

BRIEF REPORT

Voices from Flint: Community Perceptions of the Flint Water Crisis

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Abstract We describe the self-reported socioeconomic and health impacts, as well as the coping mechanisms employed by a drug-using cohort of adults during the Flint water crisis (FWC) in Flint, Michigan. Participants from an ongoing longitudinal Emergency Department study were contacted between April 2016 and July 2016 and completed a survey focusing on exposure, consequences, and coping strategies. One hundred thirty-three participants (mean age = 26, 65% African-American, 61% public assistance) completed the survey (37.9%

response rate). Of these, 75% reported exposure to water with elevated lead levels. Of these, 75% reported additional monthly expenses resulting from exposure. Almost 40% of parents reported changes in their children's health and 65% reported changes to their health since the FWC. Participants indicated the use of both positive (e.g., advice from trusted neighbors, 99.0%) and negative coping mechanisms (e.g., increased substance use, 20.0%) in response to this public health emergency. High-risk Flint residents reported multiple social, economic, and health-related consequences stemming from the FWC. Policymakers should consider additional resources for those affected, including increased access to mental health to aid recovery within the community.

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Introduction

In April 2014, the water source in Flint, Michigan, was switched from Lake Huron to the Flint River. Following resident reports of changes in the quality and appearance of their water, as well as reported health effects, researchers discovered elevated lead levels in Flint's drinking water [1]. The water quality was affected because corrosion control was not used at the water treatment plant, leading to increased lead levels in the drinking water [2]. Between April 25, 2014 and October 2015, almost 100,000 residents in Flint were affected by drinking water quality changes [2]. Although the

water source was switched back to the Lake Huron source in October 2015, residents were advised to use filtered tap water and pregnant women and children under six were advised to drink bottled water [2]. In January 2016, a state of emergency was declared at both the state and federal level in response to the Flint water crisis (FWC), the name given to the event which exposed Flint's population to elevated lead levels in the water supply [1]. In June 2016, the Centers for Disease Control and Prevention released the report from its investigation into the FWC's health impact, indicating children who drank the tap water after the switch had elevated blood lead levels [3]. Residents have reported health concerns, increased anxiety, and stress as a result of this crisis [4]. However, little is known about residents' coping strategies throughout the FWC or its socioeconomic and health impacts. This brief article aims to describe self-reported consequences of the crisis and coping strategies among a high-risk cohort of drug-using adults followed for 7 years [5, 6].

Methods

Participants ($N = 351$) from an ongoing ED-based longitudinal cohort study (Flint Youth Injury Study [5, 6]) of drug-using (95% marijuana) youth were re-contacted between April 2016 and July 2016 by phone or in person to complete a 15-min survey. The survey included a combination of validated and study-specific self-report measures, characterizing: (1) lead exposure; (2) work, financial, and medical consequences of the exposure; and (3) coping mechanisms (e.g., Brief COPE [7]) related to the crisis. Study procedures were approved by the University of Michigan and Hurley Medical Center's Institutional Review Boards.

Results

A convenience sample of 133 participants completed the survey (mean age = 26.1, 52% female, 64.7% African-American, 68% with at least one child, 60.9% public assistance) with an overall survey response rate of 37.9%. One hundred eighty-eight (54%) participants of the original cohort ($N = 351$) were unable to be reached by phone due to non-working numbers or unreturned voicemails, 19 individuals refused participation (5.4%), 8 were incarcerated, and 3 were deceased.

One hundred of the 133 survey participants (75.2%) reported exposure to elevated lead levels in their water, with 60% of the exposed sample reporting that the FWC "very much" affected their lives or their children's lives. Table 1 describes the sample characteristics and the self-reported impacts resulting from the FWC.

Among the sample, 65% were on public assistance; 75% reported spending extra money due to the FWC (average \$21–\$50/month, range \$0–\$500+), with surplus expenditures mostly for buying bottled water (53%), water filters (36%), or gasoline to pick up water safety supplies (62%). Over a fifth of participants reported that their ability to attend work or school was impacted by the FWC, mostly due to sick children at home (9%), and time needed to complete tasks such as picking up water supplies (8%). Seventy-three percent of the sample reported that they or their children have experienced negative health effects from the FWC. One in four reported seeing the doctor, and 23% reported taking their children to the doctor due to health problems, with most reporting stomach/digestive issues (56%) or rashes/abscesses (43%) for themselves and rashes/abscesses (31%) or stomach/digestive issues (25.0%) for their children.

Self-reported coping strategies for dealing with the FWC were also evaluated and included positive coping strategies such as support seeking (i.e., I've been getting advice from other people, 99.0%), and negative coping strategies such as substance use (i.e., I've been using alcohol or other drugs to help me get through it, 20.0%).

