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### Data Article

# Data on health risk assessment of fluoride in water distribution network of Iranshahr, Iran

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### ABSTRACT

The main of this data was determine the concentrations and health risks of fluoride in 66 drinking water samples collected from villages of the Iranshahr city, Sistan and Baluchestan Province in Iran. Fluoride concentration was measured by the standard SPADNS method. Data indicated that fluoride concentration in drinking water ranged from 0.25 to 1.72 mg L<sup>-1</sup> and average of fluoride concentration was 0.27 mg L<sup>-1</sup>. The mean estimated daily intake (EDI) values for fluoride in different groups of infants, children, teenagers and adults were 0.0021, 0.0151, 0.0107 and 0.0086 mg/kg, respectively. Also, risk assessment data indicated that hazard quotient (HQ) value of groundwater samples is more than 1 in 6% of groundwater samples in age groups of children and teenagers.

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## Specifications table

Subject area	Water quality
More specific subject area	Water fluoride
Type of data	Table and Figure
How data was acquired	Spectrophotometer (DR/5000, USA).
Data format	Raw, Analyzed
Experimental factors	Water samples were taken from 66 stations and were stored in polyethylene bottles in a dark place at room temperature until analysis.
Experimental features	The levels of fluoride concentration were determined.
Data source location	Iranshahr region, of Sistan and Baluchestan Province, Iran
Data accessibility	The data are included in this article
Related research article	Yousefi M, Ghoochani M, Mahvi AH. Health risk assessment to fluoride in drinking water of rural residents living in the Poldasht city, Northwest of Iran. <i>Ecotoxicology and environmental safety</i> . 2018; 148:426-30.

## Value of the data

- Knowledge of fluoride level in potable groundwater is important for health care personnel and policymaker.
- Based on data, the fluoride concentration in 98% of water samples were less than the maximum permissible limits (1.5 mg/L) according WHO guidelines.
- Health risk assessment and data analysis indicated that HQ value was less than 1 in 94% of samples in all age groups and HQ value was more than 1 in 6% of samples in age groups of children and teenagers, so should be selected a suitable resource of drinking water for this age group.
- Base on the data, DE fluoridation of drinking water could be recommended in fluorotic rural area with high fluoride concentrations.

## 1. Data

Fig. 1 shows location of the water sampling in Iranshahr city, Sistan and Baluchistan province, Iran.

And Fig. 2 Dispersion of fluoride by GIS software. the parameters used to in this data for health exposure assessment in drinking water. Fluoride concentration, EDI and HQ for the four populations of water consumers in the data have been shown in Tables 1 and 2, respectively.

## 2. Experimental design, materials and methods

### 2.1. Description of study area

Iranshahr city is located in Sistan and Baluchistan province of Iran between the latitudes 27°12' N and Longitudes 60° 41' E. According to the demographic information of Iran, this city encompassed with an area 30,200 km<sup>2</sup>. Iranshahr city has a warm and dry climate with an annual mean temperature of 26.5 °C [8–10].

### 2.2. Determination of fluoride concentration in drinking water

For this data, 66 samples were taken from drinking water resources from villages during 12 months (2016). For this purpose, polyethylene bottles washed twice with deionized water and used

