

Table 1. Studies examining the association between drinking water and health in the Gaza Strip

Risk	First author Year	Location	Objective	Design	Sample size	Risk measure RR, OR, Prev(%)	Recommendations
Nitrates	Abu Naser 2007	Three areas of Gaza Strip (Jabalia, Gaza City and Khan Younis)	To determine the factors associated with high methaemoglobin (Met-Hb) levels in infants and the relationships with nitrate concentration in drinking water wells	Descriptive cross- sectional and analytical study	338 infants	Significant positive association between Met-Hb and boiled water for formula $\chi^2=6.91, P = 0.009$	Importance of exclusive breastfeeding for infants <6 months old, and the choice of a suitable source of water for these children
Fluorides	Shomar 2004	Five governorates of Gaza	To determine the average levels of fluoride in groundwater and topsoils of the Gaza Strip; to determine the levels of fluoride in the prepared tea and tea leaves used in Gaza; to identify the major fluoride minerals in soil that may supply groundwater with fluoride ions; to determine the dental fluorosis index (DFI) for schoolchildren	Cross- sectional	353 school children (from 24 schools in 5 governorates)	Linear regression analysis found a correlation ($r =$ 0.72) between levels of fluoride in drinking water and the Dental Fluorosis Index	There are a number of wells in the northern area of Gaza that are low both in fluoride and salinity which, when mixed with other wells, will result in water of acceptable quality. Parents, caregivers, water quality experts and health care professionals should judiciously monitor use of all fluoride- containing dental products by children under of 5.
Fluorides	Abuhaloob 2012	Five governorates of Gaza	To determine the history of breastfeeding and dietary behaviours among children in the Gaza Strip and to examine potential associations with the prevalence and severity of dental fluorosis	Cross- sectional study	350 children and their mothers (Stratified cluster random sample from 5 governorates)	No association between breastfeeding, drinking formula, and use of mineral vs. tap water, and start of tea drinking and dental fluorosis.	To develop an appropriate prevention strategy to reduce the fluoride intake to a suitable level in order to prevent dental fluorosis and other potential health hazards.
Iodine	Sack 2000		To examine the relationship between low groundwater iodine and iodine deficiency and school children.	Descriptive study	Water samples collected from 44 groundwater sources (not in Gaza). Urine samples from 728 children	Children from Gaza had very high urinary iodine excretion (93% excreting more than $140 \mu\text{g l/g Cr}$ and only 1% excreting less than $50 \mu\text{g l/g Cr}$.	Several areas with low urinary iodine excretion are found in the study. Gaza is one of the areas with less proportion of children with low urinary iodine excretion. Most of the areas studied in the article were found to be iodine deficient. Therefore authors recommend that The Palestinian territory and Israel should monitor the iodine status using the WHO recommended criteria, especially in areas known to be iodine deficient

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Diarrhea	Aboutier 2011	Four governorates of Gaza (Caza - Al Zaitoun, Sabha, Northern - Jabalia, Middle - Der Al Balah, Al Nusairat, Khan Younis - Bander Khan Younis)	To investigate the impact of water resources and poverty on diarrhea occurrence in patients attending primary health care centres	Matched case control study	266 patients (recruited from 6 primary health care centers in 4 governorates)	Public water access at home OR 0.046 ($P = 0.0083$) CI (0.005 - 0.454) (Lack of public water access at home = independently predictive of diarrhea. Non-consumption of bottled water was associated with diarrhea in the univariate analysis but did not remain in the multivariable was	Efforts should be made to implement guidelines in order to better manage diarrhea, especially in children. Palestinians should be helped to improve access to and quality of water, including repairing and improving partly destroyed water and sewage networks and allowing the importation of necessary materials into Gaza.
Diarrhea/ Parasites	Abu Mourad 2004	Nuseirat Refugee Camp	To assess the socioeconomic-demographic, environmental health and hygiene conditions associated with intestinal parasites and diarrhea in Nuseirat Refugee Camp of Gaza Strip	Cross-sectional study	1625 households (stratified sample from eight Blocks)	Intestinal parasites strongly associated with source of drinking water ($\chi^2=260$, $P<0.001$) and cleaning of tanks ($\chi^2=863$, $P<0.001$). Diarrhea strongly associated with source of drinking water ($\chi^2=793$, $P<0.001$), full-day supply ($\chi^2=8.7$, $P<0.1$) and cleaning of water tanks ($\chi^2=273$, $P<0.001$).	Effort should be focused on the following interventions: Promote health-education programmes Urgent introduction of awareness and educational programmes to improve the environmental health awareness Establish multidisciplinary approach among all related sectors to overcome environmental and health-related problems Support community involvement for solving the above mentioned problems Co-operation and fund-raising for improving the and reconstructing the infrastructure.

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Diarrhea	Yassin 2006	Gaza governorate	To assess the contamination level of total and faecal coliforms in water wells and distribution networks, and their association with human health in Gaza Governorate, Gaza Strip	Cross-sectional study?	150 residents of Gaza City (sampling strategy unspecified)	Self-reported diarrhea highest among people drinking municipal water vs. desalinated/home-filtered water (OR =1.6, CI 0.5-4.75), people with municipal water networks 4-5 years old (OR = 3.43, CI 0.16-20.06) and people with interrupted water supply (OR = 2.2, CI 1.07-4.55)	Establishment of a proper sewage system in this governorate is a priority Regular maintenance of water networks is necessary to reduce breakages in pipelines. Interruption of the water supply should be minimized. Regular cleaning of water roof tanks and proper disinfection are recommended (2/3 interviewees don't clean the tanks)
Diarrhea	Abu Amr 2008	Khan Younis Governorate	To assess the contamination level of total and faecal coliforms in water wells and distribution networks over the past 7 years, and their association with human health in Khan Younis Governorate, Gaza Strip	Cross-sectional study	210 residents of Khan Younis Governorate (sampling strategy unspecified)	Self-reported diarrhea highest among people drinking municipal water vs. desalinated/home-filtered water (OR =2.03, CI 0.77-5.54), people with municipal water networks 4-5 years old (OR = 1.96, CI 0.5-7.75) and people with interrupted water supply (OR = 4.61, CI 2.06-10.4)	Establish a proper sewage system in this governorate is a priority Regular maintenance of water networks is necessary to reduce breakages in pipelines. Interruption of the water supply should be minimized. Regular cleaning of water roof tanks and proper disinfection are recommended (2/3 don't clean the tanks)
Yersinia enterocolitica	El Qouqa 2011	Pediatric departments of three hospitals	To identify risk factors for infection with Y. enterocolitica and identify presenting signs and symptoms specifically associated with developing infection.	Matched case control study	600 cases from pediatric departments of three hospitals	Compared to unmatched controls, in multivariable analysis non-chlorinated water supply (aOR 3.05, P=0.049) was independently associated with infection.	More attention to the alleviation of malnutrition. Increased supervision of the water supply by local health departments. Further studies needed to investigate more risk factors and the main sources of Yersinia enterocolitica