Health risk assessment to fluoride and nitrate in drinking water of rural residents living in the Bardaskan city, arid region, southeastern Iran

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Received 22 May 2018; Accepted 23 December 2018

A B S T R A C T

In recent decades, harmful contaminants such as nitrate and fluoride have become more common. This cross-sectional study was conducted in 2016 on the ground water resources of Baradaskan city. In order to investigate the concentration fluoride and nitrate, sampling was done in 30 drinking water resources, then chemical parameters were analyzed according to standard method. The purposes of this investigation was (1) to provide an overview of present drinking water quality and compare it with the national standard (2) to determine spatial distribution of groundwater quality fluoride and nitrate concentrations, (3) to map groundwater quality in the study area, using GIS (V10.3), and (4) human health risk assessment was performed by calculating the chronic daily intake (CDI) and hazard quotient (HQ) of fluoride and nitrate through oral intake for infants, children, teenagers and adults. The minimum and maximum values of nitrate and fluoride concentrations were between 0.0–77.2, 0.2–1.036 mg/l, respectively. Spatial distributions of nitrate and fluoride concentrations showed that highest nitrate and lowest fluoride concentrations occurred in the north-east region of the study area. HQ values of nitrate for children, teenagers and adults 3, 1, 2 villages were more than one. In contrast, mean HQ values of fluoride were lower than 1, which was mostly acceptable.

Keywords: Drinking water; Nitrate; Fluoride; Health risk; Bardaskan

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