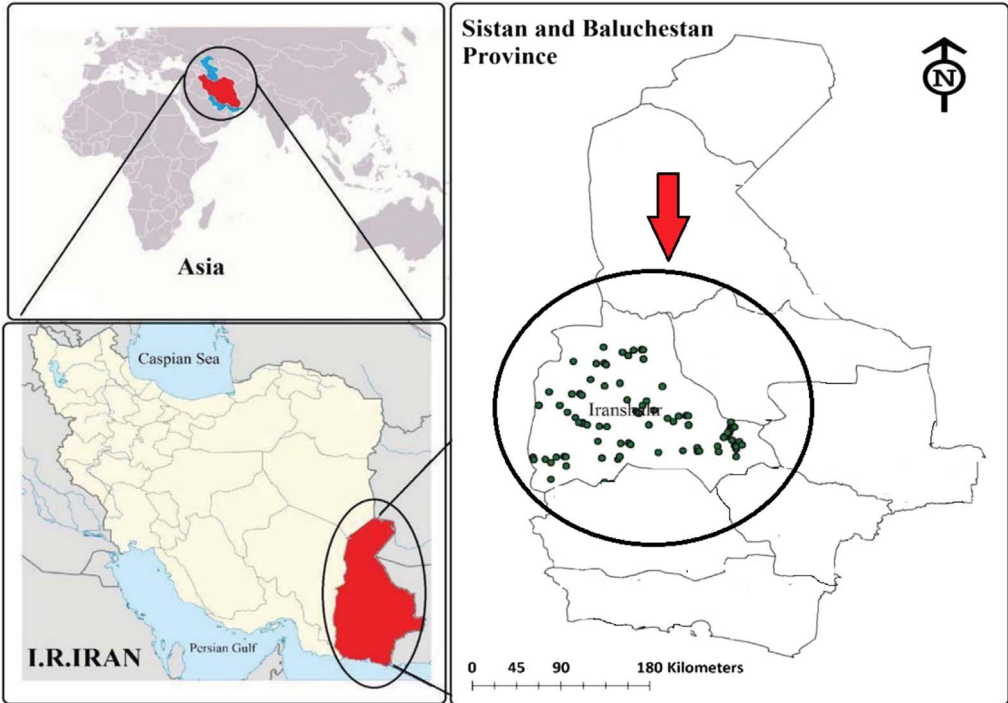


Fig. 1. Location of water sampling in Iranshahr city, Sistan and Baluchistan province, Iran.

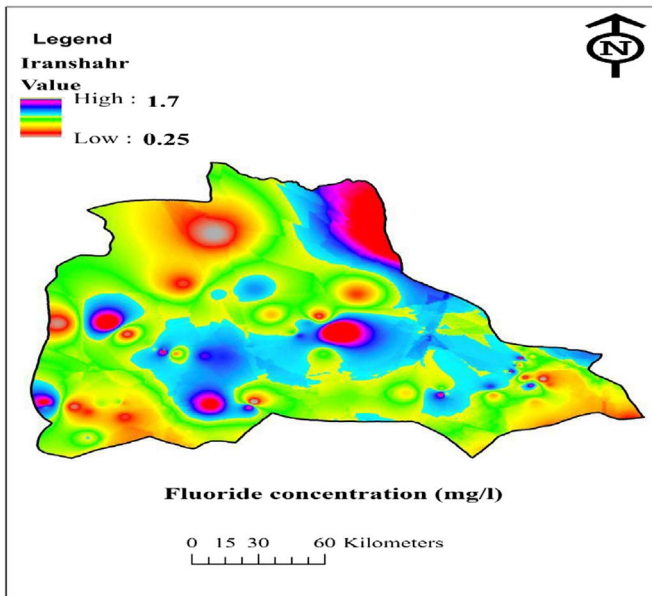


Fig. 2. Dispersion of F concentration ( $\text{mg L}^{-1}$ ) by GIS software.

**Table 1**

Parameters used to in this data for health exposure assessment in drinking water [1–7].

Parameter	Risk exposure factors	Values for groups				Unit
		Infants	Children	Teenagers	Adults	
Fluoride	$C_f$	–	–	–	–	mg/L
	$C_d$	0.08	0.85	2	2.5	Liter/day
	$B_w$	10	15	50	78	Kg
	RfD	0.06	0.06	0.06	0.06	mg/kg.day

for sampling. The water samples were transported to the laboratory in 4° and stored in a dark place at room temperature until analysis. Fluoride concentration of water samples were analyzed by SPADNS method using UV-visible Spectrophotometer (DR/5000, USA) [11–21].

### 2.3. Risk assessment of fluoride

In order to estimate the probability of adverse health effects it is necessary to assess human health risk. So, the quantitative health risk assessment of fluoride through consumption of drinking water was evaluated in rural population of Iranshahr city. For this purpose, water samples were taken from village areas. We divided population into four age groups based on physiological and behavioral differences according to study by Yousefi et al. (2017) as follow: infants (less than 2 years), children (2 to < 6 years), teenagers (6 to < 16 years) and adults ( $\geq 16$  years). The daily exposure to fluoride was calculated in these groups using Eq. (1) [2]:

$$EDI = \frac{C_f \times C_d}{B_w} \quad (1)$$

EDI: Estimation of daily fluoride consumption

$C_f$ : Fluoride concentration in drinking water (mg/L)

$C_d$ : Average daily drinking water intake

$B_w$ : body weight (Kg)

Water consumption and body weight data were measured based on a questionnaire that was asked from target groups (infants, children, adolescents and adults). The average water consumption rates in infants (0–2 years old), children (2–6 years old), teenagers (6–16 years old) and adults ( $\geq 16$  years old) were 0.08, 0.85, 2 and 2.5 L day<sup>-1</sup>, respectively. Body weights of target groups were considered 10, 15, 50 and 78 kg, respectively. HQ is the non-carcinogenic risk of fluoride to human health that was calculated using Eq. (2).

$$HQ = \frac{EDI}{RFD} \quad (2)$$

EDI: Estimated Daily intake (mg/kg d)

RFD: reference dose of fluoride (mg/Kg/day)

The reference dose for fluoride is (0.06 mg kg<sup>-1</sup> d<sup>-1</sup>).

