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Health Preferences and Culturally Appropriate Strategies to Reduce Bear Bile Demand in Northern Vietnam

Shannon Randolph
Pomona College, Shannon.Randolph@pomona.edu

Laura Zhang
Pomona College

Lena Tran
Pitzer College

Mai Nguyen
Pitzer College

Kimberley Ha
Pitzer College

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Cover Page Footnote
This project was made possible by Animals Asia's established relationships with the Traditional Medical Association, local government officials, and the residents of our study site. It is thanks to AA that our team, as foreigners, had permission to conduct this research, building upon previously established trusted relationships in the community. Thank you especially to the following AA staff members who played key roles in making this work possible: Bendixsen Tuan (director), Phan Thi Thuy Trinh, Cao Manh Tien, and Hoang Thuy Trang (Intern). The research was generously supported by EnviroLab Asia (part of a larger Henry Luce Foundation grant to the Claremont Colleges), the Pomona College Dean's Office International Initiatives, and the San Diego Zoo Institute for Conservation Research.

Health Preferences and Culturally Appropriate Strategies to Reduce Bear Bile Demand in Northern Vietnam

Shannon Randolph[1], Laura Zhang[2], Lena Tran[3], Mai Nguyen,[4] and Kimberley Ha[5]

I. Introduction

Animal products, such as pangolin scales, rhinoceros horns, tiger bones, and bear bile have been used in East Asian traditional medicine (TM) for more than 2,000 years. However, markets for medicinal wildlife products have expanded dramatically in countries like China and Vietnam in recent decades where economic prosperity has enabled a larger proportion of the population to afford wildlife products (Olmedo et al. 2017). Related new farming and commercialization practices to meet growing international demand pose environmental and human health risks. Animal products also symbolize shared cultural and historical medical practices that are distinct from the dominant Western medical model.

One such animal product, bear bile, taken from the gallbladders of bears, is used as a treatment for a wide range of inflammatory, liver and degenerative ailments (Feng et al. 2009, Li et al. 2016)[6]. The practice of "bear farming"- keeping bears captive for live extraction of bile - has grown significantly throughout Asia since the 1980's (Servheen et al. 1999). The dramatic increase in demand can be seen in the price of bear gall bladder prices that rose from US$200 per kilo in 1970 to US$30,000-50,000 per kilo in 2009 in Hong Kong's legal market (Feng et al. 2009). The combination of over-hunting, habitat loss and the increased demand for bear bile has had a significant impact on bear populations. For example, both the Asiatic black bear (*Ursus thibetanus*), also known as moon bear, and the sun bear (*Helarctos malayanus*) are currently listed as Vulnerable on the IUCN Red List. Populations having declined by 30–49% and 30%, respectively, over the past 30 years (Fredriksson et al., 2008, Garshelis et al. 2008). Some of the highest declines have been in countries with a history of bear farming. This increased demand

[1] Shannon Randolph is the Director for Community and Global Engagement at the Rick and Susan Sontag Center for Collaborative Creativity at the Claremont Colleges. She received her MA and PhD. in Anthropology at Stanford University.
[2] Laura Zhang graduated from Pomona College in 2019, majoring in Cognitive Science. She received a 2019-20 Fulbright fellowship to teach English in Taichung, Taiwan.
[3] Lena-Phuong Tran graduated from Pitzer College in 2018, majoring in linguistics and cognitive science. She received a Fulbright Fellowship to Vietnam where she will teach English in 2019-20.
[4] Mai Nguyen graduated from Pitzer College in 2019, majoring in mathematics. She currently works in Long Beach as a software engineer.
[5] Kimberly Ha studied Human Biology and Asian American Studies at Pitzer College. She received a Student Leadership Award for her work as founder of the First-Gen Club, and graduated in 2018 and is currently a Child and Family Team Facilitator at the Fred Finch Youth Center.
[6] Chemical analysis demonstrates the pharmaceutical efficacy of the compound ursodeoxycholic acid (UCDA) produced in bear gallbladders to treat inflammation and gallbladder symptoms (Wang et al 2005, Yu 2007, Feng et al. 2009).

has also led to the surge in fraudulent bear bile products (i.e., bile from domestic pigs, goats and water buffalo or a mixture of these and true bear bile; Espinoza, Shafer and Hagey 1993, Lin, Chang and Chen 1997).

