ORIGINAL RESEARCH

Codeine-Containing Cough Syrup Produces Adverse Effects on Foetal Development in Sprague-Dawley Rats

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To cite this article: Gbotolorun SC, Nnadozie AC, Okoh COA and Ogunlade B. Codeine-Containing Cough Syrup Produces Adverse Effects on Foetal Development in Sprague-Dawley Rats. Journal of Basic and Social Pharmacy Research, 2022;2(3):48-61
ISSN: 2705-3245

ABSTRACT

Background: Codeine-containing cough syrups (CCS) are consumed by people from all walks of life and almost all ages.
Objectives: The study investigated the effects of CCS on pregnancy outcomes using Sprague-Dawley rats.
Method: Twenty-five rats weighing 170 g averagely were divided into five groups: Control group received water only; Expectorant groups received doses 30 and 60 mg/kg body weight (bw) respectively (positive control); while Codeine-containing cough syrup groups (CCS) received 30 and 60 mg/kg doses /bw respectively. Cough syrups were administered to pregnant rats from gestation day 1-20 and sacrificed at day 20. Blood sample, foetus, uterus and placenta was collected for analysis.
Results: Results showed that body and uterine weights were not significantly different from control in all treatment groups. Significant reductions ($p<0.05$) were recorded in placental weight, foetal weight and crown-rump lengths except in the 60 mg/kg bw CCS group with concomitant increase in umbilical cord lengths compared to control except in the 30 mg/kg bw expectorant group. Reduced Glutathione (GSH) reduced significantly in all the treatment groups. Maternal hormonal assay showed no significant changes except for progesterone and luteinizing hormone, with significant differences in the 30 mg/kg bw CCS and expectorant groups. Histopathological findings showed presence of inflammation, necrosis, oedema, and fibrosis, with increased vascular congestions in both uterine tissue and chorion frondosum of the placenta.
Conclusion: CCS produces oxidative stress in the placenta which reaches the developing foetus thereby increasing foetal susceptibility to growth restrictions and mortality, even in the absence of obvious phenotypic malformations.

Keywords: Codeine cough syrup; Expectorant; hormonal assay; Histology, foetal parameters