

NM WRI Student Water Research Grant Final Report

1. **Student Researcher:** Hailey K. Taylor, Graduate Student, Department of Anthropology, NMSU.

Faculty Advisor: Dr. Kathryn M. Olszowy, Assistant Professor of Biological Anthropology, Department of Anthropology, NMSU.

2. **Project title:** “Living with Water-Insecurity: How do people adapt and cope with poor water quality and access?”

3. Description of research problem and research objectives.

HWI is the experience of living with limited access to water, both in terms of water quantity and quality. Water is fundamental to humans both biologically and socially, and scholars are warning of an imminent crisis of water insecurity - where “water insecurity is an increasing global challenge associated not just with climate change but also with ongoing institutional, infrastructural, and policy failure” (Brewis et al., 2020). HWI is also a neglected social determinant of health and is reflected in multiple health disparities within and between populations, including elevated mental distress and interactions with food insecurity. There is thus an urgent need for research that focuses on HWI to ensure community and individual health and well-being (Brewis et al., 2020). This highlights a need for more data on how individuals, households, and communities cope with inadequate water, as well as the implications of participating in specific coping behaviors on health and social status.

The objective of this funded project was to investigate how residents of colonias in Doña Ana County, New Mexico, who live with HWI adapt and cope with inadequate water quality and/or access and explore the potential impacts HWI and related coping mechanisms have on individuals’ physical and mental health. Colonias are underdeveloped communities along the US-Mexico border which often lack critical infrastructure, such as safe, treated, piped water, and research on how individuals, households, and communities cope with water insecurity is critical to developing effective people-centered interventions in the future. This project utilized a qualitative ethnographic approach to address the primary research objective and was completed by achieving the following goals during data collection: 1) Defined the experiences of those living in water-insecure households, including their observations and perspectives on HWI and how it interacts with other household conditions like food insecurity; 2) Identified strategies that individuals living in water-insecure households use to adapt to and cope with inadequate water quality and/or access; and 3) Determined how individuals' experiences of HWI impacts their overall health and well-being. The long-term goal of this project is to provide study findings to develop a community-based intervention to help ameliorate the impacts of HWI in the absence of immediate updates to water and sewer infrastructure.

4. Description of methodology employed.

Participants were recruited from a sample of individuals who have responded to a survey on water insecurity in Dr. Kathryn Olszowy’s (the PI’s academic advisor) quantitative research study on

water access and chronic disease risk in the colonias of Doña Ana County, New Mexico. This larger project has been collecting data on how HWI impacts mental distress, diet, and hydration status using surveys and biomarkers. We have invited participants (N<30) who reported issues with water quality and/or access on their survey forms who have also agreed to be contacted for further research and were offered a \$20 VISA gift card as compensation for completing the interview. Funding from the PI's NMWRRI Student Research Award allowed the research team to have the necessary materials to recruit and interview participants, as well as compensate participants for their part in the study and members of the research team for their contributions and time.

This funded project utilizes a qualitative approach to answer the primary research question. Participants who accepted the study invitation completed a single 30–45-minute, semi-structured interview conducted via Zoom or telephone to gain insight into individuals' observations and experiences with HWI concerning diet/cooking, hygiene, and other daily activities related to water use. Participation and interviews with Spanish-speaking participants was also possible due to the PI's NMWRRI Student Research Award providing funding for a contracted research assistant aiding in interviewing Spanish-speaking participants, transcribing interview data and responses, and translating data for eventual data analysis in NVivo data analysis software. Participants were asked about 1) their perceptions of their water access/quality and how it interacts with other aspects of their lives/households, 2) what difficulties their water situation creates in domains like having safe drinking water, cooking meals, growing foods, maintaining hygiene, etc., 3) how their water situation impacts their health and the health of others in their household, 4) what strategies they use to obtain adequate safe water for their needs, and/or to work around their water access and quality issues, and 5) what larger solutions they imagine could be useful at the individual, household, and community levels. Interviews were recorded when participant consent was obtained, and all interview data is stored in the New Mexico State University's secure OneDrive cloud and will be destroyed upon completion of this project. Upon completion of qualitative data collection for the project, the PI will utilize a grounded theoretical approach and analyze their qualitative data utilizing NVivo software obtained via the PI's NMWRRI Student Research Award, identifying and coding themes (I.e., thematic coding) within the qualitative data and comparing study findings with survey and biomarker data generated from Dr. Olszowy's research study to meet the objective and goals for this project.