Bear farms are declining in some countries and increasing in others. An estimated 23,000 bears remain in bear farms across China, Japan, South Korea and Vietnam, with China housing the majority, at more than 20,000 captive bears (Livingston, Gomez and Bouhuys 2018). In Vietnam, the focal point for this study, a government ban on live bile extraction from captive bears implemented in 1992 and again in 2006 has led to a decrease of over 70% of captive bears, from 4000 to 1200 (Nguyen 2007, Animals Asia, 2011; Crudge et al., 2016; Willcox et al., 2016; ENV, 2017, Livingstone, Gomez and Bouhuys 2018). While it is currently illegal to extract bear bile in Vietnam, it is not illegal to keep microchipped bears who were already in farms prior to the 2006 law. Bears can only be rescued if bear farmers voluntarily give up bears, or farmers are caught in the act of bile extraction. Hence, there is a need for culturally- and socially-attuned interventions.

From a potential bear bile consumer's perspective, it is important to contextualize bear bile use in relation to healthcare access and options. Healthcare options for low-income people of Northern Vietnam (Ensor and San 1996) are more limited and incur high, out-of-pocket healthcare costs (Doorslaer et al. 2007). Economic growth has led to increased utilization of healthcare services; however, access is polarized, favoring upper income groups (Ensor and San 1996, Doorslaer et al. 2007). Public hospitals serve mostly upper income people whereas lower income people in urban areas primarily use community health centers, which are underfunded by the government (Deolalikar 2002). Following its introduction by missionaries in the 1900s, Western biomedicine became well established in Asia; though, traditional and folk medicines still play a significant role in people's healthcare today and are often more accessible for the poor, especially in rural areas[7] (Cheung 2011, Gordon et al. 2006).

Vietnam, like many Asian countries, has experienced a 'revival' of traditional medicine over the past 50 years (Craig 2002). The late President Ho Chi Minh officially incorporated traditional medicine into the public health approach of Vietnam in part in response to the postcolonial isolation and trade embargos experienced in the country. These Vietnamese policies especially encourage rural populations to become self-sufficient in herbal treatments of common illnesses (Wahlberg 2006). As a result of the 1980s economic reforms and lifting of trade embargos from countries like the United States, Western medicine (WM) became cheaper and more accessible, leading to a decline in traditional medicine use. Then, in the 1990s, the Ministry of Health led

[7] Even though a nationwide health service was established after the Vietnam-America war in 1975, the health state of Vietnam is still below average in comparison to its neighboring countries. For example, male and female life expectancies are almost equal to those of more developed countries. Though, Vietnam's infant mortality is high- at 17.8 per 1000 live births (World Health Organization 2016). The country faces a shortage of hospital beds and health professionals such as nurses and midwives.

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another revival of traditional medicine to encourage home cultivation of medicinal plants in communal clinics, setting a goal that 50% of medicine used at the communal level be traditional medicine (as compared to 10% at the urban level (Huu and Borton 2003, Wahlberg 2006). The World Health Organization and several developing nations across Asia and Africa also promoted traditional medicine as an accessible treatment scheme for common illnesses in rural areas (World Health Organization 2004).

Despite its previous rarity, bear bile consumption became firmly established in Vietnamese society through the advent of bear bile farms. Availability of farmed bear bile in Vietnam has led to an overall loss in symbolic value of a product that was historically rare. Thus, rather than outcompeting wild bear bile, farms spurred a demand for bear bile that they were unable to satisfy with what was perceived to be an inferior product. Many consumers value medicinal benefits of wild-caught animals over farmed animals, which are considered "weaker" (Dinerstein et al., 2007, Damania and Bulte, 2007). This shift in demand has led to an increase in poaching pressure on wild bear populations (Drury, 2009 and Dutton et al., 2011). Cultural values and belief systems throughout Asia, such as these in Vietnam, influenced by historical and economic factors, have led to different motivations and behavioral outcomes which need to be considered when developing wildlife trade demand reduction strategies (e.g. Challender et al., 2014, Veríssimo et al., 2012) so as to better address drivers of illegal wildlife demand (Nekaris et al., 2010).

