HEALTH STATUS OF ADOPTED CHILDREN AFTER THE HAÏTIAN EARTHQUAKE

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Revised abstract

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Background

On January 12th, 2010, a 7.0-magnitude earthquake in Haïti disrupted infrastructure and displaced 2 million persons, worsening poor living conditions, overcrowding, with consequent vulnerability to malnutrition and communicable diseases.

Aim of the study

The primary purpose of this report was to monitor health status of arriving orphans, promptly adopted from Haïti, for humanitarian reasons.

Methods

- Children were evaluated at the International Health Clinic, CHU Sainte-Justine, Montreal, in a setup to accommodate numerous adoptees arriving in a very short period of time, between 2010/01/24 and 2010/03/25.
- Demographic information, growth parameters, tuberculosis skin testing (PPD), and laboratory screening tests were gathered.
- WHO Growth Charts for Canada were used[1].
- For statistical comparison, we used our previous databases including 52 / 630 immigrant children and 38 / 671 adoptees, emigrated from Haïti.
- Data compilation and analysis were realized using Microsoft Excel Office XP and SPSS software.
- *Ancylostoma duodenale, Ascaris lumbricoides, Dientamœba fragilis, Entamœba histolytica, Enterobius vermicularis, Giardia lamblia, Hymenolepsis nana, Schistosoma mansoni, Strongyloides stercoralis and Trichuris trichiura* were considered to be pathogenic, while *Blastocystis hominis, Chilomastix mesnili, Endolimax nana, Entamœba coli, Entamœba dispar, Entamœba hartmanii and Iodamœba buetschlii* were considered to be non-pathogenic.

[1] http://www.dietitians.ca/Secondary-Pages/Public/Who-Growth-Charts.aspx

Results

TABLE 1. DEMOGRAPHIC CHARACTERISTICS AND GROWTH PARAMETERS

	Adopted after Earthquake 2010-01 / 2010-03 N : 101	Immigrant 1998-09 / 2009-05 N : 52	Adoptees 1998-02 / 2001-12 N : 38
Gender (female); N (%)	70 (69.3)	27 (51.9)	17 (44.7)
Age at arrival (years)			
Average ± SD	6.7 ± 5.3	6.2 ± 4.3	2.1 ± 2.3
Median and Ranges	4 [0 - 20]	5 [0 - 18]	2 [0 - 12]
Age ≤ 5 years			
N (%)	58 (57.4)	33 (63.5)	36 (94.7)
Average ± SD	2.7 ± 1.1	3.4 ± 1.4	1.6 ± 1.2
Median and Ranges	3 [0 - 5]	3 [1 - 5]	2 [0 - 4]
Time/evaluation after arrival (days)			
Average ± SD	3.8 ± 5.2	252.2 ± 251.7	49.1 ± 83.2
Median and Ranges	3 [0 - 50]	188 [8 - 1198]	29 [3 - 437]
Time < 1 day			
N (%)	25 (24.8)	0	0
Average ± SD	0.5 ± 0.5		
Median and Ranges	1 [0 - 1]		
Children hospitalized at first visit; N (%)	8 (7.9)	NA	NA
Height* < 0.1% P; N (%)	17 (16.8)	1 (1.9)	10 (26.3)
Weight† < 0.1% P; N (%)	13/71 (18.3)	0/43	5/36 (13.9)
Cranial circumference ‡ < 0.1% P; N (%)	2/18 (11.1)	0/10	1/26 (3.9)
Weight / Height‡ < 0.1% P; N (%)	1/18 (5.6)	0/10	1/25 (4.0)
Body Mass Index** < 0.1% P; N (%)	1/83 (1.2)	0/49	0/16

NA: Not available P: percentile * [0-19 years old], † [<10 years old], ‡ [<2 years old], ** [>2 years old]

TABLE 2. GENERAL HEALTH SCREENING

	Adopted after Earthquake 2010-01 / 2010-03 N : 101	Immigrant 1998-09 / 2009-05 N : 52	Adoptees 1998-02 / 2001-12 N : 38
Haemoglobin			
Low; N (%)	50 (49.5)	28 (53.9)	22 (57.9)
Average ± SD	102.0 ± 10.4	108.0 ± 8.3	97.1 ± 12.0
Median and Ranges	102 [72 - 126]	111 [79 - 119]	97 [76 - 114]
Iron Saturation			
≤ 0.20; N (%)	72/100 (72.0)	22/39 (56.4)	7/17 (41.2)
Average ± SD	0.1 ± 0.1	0.1 ± 0.0	0.1 ± 0.0
Median and Ranges	0.1 [0.1 - 0.2]	0.1 [0.1 - 0.2]	0.1 [0 - 0.2]
Count of eosinophils			
≥ 500 cells/mm³; N (%)	28 (27.7)	7 (13.5)	16 (42.1)
Average ± SD	1250.0 ± 926.4	614.3 ± 167.6	1531.3 ± 2021.5
Median and Ranges	800 [500 - 3800]	500 [500 - 900]	850 [500 - 8000]
Hemoglobinopathy; N (%)	19/100 (19.0)	13/48 (27.1)	10/35 (28.6)
Low G6PD; N (%)	18/99 (18.2)	7/35 (20.0)	NA
Low Albuminemia; N (%)	35/99 (35.4)	NA	6/26 (23.1)
Low Vitamin A; N (%)	7/99 (7.1)	NA	NA
Low Zinc; N (%)	20/98 (20.4)	NA	NA
TSH Abnormal; N (%)	14/100 * (14.0)	NA	0/7
Average ± SD	0.7 ± 0.1		
Median and Ranges	0.7 [0.4 - 0.9]		
Lead > 0.32umol/L; N (%)	35/99 (35.4)	5/21 (23.8)	NA
Average ± SD	0.6 ± 0.3	0.6 ± 0.4	
Median and Ranges	0.5 [0.3 - 2.0]	0.4 [0.3 - 1.2]	
Bone maturation Altered; N (%)	33/100 † (33.0)	NA	1/4 † (25.0)

