in intellectual abilities becomes progressive.

Results point out that large number of war veterans with PTSD (86.0%) had significantly expressed mental deterioration ($p<0.01$), 76% of war veterans had score in index of mental deterioration higher than 12, that is 30% had index of mental deterioration between 12-20, and 46.0% of war veterans with developed PTSD expressed extremely high score in index of mental deterioration ($\%MD>20$). However, in war veterans without PTSD there was no score in mental deterioration ($\%MD<12$). Based on those results we conclude that large number of war veterans with PTSD had intensive decrease in mental abilities faster than suitable to aging.

Index of mental deterioration (%MD), in war veterans with PTSD highly correlates with the PTSD index of positive sign (strength of PTSD) as well as with the symptoms of PTSD grouped according to diagnostic categories. Stress level and PTSD strength significantly influence accelerated decreasing of intellectual abilities. Since that decrease is larger than changes expected for aging, largest number of participants were younger than 40 years, we can conclude with certainty than under the influence of traumatic stress and strong PTSD severe damages of intellectual functions occurred.

Psychological changes, occurring due to brain damaging, in traumatic stress and intellectual dysfunctions were an object of many researches. Wechsler points out that damaging of intellectual abilities can be caused by any brain damage where changes can move from insignificant changes in coefficient of intelligence (IQ), like in some localized injures, to visible damages or deterioration like in extensive temporal injures or some degenerative brain illness. Since traumatic stress with PTSD influences on significant changes, brain damages in area of cortex and limbic system, deficits in intellectual functions can be connected to brain damaging caused by traumatic stress and devastating PTSD.

Clinical differential – diagnostic assessment, that is analysis of scores in Wechsler scale of intelligence besides global indicators, includes indicators of mental functioning where it is needed to conduct inter – tested analysis, to analyze relation of results in comparison to average values of age group participants belong to. Results of deviation from average results of age group point out how much given results are in accordance to expected results, whether participants resolved tasks with more or less success.

War veterans with and without PTSD, on subtests of "education", "understanding", "mutual concepts" and "assembling figures" have no significant deviation from average values of their age group. These results confirm that their development in gaining knowledge coursed in stimulative conditions. These results are consistent to results of Vasterling et al. (2002). War veterans with

and without PTSD have a good level effective and practical knowledge (general knowledge), abilities of judgment, common sense (understanding), as well as abilities of logical understanding and understanding of mutual relations (mutual concepts). However, signifycant results difference ($p<0.01$) between war veterans with and without PTSD, points out that war veterans with PTSD were less efficient in abilities of general knowledge, abilities of understanding, common sense orientation and abilities of logical understanding. Correlation of these tests with frequency of expressing PTSD symptoms as well as with PTSD group symptoms categorized by diagnostic categories, was insignificant ($p>0.01$). These results show tnat abilities embrased in mentioned subtests are resistant to influence of traumatic stress with developed PTSD.

War veterans without PTSD also achieved on other tests of Wechsler scale, average results of their age group, especially scoring on practical knowledge, abilities of analytic – synthetic opinion, perception, perceptive organization. War veterans with PTSD express certain difficulties in solving tasks, and are less efficient in abilities of manipulating simple calculation tasks ("calculation"), have difficulties maintaining concentration in conditions of mind activities ("forming cubes"), abilities of perceptual organization ($p<0.01$). Also, war veterans with developed PTSD, on tests of mechanical memory ("memorizing numbers"), visual – perceptive abilities, abilities of perceptual organization ("sorting pictures"), abilities of mind concentration ("fulfilling pictures"), as well as associative thought elasticity and ability of short – term learning ("coding"), expressed extremely low level of efficacy with significant deficits ($p<0.01$). These results point out that deficits in mentioned intellectual abilities can with great certainty be attached to difficulties and severity of traumatic stress and strength of PTSD. These deficits are greater as frequency and strength of PTSD is greater.

Given results in this research are consistent to previous researches of Everley and Horton (1989, according to Knaight 1997), that determined significant correlation to attention disturbances, memory and short – term learning. Also, Dinklage and Godzinsky (1993, according to Knaight 1997) claimed that abused persons expressed significant attention deficits, verbal memory. Vasterling et.al. (2002), in Vietnam war veterans, besides attention deficits, memory, also point out significant deficits in associative mind elasticity, ability of short – term learning ("coding").