II. Research Questions and Methods

***Research Objective**:* In August 2017, Dr. Shannon Randolph initiated a multiple methods social science pilot research project as a postdoc at the San Diego Zoo Institute for Conservation Research, in partnership with Animals Asia (AA) Vietnam. Then, from June - August 2018, as the Director of Community and Global Engagement at the Center for Collaborative Creativity at the Claremont Colleges, she led a student-team from the Claremont Colleges comprised of Lena Tran (Pitzer College), Kimberly Ha (Pitzer College), and Laura Zhang (Pomona College) in a second phase of the project, which included a second iteration of the same social science methods and the introduction of a new tool: human-centered design. The overarching goal of this research was to explore the intersections between individual health perceptions, practices, and motives, and the most culturally appropriate means to change practices of key bear bile consuming groups. The research objectives include: (1) examining Vietnamese health perceptions regarding the cultural use of bear bile as a medicinal treatment and the many alternatives people may use, (2) assessing perceptions and behavioral motives, and (3) testing behavioral change approaches to identify culturally appropriate means to shift attitudes and behaviors of key target groups away from using bear products, specifically bear bile.

Study Site: This case study took place in a primary bear bile farming peri-urban community one hour outside of Hanoi where Animals Asia conducts health outreach efforts. This village is one of the last bastions of bear farming, with 200 bears on 37 bear farms; thus, many of the villagers may have easy access to bear bile through family or friends that own bears.

Research questions (RQ), objectives and methods (activities):

The following research questions, objectives and methods were formulated and employed for this study.

RQ1: What are the key persona descriptions (defined by a combination of demographics, shared values and preferences and/or life experiences) of people who strongly trust (a) herbal medicine, (b) animal parts medicine, or (c) pharmaceutical Western medicine? Among these, which influential personas have changed from preferring bear bile to another treatment approach?

RQ2: What important life experiences, knowledge and beliefs, and proximity to different health systems shape beliefs and behaviors regarding health decisions?

RQ3: What experiences, services or programs will incentivize target audiences to use sustainably harvested/produced medicine that do not cause harm to animals or threaten wild populations of animals and plants?

Objective 1. Classify personas and extreme preferences regarding how people think and behave regarding health treatment choices and changes in these choices, namely when choosing animal parts, herbal medicine and/or pharmaceutical medicine.

Activity 1.1: Conduct initial meetings with partner organization, Animals Asia, followed by observations at Animals Asia Health Day to identify types of people in target communities (surrounding bear farms) who are influential and either heavy users of bear bile or people who have changed their preferences away from bear bile.

Activity 1.2: Work with Animals Asia to set up "Health Days" (HDs) in the peri-urban village study site. During these Health Days, Animals Asia brings in traditional medical practitioners from Hanoi who provide free health consultations to residents of the village.

Activity 1.3: Conduct brief surveys (n=118; 20 minutes in length; two iterated versions) in four village hamlets. Document perceptions, attitudes and knowledge of health, symptoms, types of health treatments sought, personal use of bear bile, and attitudes towards Animals Asia and their Health Days. Document motivations for medicine choices (e.g., trust of a particular type of

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medicine, family and friend recommendations, personal experience, or celebrity recommendations).

Activity 1.4: Analyze survey results using descriptive statistics, and correlation and regression tests in R (R Core Team, 2018). Test predictions that particular demographic factors (e.g. age and education), previous health behaviors and preferences (e.g. for particular types of medicine - traditional or Western), and experiences with particular health issues (e.g. back pain) are correlated with (a) an individual's previous bear bile use and (b) the number of people one knew who had used bear bile.

Activity 1.5: Assess target persona audiences to focus on for behavior change approaches with pronounced needs associated with bear parts use based on survey and interview results.

Objective 2. Investigate and define the perhaps surprising motives, beliefs, life experiences, and trust relationships that shape key personas' evolving beliefs and behavior regarding health decisions. Identify potential points of tension and intervention.