NA: Not Available * Low TSH: N=12; High TSH N=2 Bone Maturation: † Retarded N= 28, Advanced N=5; ‡ Advanced N=1/4

TABLE 3. INFECTIOUS HEALTH SCREENING

	Adopted after Earthquake 2010-01 / 2010-03 N : 101	Immigrant 1998-09/ 2009-05 N : 52	Adoptees 1998-02 / 2001-12 N : 38
TST (PPD)			
≥10mm; N (%)	22/87 (25.3)	12/46 (26.1)	5/27 (18.5)
Average ± SD	24.1 ± 8.6	15.1 ± 3.7	14.0 ± 4.0
Median and Ranges	24 [11 - 44]	15 [10 - 22]	13 [11 - 21]
Latent tuberculosis	20	12	5
Tuberculosis disease	2	0	0
Hepatitis B			
HBsAg; N (%)	0	0	0
Anti-HBs			
≥10 mUI/ml; N (%)	17/100 (17.0)	28/51 (54.9)	5 (13.2)
Average ± SD	474.3 ± 418.6	532.2 ± 406.6	34.2 ± 21.4
Median and Ranges	370 [12 - > 1000]	383 [21 - >1000]	29 [14 - 69]
Anti-HBc; N (%)	3/98 (3.1)	1/50 (2.0)	1/37 (2.7)
IgG	NA	1	1
IgM	NA	0	0
Hepatitis C (IgG); N (%)	0/99	0	1 (2.6)
Hepatitis A; N (%)			
IgG	64/98 (65.3)	1/10 (10.0)	1/37 (2.7)
IgM	2/100 (2.0)	2/10 (20.0)	1/37 (2.7)
Syphilis (RPR); N (%)	0/88	0/48	1/36 (2.8)
HIV; N (%)	0/100	2/51 (3.9)	0
Strongyloides stercoralis; N (%)	13 (12.9)	2/13 (15.4)	NA
Stool parasites; N (%)			
- Infection with ≥1 pathogen/commensal	70/99 (70.7)	16/44 (36.4)	12/29 (41.4)
- Infection with ≥3 pathogens/commensals	38/99 (38.4)	1/45 (2.2)	5/29 (17.2)
- Infection with ≥1 pathogen	41/99 (41.4)	8/45 (17.8)	11/29 (37.9)
Stool cultures N (%)	5/68 (7.4)	0/9	4/20 (20.0)

Strongyloides serology: Doubtful [0.20-0.29]; Positive [≥0.30]

TABLE 4. RISK FACTORS FOR ADOPTED HAÏTIAN AFTER EARTHQUAKE

	Immigrant Univariate (OR) (95% CI)	Adoptees Univariate (OR) (95% CI)
Female	**2.1 [1.1 – 4.2]**	**2.8 [1.3 – 6.0]**
Age ≤ 5 years	0.9 [0.4 - 1.8]	**0.1 [0.0 – 0.4]**
Iron saturation ≤ 0.20	2.0 [0.9 - 4.3]	**4.7 [1.6 – 14.0]**
Eosinophilia ≥ 500 cells/mm³	2.1 [0.9 - 5.0]	0.5 [0.2 – 1.2]
PPD ≥ 10 mm	1.0 [0.4 - 2.2]	1.5 [0.5 - 4.4]
Stool parasites		
Infection with ≥1 pathogen/commensal	**4.2 [2.0 - 9.0]**	**3.4 [1.5 – 8.1]**
Infection with ≥3 pathogens/commensals	**27.0 [3.6 - 203.9]**	**2.9 [1.0 – 8.4]**
Infection with ≥1 pathogen	**3.2 [1.4 - 7.6]**	1.1 [0.5 – 2.7]

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Compared to Haitian Immigrant, in a multivariate model, we included the variables: gender, age ≤5 years, eosinophilia and presence of ≥ 3 parasites; only the presence of parasites remained significant [OR: 21.9; 95% CI: 2.9 – 168.5].

Compared to Haitian Adoptees, in a multivariate model, we included: gender, age ≤5 years, iron saturation and presence of ≥ 1 parasite; gender [OR: 8.9; 95% CI: 1.7 – 48.3] and iron saturation [OR: 11.9; 95% CI: 2.6 – 55.9] remained significant.

Conclusion

- This study shows a high vulnerability of these children for anemia, iron deficiency, eosinophilia, hypoalbuminemia, and latent tuberculosis.
- Upon arrival, a significant number of children had been hospitalized.
- Haïtian children adopted after earthquake had higher probability of harbouring intestinal parasites than immigrant children or adoptees from Haïti.
- In a multivariate model, only the presence of parasites - compared to haïtian immigrant - and the gender and iron saturation -compared to haïtian adoptees - remained significant.
- We strongly believe that rapid evaluation and screening was mandatory in these children in order to provide adequate health care, appropriate treatment and to assure guidance to the adoptive family.