A value of HQ less than one indicates a negligible risk of non-carcinogenic effects and HQ higher than one indicates a significant risk level [22–25].

**Table 2**

The fluoride concentration in drinking water and EDI and HQ for the four populations of water consumers.

Nos	Fluoride concentration	Infants	EDI Children	Teenagers	Adults	Infants	HQ Children	Teenagers	Adults
1	0.380	0.0030	0.0215	0.0152	0.0122	0.0507	0.3589	0.2533	0.2030
2	0.590	0.0047	0.0334	0.0236	0.0189	0.0787	0.5572	0.3933	0.3152
3	0.770	0.0062	0.0436	0.0308	0.0247	0.1027	0.7272	0.5133	0.4113
4	0.700	0.0056	0.0397	0.0280	0.0224	0.0933	0.6611	0.4667	0.3739
5	0.420	0.0034	0.0238	0.0168	0.0135	0.0560	0.3967	0.2800	0.2244
6	0.510	0.0041	0.0289	0.0204	0.0163	0.0680	0.4817	0.3400	0.2724
7	0.810	0.0065	0.0459	0.0324	0.0260	0.1080	0.7650	0.5400	0.4327
8	0.500	0.0040	0.0283	0.0200	0.0160	0.0667	0.4722	0.3333	0.2671
9	0.780	0.0062	0.0442	0.0312	0.0250	0.1040	0.7367	0.5200	0.4167
10	0.630	0.0050	0.0357	0.0252	0.0202	0.0840	0.5950	0.4200	0.3365
11	0.610	0.0049	0.0346	0.0244	0.0196	0.0813	0.5761	0.4067	0.3259
12	0.350	0.0028	0.0198	0.0140	0.0112	0.0467	0.3306	0.2333	0.1870
13	0.530	0.0042	0.0300	0.0212	0.0170	0.0707	0.5006	0.3533	0.2831
14	0.410	0.0033	0.0232	0.0164	0.0131	0.0547	0.3872	0.2733	0.2190
15	0.290	0.0023	0.0164	0.0116	0.0093	0.0387	0.2739	0.1933	0.1549
16	0.540	0.0043	0.0306	0.0216	0.0173	0.0720	0.5100	0.3600	0.2885
17	0.940	0.0075	0.0533	0.0376	0.0301	0.1253	0.8878	0.6267	0.5021
18	0.590	0.0047	0.0334	0.0236	0.0189	0.0787	0.5572	0.3933	0.3152
19	0.690	0.0055	0.0391	0.0276	0.0221	0.0920	0.6517	0.4600	0.3686
20	0.900	0.0072	0.0510	0.0360	0.0288	0.1200	0.8500	0.6000	0.4808
21	0.510	0.0041	0.0289	0.0204	0.0163	0.0680	0.4817	0.3400	0.2724
22	1.720	0.0138	0.0975	0.0688	0.0551	0.2293	1.6244	1.1467	0.9188
23	1.070	0.0086	0.0606	0.0428	0.0343	0.1427	1.0106	0.7133	0.5716
24	1.050	0.0084	0.0595	0.0420	0.0337	0.1400	0.9917	0.7000	0.5609
25	0.970	0.0078	0.0550	0.0388	0.0311	0.1293	0.9161	0.6467	0.5182
26	0.950	0.0076	0.0538	0.0380	0.0304	0.1267	0.8972	0.6333	0.5075
27	0.600	0.0048	0.0340	0.0240	0.0192	0.0800	0.5667	0.4000	0.3205
28	0.690	0.0055	0.0391	0.0276	0.0221	0.0920	0.6517	0.4600	0.3686
29	0.420	0.0034	0.0238	0.0168	0.0135	0.0560	0.3967	0.2800	0.2244
30	0.530	0.0042	0.0300	0.0212	0.0170	0.0707	0.5006	0.3533	0.2831
31	0.440	0.0035	0.0249	0.0176	0.0141	0.0587	0.4156	0.2933	0.2350
32	0.310	0.0025	0.0176	0.0124	0.0099	0.0413	0.2928	0.2067	0.1656
33	0.870	0.0070	0.0493	0.0348	0.0279	0.1160	0.8217	0.5800	0.4647
34	1.220	0.0098	0.0691	0.0488	0.0391	0.1627	1.1522	0.8133	0.6517
35	0.75	0.0060	0.0425	0.0300	0.0240	0.1000	0.7083	0.5000	0.4006
36	0.76	0.0061	0.0431	0.0304	0.0244	0.1013	0.7178	0.5067	0.4060
37	0.62	0.0050	0.0351	0.0248	0.0199	0.0827	0.5856	0.4133	0.3312
38	0.28	0.0022	0.0159	0.0112	0.0090	0.0373	0.2644	0.1867	0.1496
39	1.03	0.0082	0.0584	0.0412	0.0330	0.1373	0.9728	0.6867	0.5502
40	0.53	0.0042	0.0300	0.0212	0.0170	0.0707	0.5006	0.3533	0.2831
41	1.25	0.0100	0.0708	0.0500	0.0401	0.1667	1.1806	0.8333	0.6677
42	0.52	0.0042	0.0295	0.0208	0.0167	0.0693	0.4911	0.3467	0.2778
43	0.62	0.0050	0.0351	0.0248	0.0199	0.0827	0.5856	0.4133	0.3312
44	0.57	0.0046	0.0323	0.0228	0.0183	0.0760	0.5383	0.3800	0.3045
45	0.73	0.0058	0.0414	0.0292	0.0234	0.0973	0.6894	0.4867	0.3900
46	0.37	0.0030	0.0210	0.0148	0.0119	0.0493	0.3494	0.2467	0.1976
47	0.32	0.0026	0.0181	0.0128	0.0103	0.0427	0.3022	0.2133	0.1709
48	0.54	0.0043	0.0306	0.0216	0.0173	0.0720	0.5100	0.3600	0.2885
49	0.54	0.0043	0.0306	0.0216	0.0173	0.0720	0.5100	0.3600	0.2885
50	0.39	0.0031	0.0221	0.0156	0.0125	0.0520	0.3683	0.2600	0.2083
51	0.76	0.0061	0.0431	0.0304	0.0244	0.1013	0.7178	0.5067	0.4060
52	0.43	0.0034	0.0244	0.0172	0.0138	0.0573	0.4061	0.2867	0.2297
53	0.54	0.0043	0.0306	0.0216	0.0173	0.0720	0.5100	0.3600	0.2885
54	0.83	0.0066	0.0470	0.0332	0.0266	0.1107	0.7839	0.5533	0.4434
55	0.36	0.0029	0.0204	0.0144	0.0115	0.0480	0.3400	0.2400	0.1923
56	0.58	0.0046	0.0329	0.0232	0.0186	0.0773	0.5478	0.3867	0.3098
57	0.37	0.0030	0.0210	0.0148	0.0119	0.0493	0.3494	0.2467	0.1976
58	0.42	0.0034	0.0238	0.0168	0.0135	0.0560	0.3967	0.2800	0.2244
59	0.25	0.0020	0.0142	0.0100	0.0080	0.0333	0.2361	0.1667	0.1335