Empathy

Activity 2.1: Conduct semi-structured key informant *empathy* interviews (n=20) with representatives from target audiences, identified in Animals Asia meetings, observations, and surveys. Identify key personas and factors that shape (a) trust in Western, animal parts, or traditional (Vietnamese and/or Chinese) herbal medicine and (b) motives for changes in people's health preferences. Collect stories about key health related experiences, beliefs and challenges of key informants to identify factors (e.g. demographics, knowledge, life experience, geographic access) that drive different personas to make particular health treatment choices.

Activity 2.2: Conduct observations and guided walks (n=8) with rural residents to gage social, economic and geographic access to different health options and the impact on individual health choices.

Activity 2.3: Conduct interviews with traditional medical practitioners (TMPs; n=6) to understand (a) the history and personal experience of TMPs with shifting healthcare options and preferences in Vietnam as well as (b) individual perceptions of animal parts vs. herbal medicine value.

Activity 2.4: Use grounded theory and inductive reasoning to draw out major interview themes that emerge from a close reading of responses (Glaser and Strauss 1967, Bernard and Ryan 1998, Charmaz 2006). Identify behaviors and attitudes regarding sickness, treatment and health choices related to particular target audience bear bile user groups (i.e., personas). Identify points of high risk, desired behavior (using herbal or pharmaceutical medicine successfully), and opportune

times, places and experiences for behavior change interventions and messaging for particular personas.

Define

Activity 2.5 Inductively identify persona statements (also called "points of view") for the target, influential archetype groups (selected based on estimated impact), including important factors and traits defining the persona, and unexpected insights about their needs, around which to frame behavior change and messaging campaigns.

Ideate

Activity 2.6: Brainstorm (also called *ideate*) 100 creative potential programming strategies, experiences, services or outreach approaches to address each persona's needs and encourage a shift towards desired behavior. Use structured prompts, such as "*How might we (HMW) make the experience worse?"* Or "*HMW make herbal medicine more accessible?"* In this stage, a wide range of realistic and unrealistic ideas are encouraged in order to generate unexpected ideas. AA provides feedback on ideas, and, together, select the (a) most delightful, (b) most likely to succeed, and (c) most breakthrough human-centered strategies to prototype and test.

Prototype and Test

Activity 2.7: In the *prototyping* stage, use very basic materials (post-its, cardboard, colored paper, and experiential simulations) to create prototyped experiences of our ideas, and then present (i.e. *test*) prototypes in an experiential manner with original users to gain their candid feedback. Finally, identify further modifications and iterations to prototype based on feedback, and select the most compelling ideas to test further for the target audience groups.

III. Results

1. History of health and bear farming outreach based on interviews with Animals Asia

Bear bile trade peaked in Vietnam from 2007-8. AA started engaging the Traditional Medical Association of Vietnam (TMA) in 2010 as part of their efforts to reduce the demand of bear bile and phase out bear farms. They aimed to encourage TMA doctors to stop using bear bile and promote the use of herbal alternatives to bear bile. The strategies AA employed ranged from the production of a booklet on "Herbal Alternatives to Bear Bile", to the creation of training modules for TMPs, to the planting of bear bile herbal alternative nurseries intended for seed distribution to the public and TMPs across the country. The TMA also signed an agreement with AA to carry out activities that, by 2020, over 95% of doctors and practitioners in the TMA would no longer be using bear bile.

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AA also started an education campaign in bear farming communities. Soon, they realized their efforts to "educate" the communities about the problems with bear bile and bear farming were spurring animosity rather than advocacy in the community. AA then pivoted their approach and partnered with TMA to provide free health consultations and sample herbal alternatives to bear bile. Hence, "Health Day" (HD) interventions were born.

These HDs aimed to provide a space for positive interactions between community members and AA by offering a service (health care) that is often lacking and desired in rural Vietnam. AA hoped to build the community's trust in their organization, to identify partners to help them close the farms, and to reduce the demand for bear bile in areas where bear bile is easily accessible. HDs currently target villages and peri-urban areas around Hanoi that have high concentrations of bear farms. At these HDs, AA brings in official TMPs from the Hanoi TMA. The TMPs offer free walk-in consultations to any residents in the village and prescribe herbal alternative medicines for conditions that patients may use bear bile to treat. Patients are educated about different herbal plants that they can grow in their garden, and they are given a small sample bottle of an herbal alternative to bear bile designed for pain relief (the primary use of bear bile).

