

## RINGKASAN

### **PERUBAHAN TINGKAT INTENSITAS NYERI KEPALA, STRES PSIKOLOGIS, DEPRESI, KECEMASAN DAN KADAR NITRIT SERUM, PADA PENDERITA NYERI KEPALA TIPE TEGANG KRONIK. PENELITIAN PENGUKURAN PARAMETER SENSITISASI SENTRAL DARI TRIGEMINAL NUCLEUS CAUDALIS (TNC)**

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*Tension-Type Headache* (TTH) yang dalam bahasa Indonesia dikenal sebagai Nyeri Kepala Tipe Tegang (NKTT), adalah jenis nyeri kepala yang paling banyak dijumpai di populasi, berhubungan dengan ketegangan otot kepala (perikranial) dan ketegangan psikologis, serta banyak terkait dengan penurunan kualitas hidup, terutama jenis kronis yang dikenal dengan nama Nyeri Kepala Tipe Tegang Kronik (NKTTK).

Hingga kini, patofisiologi NKTT belum sepenuhnya dimengerti, walaupun banyak hipotesis diajukan, namun tidak satupun yang mampu menjawab semua aspek yang berkaitan dengan patogenesisnya. Diantara yang ada, maka hipotesis trigemino vaskular adalah yang paling rasional karena bertumpu pada eksitabilitas neuron sebagai pengirim impuls nyeri kepala.

Pada saat ini, kronisitas atau seringnya terjadi nyeri kepala pada penderita NKTTK, dianggap disebabkan oleh karena adanya suatu sensitisasi sentral (SS) dari *Trigeminal Nucleus Caudalis* (TNC), neuron urutan kedua saraf trigeminus yang membawa impuls nyeri ke otak. SS terjadi karena gangguan keseimbangan antara eksitasi yang berupa masukan (*input*) saraf tepi dari otot perikranial yang mengalami kontraksi lama dengan modulasi inhibisi sentral pada tingkat TNC. Eksitasi otot perikranial yang berlangsung lama, merangsang produksi *nitric oxide*

(NO) yang akan memicu SS dan ditandai oleh meningkatnya intensitas nyeri kepala, sedang gangguan modulasi inhibisi sentral banyak dipicu oleh keadaan psikologis, antara lain : stres psikologis, tingkat depresi dan kecemasan.

Penelitian yang bersifat observasional analitik ini, bertujuan untuk menguji teori mekanisme sensitisasi sentral TNC yang mendasari terjadinya NKTTK dengan cara mengukur kadar nitrit serum (sebagai indeks dari perubahan *nitric oxide*), intensitas nyeri kepala, tingkat stres, tingkat depresi dan tingkat kecemasan kasus NKTTK sebagai parameter yang mempunyai peran terhadap terjadinya sensitisasi sentral TNC. Untuk itu, ada 3 kelompok sampel yaitu : kelompok kasus NKTTK, sedang kelompok kontrol ada 2 macam, yaitu kelompok kontrol NKTTE dan kelompok kontrol subyek normal. Maksud dari pemakaian kedua kelompok kontrol tersebut yaitu : (1) kelompok kontrol subyek normal adalah mewakili keadaan subyek pada saat dalam keadaan normal sedang, (2) kontrol NKTTE adalah mewakili keadaan subyek pada saat NKTT namun belum mencapai tahap NKTTK.

Selain memperkuat konsep sensitisasi sentral TNC sebagai dasar mekanisme terjadinya NKTTK, hasil penelitian ini dapat digunakan sebagai : indikator dalam mencegah berkembangnya NKTTE menjadi NKTTK, dasar dalam memberi terapi secara lebih terarah, dan model bagi penelitian nyeri kepala primer lainnya.

## SUMMARY

### **THE LEVEL CHANGES OF HEADACHE INTENSITY, PSYCHOLOGICAL STRESS, DEPRESSION, ANXIETY AND SERUM NITRITE, IN CHRONIC TENSION-TYPE HEADACHE (CTTH) PATIENTS.**