5. Description of results; include findings, conclusions, and recommendations for further research.

The PI and their research team are still in the active stages of the research process with the ongoing collection of qualitative data to later be analyzed in tandem with other results. Quantitative data from the larger study conducted by the PI's faculty mentor, Dr. Kathryn Olszowy, has shown significant correlations with experiences of HWI and beverage consumption choice. Data were collected from 220 participants through surveys conducted online, by phone, or by mail. We found that 22.3% of participants surveyed were water insecure. Individuals in water insecure homes more frequently consumed bottled water ($p=.007$) and beer ($p=0.029$) as compared to individuals in water secure homes, while individuals in water secure homes

consumed tap water more frequently ($p < 0.001$). No significant differences were found in frequency of sugar-sweetened beverage consumption.

Results from ongoing qualitative interviews conducted with a sub-sample of participants will aid in expanding knowledge on how participants who live with HWI adapt and cope with inadequate water quality and/or access and its impacts on food and beverage choices. While qualitative data collection and analysis is still ongoing, preliminary results have begun to illustrate larger shared narratives that reflect participant's experiences with a lack of both adequate quality and quantity, though survey data initially reported an issue with either quality or quantity, while observations from initial interviews challenge that statistic. Additionally, preliminary results from early interviews have shown the interview questions to be effective in examining individuals' understanding of their experience with inadequate water quality and/or access and how they adapt and cope with instances of water insecurity, and potential topics of interest to further research for this phenomenon have included the correlation between participants' experiences of water insecurity and local industrial agriculture (I.e., pecan farming), and inadequate, outdated infrastructure systems within Dona Ana County's more rural areas. It has also been found in early data analyses that coping responses to experiences of HWI could be greatly related to the participant's identity/position and world-view perceptions within their local community, city, state, and country of residence (I.e., United States).

These results show that HWI impacts beverage consumption behavior among adults living in the colonias, and future research will explore potential downstream impacts on chronic disease risk.

6. Provide a paragraph on who will benefit from your research results. Include any water agency that could use your results.

From the data generated by this project the research team hopes to make available data to the Department of Health and Human Services, Dona Ana County, New Mexico, and to water agencies or entities to assist in the development of improved water infrastructure and in understanding individuals' circumstances of HWI, as well as any potential health consequences identified by this research. The long-term goal of the PI is to translate these findings into community-based strategies for dealing with water insecurity across Dona Ana County, and potentially other colonias communities in the US border region.

7. Describe how you have spent your grant funds. Also provide your budget balance and how you will use any remaining funds. If you anticipate any funds remaining after May 19, 2022, please contact Carolina Mijares immediately. (575-646-7991; mijares@nmsu.edu)

Thus far, this study has utilized its grant funds in the following ways:

| Budget Section | Item Purchased | Purchase Order Request Date | Cost | Total |
|----------------|-----------------|-----------------------------|---------|---------|
| A | Personnel | N/A | 3413.16 | 3413.16 |
| B | Fringe Benefits | N/A | 78.84 | 3492.00 |

| | | | | |
|--------------|--|--|---------|---------|
| C | NVivo Qualitative Data Analysis Software | 7/19/2021 | 1348.00 | 4840.00 |
| C | Envelopes (1 package of 100 envelopes) | 7/19/2021 | 9.99 | 4849.99 |
| C | Stamps (1 roll of 100 individual stamps) | 7/19/2021 | 48.75 | 4898.74 |
| C | Additional acquisition of printing and mailing materials for additional participant recruitment? | 10/15/2022 | 70.40 | 4969.14 |
| D | Travel (HBA/AABA Conferences 2022) | 04/13/2022 | 1057.33 | 6026.47 |
| E | Mastercard Gift Cards (30) | 10/12/2021 | 778.50 | 6804.97 |
| E | Compensation for Research Consultant (transcription, translation) | IP (submitted April 13 th , 2022) | 500.00 | 7304.97 |
| Total | | | | 7304.97 |