AA's hoped that through these Health Day interventions, people would find replacements for bear bile without compromising their health, and that they would stop using bear bile altogether. This would reduce the demand for sales of bear bile, leading bear farmers to be more willing to give their bears up to sanctuaries in Vietnam.

2. Survey Results

Demographics

Of the 118 people surveyed at the Animals Asia Health Day, 71.19% were women. The average age was 65, ranging from 23 to 89 (Appendix Figure 1). The majority of respondents had either primary school education (n=38, 32.20%), secondary school education (n=35, 29.66%), or no education (21.19%). The most represented occupational status was retired (n=59, 50%) followed by agriculture-related workers (n=31, 26.27%).

Health Day Perceptions and Feedback

The vast majority (94.59%, n=70 out of 74 respondents) of participants were satisfied with the HD. When asked what people liked about the health day in the 2017 survey, most people liked the free health consultation (n=42, 98%), the free herbal alternative medicine sample (n=30, 70%), followed by the entertainment (n=7, 23%), free childcare and the opportunity to see friends (n=7, 23%). People also mentioned that they liked that the TMP doctors were well qualified and nice, and that the sample medicine was quite effective. The most commonly named improvements suggested for the HD were: 1) to provide additional, different kinds of medicine

to purchase or more sample medicine, 2) to host HD more frequently so more people are able to attend, and 3) to provide more thorough consultations to address multiple health issues.

Herbal alternative sample medicine perceptions and feedback

Half (50.42%) of the participants had previously received and used the herbal alternative sample medicine. The majority (79.77%) of respondents who had used the sample medicine were satisfied with its effectiveness and wanted to use it again. People liked that it was free, effective in reducing pain, and safe to use (i.e., no side effects or question of genuine quality). Participants wanted to be able to obtain more quantities of the sample medicine (whether that be bigger sample sizes, or access to the sample outside of the HD). Most participants used the sample medicine to treat joint pain, arthritis, back and body pains.

Health Issues

The most represented health issues people sought consultation for at the Health Day (Appendix Figure 2) were body, joint and back pain (n=46, 38.98%) and high blood pressure (n=14, 11.86%). Eye issues (n=7, 5.93%), insomnia (n=3, 2.54%), old injury (n=2, 1.69%) and gout (n=2, 1.69%) were also named. Other medical issues named included heart disease, large intestine disease, bone numbness, low blood pressure, kidney stones, dizziness, fever, cough, sore throat, itchy skin, sciatica, spinal disc herniation, and degenerative cervical vertebrae. Others (n=39, 33.05%) did not come for a particular issue, but rather sought general health consultation and participation in the Health Day event.

Health seeking advice

When asked what motivated people to seek particular types of medical treatment for their primary medical issue, of those who answered (n=104, 88.14%), medical expertise, both from traditional healers and Western medical experts (n=73, 70.19%), was the most commonly named reason (Appendix Figure 3). Medical advice from family and friends (n=19, 18.27%) was also sought and oftentimes pointed people to particular types of medical experts. Positive previous experience with a particular health approach (n=12, 11.54%) also motivated people's choices. Neither celebrity endorsements nor known legal status of medicine motivated anyone's choices in seeking particular treatments.

Medical treatments sought

Of those who named a most-used particular type of medicine to treat their primary medical issue (n = 56, 47.46%), the majority (n = 33, 58.93%) used Western medicine, followed by traditional medicine (both Vietnamese and Chinese medicine; n = 21, 37.5%) and a blend of both Western and traditional medicine (n = 2, 3.57%). The majority (n=24, 88.89%) of participants (from the 2017 survey) who used traditional medicine used *thuc nam* (Vietnamese fresh or dried herbal medicine gathered around house or obtained from another) rather than *thuc bac* (Northern or Chinese processed dry medicine).

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For the most frequently named medical issue, body, joint and back pain, the majority (n=25, 55.56%) did not use any medication, followed by those who primarily used traditional medicine (n = 11, 23.91%) and Western medicine (n = 9, 19.57%). Conversely, Western medicine was almost exclusively used to treat the second most-named medical issue, high blood pressure (Appendix Figure 4).