**Table 2** (continued)

Nos	Fluoride concentration	Infants	EDI Children	Teenagers	Adults	Infants	HQ Children	Teenagers	Adults
60	0.5	0.0040	0.0283	0.0200	0.0160	0.0667	0.4722	0.3333	0.2671
61	0.84	0.0067	0.0476	0.0336	0.0269	0.1120	0.7933	0.5600	0.4487
62	0.69	0.0055	0.0391	0.0276	0.0221	0.0920	0.6517	0.4600	0.3686
63	0.93	0.0074	0.0527	0.0372	0.0298	0.1240	0.8783	0.6200	0.4968
64	0.54	0.0043	0.0306	0.0216	0.0173	0.0720	0.5100	0.3600	0.2885
65	0.51	0.0041	0.0289	0.0204	0.0163	0.0680	0.4817	0.3400	0.2724
66	0.75	0.0060	0.0425	0.0300	0.0240	0.1000	0.7083	0.5000	0.4006
Mean	0.27	0.0021	0.0151	0.0107	0.0086	0.0356	0.2522	0.1781	0.1427
Min	0.25	0.0020	0.0142	0.0100	0.0080	0.0333	0.2361	0.1667	0.1335
Max	1.72	0.0138	0.0975	0.0688	0.0551	0.2293	1.6244	1.1467	0.9188
SD	0.27	0.0021	0.0151	0.0107	0.0086	0.0356	0.2522	0.1781	0.1427

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## Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.dib.2018.08.184>.

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