

**PERBEDAAN PENGARUH PAPARAN MUSIK MOZART, BEETHOVEN,
DAN CHOPIN SELAMA KEBUNTINGAN TERHADAP INDEKS
APOPTOSIS SEL NEURON DI CEREBRUM DAN CEREBELLUM *Rattus
norvegicus* BARU LAHIR**

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ABSTRAK

Upaya yang dapat dilakukan untuk meningkatkan sel-sel otak di masa pranatal yaitu pemberian nutrisi dan stimulasi yang baik. Paparan musik klasik seperti Mozart, Beethoven, dan Chopin dapat meningkatkan gelombang aktivitas otak. Musik Mozart selama kebuntingan terbukti menurunkan apoptosis sel neuron.

Tujuan penelitian ini adalah menganalisis perbedaan indeks apoptosis sel neuron pada *cerebrum* dan *cerebellum Rattus norvegicus* baru lahir antara yang dipapar musik Mozart, Beethoven, Chopin, dan yang tidak dipapar musik selama kebuntingan dengan menggunakan metode penelitian eksperimental laboratorium, *posttest-only control group design*. Subjek penelitian *Rattus norvegicus* betina bunting dibagi 4 kelompok secara random masing-masing 6 sampel, 1 kelompok kontrol dan 3 kelompok perlakuan. Dilakukan superovulasi, setelah kebuntingan hari ke 10 diperdengarkan musik selama 1 jam malam hari pukul 20.00-21.00 dengan intensitas 65dB. Hari ke 20 induk dikorbkan dan dilakukan *sectio caesarea*, diambil 2 anak *Rattus norvegicus* baru lahir dengan berat terbesar, dan diambil jaringan otaknya untuk dibuat sediaan.

Rerata indeks apoptosis *cerebrum* dan *cerebellum* kelompok musik Mozart ($0,9 \pm 0,59$ dan $0,7 \pm 0,41$), Beethoven ($1,57 \pm 0,3$ dan $1,17 \pm 0,68$), Chopin ($1,77 \pm 0,81$ dan $1,57 \pm 0,49$), kontrol ($1,97 \pm 0,34$ dan $1,63 \pm 0,82$). Hasil Uji Kruskal-Wallis terdapat perbedaan bermakna antar kelompok dengan nilai $p=0,014$ pada *cerebrum* dan $p=0,033$ pada *cerebellum*. Dapat disimpulkan bahwa indeks apoptosis sel neuron *cerebrum* dan *cerebellum Rattus norvegicus* baru lahir yang dipapar musik Mozart terbukti lebih rendah dibandingkan yang dipapar musik Beethoven, Chopin.

Kata Kunci : Beethoven, Chopin, indeks apoptosis, Mozart, *Rattus norvegicus*

ABSTRACT

**THE DIFFERENCE OF INFLUENCE OF THE MOZART, BEETHOVEN,
AND CHOPIN MUSICAL COMPOSITIONS EXPOSURE DURING
PREGNANCY TO THE CEREBRUM AND CEREBELLUM APOPTOSIS
NEURONAL OF *Rattus norvegicus* OFFSPRING**

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The efforts that can be done to improve brain cells in the prenatal period is the provision of nutrients and good stimulation. Exposure to classical music such as Mozart, Beethoven, and Chopin music can increase the wave of brain activity. During pregnancy, Mozart music is proven to decrease the apoptosis of neuronal.

Analyzing the difference of apoptosis neuronal of cerebrum and cerebellum the offspring of *Rattus norvegicus* that are exposed to the Mozart, Beethoven, and Chopin music, and that is not exposed to music during pregnancy.

Laboratory experimental research, posttest-only control group design. Subjects were female pregnant *Rattus norvegicus*, grouped into 4 random groups: 1 control group and 3 treatments groups; with 6 samples each. Subjects were super ovulated, and 65 dB intensity of music was played for an hour at 8-9 pm on the subjects on 10th day of pregnancy. On 20th day of pregnancy, the mothers were dissected using sectio caesarea. 2 heaviest offspring' of *Rattus norvegicus* taken, and their brain tissues are taken as samples.

The mean of apoptosis neuronal of rat offspring' cerebrum and cerebellum were respectively from the low to high levels as follow Mozart music ($0,9\pm 0,59$ and $0,7\pm 0,41$), Beethoven ($1,57\pm 0,3$ and $1,17\pm 0,68$), Chopin ($1,77\pm 0,81$ and $1,57\pm 0,49$), control ($1,97\pm 0,34$ and $1,63\pm 0,82$). The data were analysed using Kruskal-Wallis test which showed significant differences between four groups $p=0,014$ in cerebrum and $p=0,033$ in cerebellum.

In conclusion, exposure of Mozart composition during pregnancy gave lower apoptosis of neuronal cerebrum and cerebellum in the offspring-rat compared with Beethoven and Chopin composition.

Keywords: Beethoven, Chopin, indeks apoptosis, Mozart, *Rattus norvegicus*