

The Effects of Shift Work on Neurobehavioral Performance: A Meta Analysis

Authors : Thomas Vlasak, Tanja Dujlociv, Alfred Barth

Abstract : Shift work is an essential element of modern labor, ensuring ideal conditions of service for today's economy and society. Despite the beneficial properties, its impact on the neurobehavioral performance of exposed subjects remains controversial. This meta-analysis aims to provide first summarizing the effects regarding the association between shift work exposure and different cognitive functions. A literature search was performed via the databases PubMed, PsyINFO, PsyARTICLES, MedLine, PsycNET and Scopus including eligible studies until December 2020 that compared shift workers with non-shift workers regarding neurobehavioral performance tests. A random-effects model was carried out using Hedge's g as a meta-analytical effect size with a restricted likelihood estimator to summarize the mean differences between the exposure group and controls. The heterogeneity of effect sizes was addressed by a sensitivity analysis using funnel plots, egger's tests, p-curve analysis, meta-regressions, and subgroup analysis. The meta-analysis included 18 studies resulting in a total sample of 18,802 participants and 37 effect sizes concerning six different neurobehavioral outcomes. The results showed significantly worse performance in shift workers compared to non-shift workers in the following cognitive functions with g (95% CI): processing speed 0.16 (0.02 - 0.30), working memory 0.28 (0.51 - 0.50), psychomotor vigilance 0.21 (0.05 - 0.37), cognitive control 0.86 (0.45 - 1.27) and visual attention 0.19 (0.11 - 0.26). Neither significant moderating effects of publication year or study quality nor significant subgroup differences regarding type of shift or type of profession were indicated for the cognitive outcomes. These are the first meta-analytical findings that associate shift work with decreased cognitive performance in processing speed, working memory, psychomotor vigilance, cognitive control, and visual attention. Further studies should focus on a more homogenous measurement of cognitive functions, a precise assessment of experience of shift work and occupation types which are underrepresented in the current literature (e.g., law enforcement). In occupations where shift work is fundamental (e.g., healthcare, industries, law enforcement), protective countermeasures should be promoted for workers.

Keywords : meta-analysis, neurobehavioral performance, occupational psychology, shift work

Conference Title : ICOPOH 2021 : International Conference on Organizational Psychology and Occupational Health

Conference Location : Vienna, Austria

Conference Dates : December 27-28, 2021