The most popular place to obtain medicine (as reported in the 2017 survey alone) was at the pharmacy (n=19, 41.13%), followed by from local TMPs (n=12, 26.09%) and WM doctors and nurses (n=8, 17.39%). Very few people gathered their own medicine from a farm or the wild, from public health stations, or from friends or family.

The most important factors for people when choosing medicine were geographic accessibility (44.19%), quality (41.86%), and preference for a particular type of medicine (41.86%, e.g. TM or WM). Price (16.28%), trusted family or friend recommendation (16.28%) and reputation of the seller (16.28%) were secondary in importance. Celebrity recommendations were not important to any respondents, and legal status of medicine was only important to one respondent.

Bear bile usage of the respondents and people they know

The majority of people (n = 80, 67.79%) reported never having personally used bear bile, followed by 16.95% (n = 20) having used bear bile 1-5 times, 3.39% (n= 4) having used bear bile 6-10 times, and 11.02% (n = 13) having used bear bile more than 10 times. Women more often reported never having used bear bile.

Regarding the number of people respondents knew who had used bear bile, the majority (n= 67, 56.78%) reported knowing no one, followed by 23.73% (n = 28) knowing 1-5 people, 2.54% (n= 3) knowing 6-10 people, and 11.86% (n = 14) knowing 10 or more people.

The primary reasons given for not using bear bile were diminishing quality of bear bile, uncertainty about the genuineness of the product (adulterated bile), and preference for herbal traditional or Western medicine. When comparing wild versus farmed bear bile, some people who used bear bile preferred farmed because there was a perception that wild was not a genuine product, and the quality cannot be trusted. Others preferred wild bile because it was perceived to be stronger and better quality.

Factors influencing bear bile use and medical preference (TM or WM; **Appendix Figures 4-17)**

Gender (x-squared = 11.141, df = 4, p = 0.025), education (x-squared = 92.0014, df = 28, p < 0.001), and medical issue experienced by the person (x-squared = 47.737, df = 28, p-value = 0.011) were correlated with the number of times an individual reportedly used bear bile.

Education (x-squared = 54.035, df = 28, p-value = 0.002) and the medical issue (x-squared = 69.360, df = 28, p< 0.001) were also strongly correlated with the number of people one knew who had used bear bile. Age, occupation, and the individual's motivation for treatment were not correlated with bear bile use. No variables tested were correlated with the type of medicine most used (Western or traditional).

Regression analyses did not reveal that any independent variables predicted the dependent variables: (1) type of medicine most trusted, (2) personal bear bile usage or (3) the number of people one knew who had used bear bile.

https://scholarship.claremont.edu/envirolabasia/vol2/iss1/3
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3. Interview Results from Key Persona Interviews

Key Themes Driving Bear Farming Community Health Perceptions and Behaviors

Semi-structured interviews with Health Day participants in the host bear farming communities and TMPs providing health consultations at the Health Day were inductively analyzed to draw out the following key themes that drove health perceptions and behaviors: trust, accessibility, and complexity and nature of the health condition and treatment (Figure 1). Each theme is further explained below with anecdotal examples from interviews.