#### **A MEASUREMENT STUDY FOR CENTRAL SENSITIZATION PARAMETERS OF THE TRIGEMINAL NUCLEUS CAUDALIS (TNC)**

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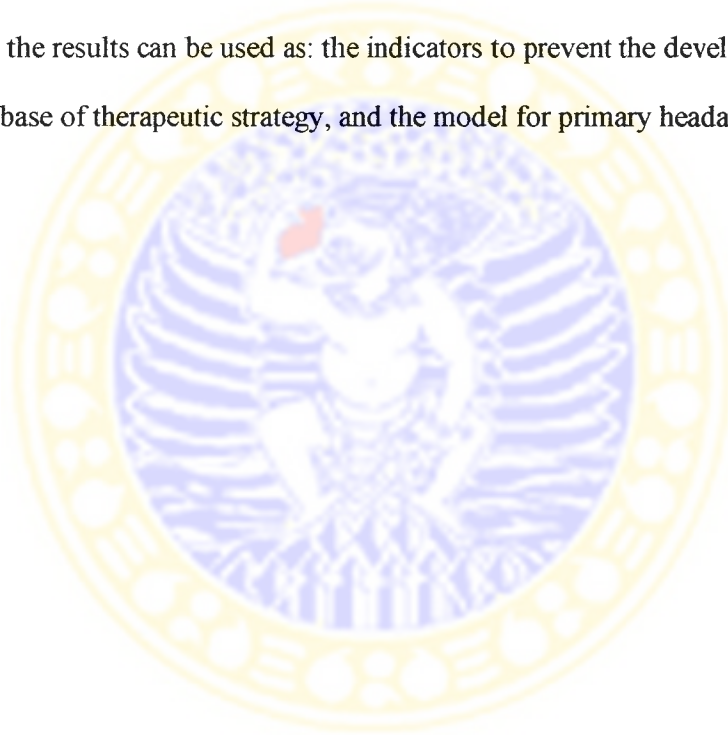
*Tension-Type Headache (TTH)* is the most common type of headache found in population. The headache is related to the pericranial muscles stress, psychological tensions, and to the decrease of quality of life as well, especially in the chronic type.

To date, the pathophysiology of TTH has not been fully understood. Chronicity of TTH is thought to be caused by central sensitization of the Trigeminal Nucleus Caudalis (TNC), the second order neuron that sends headache impulse to the brain. The central sensitization of the TNC is due to the imbalance of the increase of neuronal excitation input from peripheral pericranial muscles and decrease of central inhibition modulations in the level of TNC. Long-term contraction of pericranial muscles stimulates nitric oxide (NO) production and causes the central sensitization, characterized by the increase of headache intensity, while the decrease of central inhibition modulation of the TNC is most triggered by psychological stress, depression and anxiety levels.

This analytic observational study, was performed to investigate the central sensitization of the TNC, by measuring the headache intensity, psychological

stress, depression, anxiety and serum nitrite (index of NO change) levels, as the parameters of central sensitization of the TNC. There were 3 sample groups, i.e.: the Chronic Tension-Type Headache (CTTH) case group, Episodic Tension-Type Headache (ETTH) and normal subject control groups. The normal subject group represented the CTTH in normal condition, while the ETTH group is the representation of CTTH in the TTH circumstance but has not achieved the level of CTTH.

The aim of study was to strengthen the TNC central sensitization concept and the results can be used as: the indicators to prevent the development of CTTH, the base of therapeutic strategy, and the model for primary headache study.



## ABSTRACT

### THE LEVEL CHANGES OF HEADACHE INTENSITY, PSYCHOLOGICAL STRESS, DEPRESSION, ANXIETY AND SERUM NITRITE, IN CHRONIC TENSION-TYPE HEADACHE (CTTH) PATIENTS.

A MEASUREMENT STUDY FOR CENTRAL SENSITIZATION  
PARAMETERS OF THE TRIGEMINAL NUCLEUS CAUDALIS (TNC)

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**Background and aim:** To date, the pathophysiology of Tension-Type Headache (TTH) has not been fully understood. Currently, chronicity of TTH is thought to be caused by central sensitization of the Trigeminal Nucleus Caudalis (TNC). The central sensitization of the TNC is due to the imbalance of neuronal excitation and inhibition modulations in the level of the TNC. Long-term contraction of pericranial muscles, stimulates nitric oxide (NO) production and causes the central sensitization, characterized by the increase of headache intensity, while the decrease of central inhibition modulation is most triggered by psychological stress, depression and anxiety levels. The aim of the present study was to investigate the central sensitization of the TNC that underlay the mechanism of CTTH, by measuring the headache intensity, psychological stress, depression, anxiety and serum nitrite (index of NO change) levels, as the parameters of central sensitization of the TNC.

**Method:** This study involved 3 sample groups, i.e.: Chronic Tension-Type Headache (CTTH) case (30 persons), Episodic Tension-Type Headache (ETTH) (25 persons) and normal subject control groups ((25 persons). The headache intensity was measured by using visual analog scale (VAS), psychological stress

by Holmes & Rahe Method, depression by Beck Depression Inventory (BDI), anxiety by Taylor Manifest Anxiety Scale (TMAS) and serum nitrite levels by Griess reagent spectrophotometrically. The Anova (F test) was used to differentiate the mean values of sample groups statistically.

**Results:** The CTTH group had VAS, psychological stress, and depression levels higher than both the ETTH and normal subject control groups significantly. Anxiety level was not different between the CTTH and ETTH group, but CTTH group had anxiety level higher than normal control groups significantly, while there were no differences of the serum nitrite levels among the 3 sample groups.

**Conclusion:** The headache intensity, psychological stress and depression levels seemed to be the important factors in triggering central sensitization of the TNC. Although it had a role in the central sensitization of the TNC, anxiety level was not significantly different between CTTH and ETTH. So, the headache intensity, psychological stress and depression levels can be used as parameters to differentiate CTTH from ETTH, especially in the borderline case, while anxiety and serum nitrite levels were not.

**Keyword :** CTTH—SS-TNC—VAS—psychological stress—BDI— TMAS —  
serum nitrite levels.