In clinical interpretation of Wechsler scale of intelligence for adults, as determinants of clinical characterristics of participants, great influence is given to inner – test variability. Inner- test variability is occurring in moments when participants solves certain test with success while others poorly. That is a measure pointing out in how many measure units the result of individual in certain test deviates from subtest average. According to Wechsler every deviant, bigger or lesser than ±1.4 units of subtest average is significant.

Based on that, based on different solutions and tasks performance, inner-tested variability provides identifycation of different damaging of mental functioning, identification of different diagnostic groups. Determining diagnostic groups demands finding unique signs combination, characteristic to certain diagnostic groups. According to results, in structure of mental functioning, war veterans with PTSD expressed significant oscillations while results of war veterans without PTSD were within limits of average subtests values, that is had no significant deviations from subtest average and were within range ±1.4. Significant negative deviations in war veterans with PTSD were expressed in tests "memory", "completing pictures", "coding"; 86.0% on test "memory", 58.0% on tests "completing pictures" and 48.0% on test "coding" had results below average. However, on test "education" (52.0%), "understanding" (64.0%), "mutual concepts" (78.0%) and "forming objects" (64.0%) had expressed significant deviations from test average. On tests "calculating" (68.0%), "sorting pictures" (62.0%) and "forming cubes" (70.0%) no significant deviations from average were determined.

Test variability expressed in this way, positive and negative deviations from test average, are diagnostic indicator pointing out certain dysfunctions in structure of intellectual functioning in war veterans with PTSD. According to results we can conclude that stress with developed PTSD significantly influenced deficits in the area of intellectual abilities (abilities of short – term and mechanic memory, efficient attention, concentration in terms of mind activities, associative mind elasticity, short – term learning). Based on those data, deficits expressed in psychologically traumatized war veterans with developed PTSD were caused by changes in rain functions due to effects of devastating PTSD.

The level o expressed positive and negative as well as moderate deviations from subtest average in war veterans with PTSD, develops a specific configuration of subtest grades, that are together with highly expressed mental deterioration, insignificantly higher verbal intelligence coefficient in comparison to non – verbal intelligence coefficient, as well as significantly low level of mind efficacy coefficient, the closest to Wechsler so called syndrome of "psycho-organic damage".

These results are consistent to researches of Vasterling et al. (1998), in comparison to neurocognitive and intellectual functions of war veterans with PTSD found significantly high correlation. War veterans with PTSD were less functioning on tasks assessing attention and work memory, learning ability.

Results of this study are consistent to results of most authors (Dinklage and Godzinsky 1993, according to Knaight-u 1997, Friedman et al. 1995, Bremner et al. 1996, Bremner et al. 1996, 1997, Arnsten 1998, Markowitsch et al. 1998, Vaesterling et al. 1998, 2002, Lambrosio and Sapolsky 1998, Bremner et al. 1999, Bremner 2000), that found significant disorders in area of intellectual abilities, attention, memory, short – term learning.

CONCLUSIONS

Difficulty of surviving and frequency of traumatic events are in high correlation with severity of PTSD, stress level. More severe and more frequent traumatic events mean higher stress level, PTSD symptoms occur almost everyday.

According to results, high level of correlation between strength of PTSD, stress level, we can conclude that devastating PTSD is directly connected to deficits in intellectual functioning. More expressed PTSD symptoms more expressed deficits in area of short – term and mechanic memory, efficient attention, concentration in terms of mind activity, associative mind elasticity, short – term learning, general intellectual functioning, mind efficacy and high level of mental deterioration.

Using large number of control variables, level of education and achievement in school, as well as achievement on test of efficient and practical knowledge, ability of judgment, common sense, results point out that war veterans in pre – traumatic period had no serious expressed difficulties in intellectual functioning. Based on this, with great reliability we conclude that disorders in intellectual functioning in war veterans with PTSD and high level of stress can be taken as a consequence of devastating PTSD and not as a consequence of pre – traumatic vulnerability.

Using methods of differential interpretation, we have an explanation of inner relations between certain factors of mind structure and aspects of mental functioning, between war veterans with and without PTSD. A significant result difference in intellectual functioning had been determined between war veterans with and without PTSD. War veterans with PTSD in comparison to war veterans without PTSD, expressed significantly lower results in general intelligence (IQ), as well as partial intelligence indicators (VIQ and NIQ), mind efficacy ability (SQ), had high level of mental deterioration as well as significantly expressed oscillation in inter – tested and inner – tested variability.

Acknowledgements: None.

Conflict of interest: None to declare.

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