Additional funds (\$70.40) from the original reward (\$7,500) were allocated within the latest part of the project timeline to recruit additional participants for the qualitative interview portion of this study as necessary. The remaining funds (\$195.03) will be transferred back to the NMWRRRI.

8. List presentations you have made related to the project.

The PI was able to present a virtual poster presentation on preliminary findings from this larger research project at the online NMWRRRI Conference in Fall 2021. The PI also presented an accepted poster presentation on preliminary data findings from this research at the 2022 Annual Human Biological Association conference in Denver, CO, this past March.

The PI will continue to look for additional presentation and publication opportunities related to the dissemination of this research project as data collection ends and data analyses are finalized and hopes to translate this work that will be used for their thesis project in the NMSU Anthropology Graduate Program into a manuscript that can be submitted for consideration in journals related to human health and health inequities.

9. List publications or reports, if any, that you are preparing. For all publications/reports and posters resulting from this award, please attribute the funding to NMWRRRI and the New Mexico State Legislature by including the account number: NMWRRRI-SG-2021.

After the completion of data collection and comprehensive data analyses, the PI intends to produce a manuscript synthesizing the qualitative and quantitative components of this research to address the study's primary objectives for journal submission considerations. The PI intends to produce additional publications and short reports from this research and utilize this study's findings in future applied research during their time in the NMSU MPH program. Additionally, the PI is currently working to create a publication that can be shared with the Department of Health and Human Services, Dona Ana County, New Mexico and the community members of the population under study (I.e., colonias communities in Dona Ana County, New Mexico). Lastly, the PI intends to present their full study findings at the 2023 HBA Conference, in addition to

submitting presentation considerations to the 2023 NMPHA annual conference amongst others if attendance is feasible (e.g., Society for Applied Anthropology).

10. List any other students or faculty members who have assisted you with your project.

Acknowledgment is given to the PI's faculty mentor and thesis chair, Dr. Kathryn Olszowy; the PI's thesis co-chair and faculty co-mentor, Dr. Mary Alice Scott; an undergraduate research assistant and translator, Andrea Maranon-Laguna; and a community collaborator from the Department of Health and Human Services, Dona Ana County, New Mexico, Claudia Mares, for their contribution to this research project thus far.

11. Provide special recognition awards or notable achievements as a result of the research including any publicity such as newspaper articles, or similar.

The PI and faculty mentor, Dr. Kathryn Olszowy, have been recognized and interviewed for news articles and publications from the NMWRRI and the Department of Anthropology, NMSU. Additionally, research assistant Andrea Maranon-Laguna has been recognized by the university and numerous departments (e.g., Department of Anthropology, College of Arts and Sciences) for their hard work as an undergraduate research assistant in this and other research projects at the completion of their undergraduate degree.

12. Provide information on degree completion and future career plans. Funding for student grants comes from the New Mexico Legislature and legislators are interested in whether recipients of these grants go on to complete academic degrees and work in a water-related field in New Mexico or elsewhere.

The PI intends to complete their MA in Anthropology in May 2023 from NMSU. The PI aspires to transition from academia to applied settings to continue their career researching the prevalence and associated variables of variation in human health and health behaviors.

13. Appendix

Please see the PDF file attached to the email, which contains a copy of the poster presented at the 2022 HBA conference. The PI will attempt to get in contact with collaborators to provide photographs from the 2022 HBA conference in the final report.

You are encouraged to include graphics and/or photos in your draft and final report.

Final reports will be posted on the NM WRRI website.