Discussion

To our knowledge, this is the first brief article to quantify the multidimensional challenges and coping strategies of those affected by the FWC. Our study quantifies some of the negative consequences and coping strategies of those affected by the FWC. Among a predominantly African-American sample of high-risk individuals in Flint, self-reported exposure to lead was high. Many participants spent extra money to purchase water safety items (i.e., bottled water, filters), the gas to get those items, and the gas to get to doctor appointments despite their limited financial resources. Our participants reported significant negative health-related consequences, such as digestive problems and skin rashes. While participants faced both financial and health-related challenges, many employed active coping strategies, such as positive reframing, seeking emotional

Table 1 Demographics, self-reported impacts, and coping strategies used after the FWC by domain of life ($N = 100$) (N (%))

Domain	N (%)
Sample demographics	
Age (mean, STD)	26.1 (2.4)
Female	52 (52%)
African-American	66 (66%)
Hispanic	3 (3%)
At least 1 child	68 (68%)
Public assistance	65 (65%)
Lead exposure	
Exposed at home	79 (79%)
Exposed at school/work	62 (62%)
Financial consequences	
Spend extra money per month due to FWC	75 (75%)
Average amount spent extra per month	\$21–\$50
Spent extra money monthly on:	
Bottled water	53 (53%)
Water filters	36 (36%)
Doctor's appointments	20 (20%)
Gas to drive to appointment	34 (34%)
Gas to pick up water safety supplies (ex. filters, bottled water)	62 (62%)
School/work consequences	
Ability to go to school/work changed due to FWC	21 (21%)
Hard time going to work/school, due to the tasks related to the FWC	8 (8%)
Trouble focusing due to the FWC	7 (7%)
Health has been poor due to the FWC and has gotten in the way	2 (2%)
Child's health has been poor due to the FWC and has gotten in the way	9 (9%)
Health	
Self-reported general health concerns	
Unexplained change to health since the FWC	65 (65%)
Went to the doctor due to health concerns related to the FWC	25 (25%)
Self-reported specific health concerns	
Unexplained rashes and abscesses since the FWC	43 (43%)
Unexplained high blood pressure since the water crisis	18 (18%)
Unexplained miscarriage since the water crisis.	2 (2%)
Unexplained stomach/digestive problems	56 (56%)
Parental-reported child health concerns (general and specific)	
Unexplained change to child's health since the FWC	39 (39%)

Table 1 (continued)

Domain	N (%)
Child went to the doctor due to health concerns related to the FWC	23 (23%)
Unexplained rashes and abscesses since FWC	31 (31%)
Unexplained high blood pressure since FWC	3 (3%)
Unexplained stomach/digestive problems	25 (25%)
Coping strategies	
Substance use	
Active response	20 (20%)
Active coping	80 (80%)
Venting	99 (99%)
Positive reframing	72 (72%)
Planning	79 (79%)
Humor	44 (44%)
Distraction	
Support seeking	73 (73%)
Emotional support seeking	65 (65%)
Advice seeking	99 (99%)
Religion/faith	74 (74%)
Self-blame	42 (42%)
Disengagement	51 (51%)
Denial	59 (59%)
Acceptance	93 (93%)

support, and acceptance to deal with this public health crisis. One fifth of the cohort, however, used substances (e.g., marijuana) as a means to cope.

Our cohort may be predisposed to substance use, given previously reported drug use at recruitment in 2009 [5, 6]. However, substance use may also be due to worsening mental health status and decreased coping ability due to the crisis. Self-reported challenges may work synergistically to increase the impact of the crisis by decreasing coping ability. Nevertheless, many participants reported positive coping strategies, illustrating the resilience that is evident among the Flint community at large.

Our study has limitations. The sample is not representative of the Flint population. However, our sample deserves special focus, as the FWC consequences may disproportionately affect individuals of low socioeconomic status and those with baseline risk for substance abuse [2]. Also, given the cross-sectionality of the study, causal inferences between the FWC and outcomes cannot be made. Finally, the increased media attention may

have resulted in over-reporting and increased parental concerns [4, 8] within our sample.

The spotlight on Flint has justifiably been focused on children's health [9]; however, our findings suggest that vulnerable adult populations deserve substantial attention as well. Further, our findings emphasize the need for access to quality mental health care, including substance abuse treatment for Flint residents, especially those who report medical, financial, and work-related consequences from the FWC. While unsafe water was the primary problem residents faced, policymakers should address the secondary consequences of the crisis to help this resilient community recover and thrive.

Public Health Implications

Despite efforts to help residents in Flint to date, an evaluation and understanding of the population's needs and concerns with respect to health, financial, and socioemotional well-being has not been previously documented. Conducting this pilot study describing participants' experiences with the Flint water crisis and the impact on their lives as a result of this public health emergency helps point public health professionals and policymakers towards the next critical steps to support the Flint community. Additional considerations for Flint residents such as allocating state and federal funds to help increase access to mental health providers, substance abuse treatment facilities, and financial support for the city and those residents economically devastated by the crisis should be weighed heavily.

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