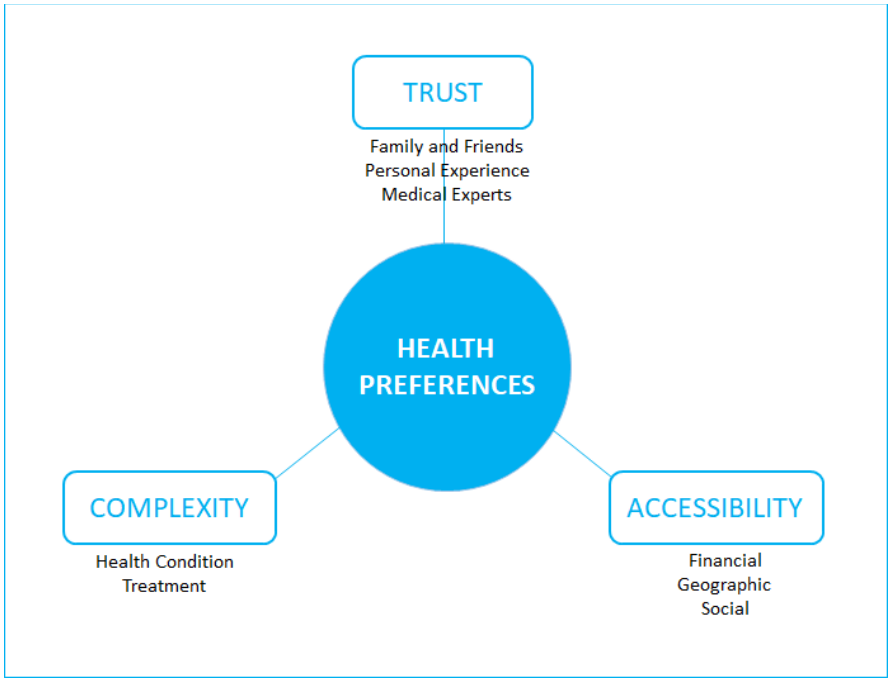

Figure 1. Themes shaping health preferences inductively extrapolated from qualitative interviews.

a. Trust

Family and Friend Recommendations: Overall, recommendations of family and friends seemed to influence health decisions the most. In most cases, interviewees heard about a TM or WM expert or folk treatment approach through their friends and family. Because of the oral nature of word-of-mouth sharing, health knowledge was often undocumented and highly localized by neighborhood or town, resulting in "folk medicine" knowledge.

For example, a 40-year-old woman initially tried Western medicine (pills and injection) for her back pain, but it didn't help. So, she changed to traditional herbal medicine based on a recommendation from a family member. This helped to alleviate her pain. Her daughter, aged 8, had an amazing experience with health treatment from another TMP recommended by a friend. Her daughter had a problem with a muscle in her mouth, but after the TMP gave her medicine and practiced acupuncture on her, she recovered completely.

From a TMP's perspective, many followed a TMP's suggestions if they seek consultation. However, many trusted folk medicine more than TMP advice: "Most patients just follow the doctors' prescription, and don't mention any preference. There are cases where they heard about something, so they asked the doctor about it, but if the doctor firmly recommend against that, they usually don't use it. There are some old medicinal recipes [folk medicine] that were passed down and are thought to be effective. When the prescribed treatment differs too much from those old recipes, some people would get suspicious and go back to use those old recipes. Just following old folk knowledge, there are many Vietnamese people who ignore doctors' recommendations and prescription."

Personal experience: Some people personally witnessed healing of another or themselves through unexpected treatments which caused an immediate shift to trust in a new treatment type or medical approach (traditional or Western medicine).

For example, a 74-year-old male former bear bile seller used to live in a remote area in the Hoa Binh province, studying the propagation of herbs in the jungle. There, he witnessed two cases of medical emergencies that had been healed by herbal medication. One story involves a person getting bitten by a toxic snake while the other involves someone who had received a severe cut on his ankle while working in the forest. Both individuals successfully used plants to treat their wounds, thereby deepening their belief in the efficacy of herbal medicine. They did not go to a doctor nor a hospital.

From a TMP perspective, "traditional medicine is gradually growing again in demand. People tend to try Western medication first, before treating the side effects of such medication with non-toxic traditional medicine. Most people who opt for traditional medicine first have typically been practicing it for a long time."

Medical Experts: People trusted a particular medical expert if they knew someone who had gone to them before or if they witnessed a recovery of a friend or family member from their treatment. Some interviewees preferred to follow the orders of their TMP, then Western doctors because of financial or social reasons. However, the majority of people reported preferring Western medicine. Trust in medical experts and approaches (both TM and WM) grew with each positive health outcome associated with that particular medical expert.

b. Accessibility

Geographic: Most interviewees who consulted medical practitioners lived within 20 km of their preferred medical practitioner or providers, though many did not consult with either TM or WM experts due to their distant proximity. Foot or motorbike were the two most common modes of

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transportation. Many people utilized folk medicine and pharmacists due to their closer geographic proximity, relative to both Western and traditional medical experts.

Social: Similar to the 'family and friends' category in the trust theme, familial and/or social connections influenced one's accessibility to certain medicines and, subsequently, health behavior. As it relates to the theme of sharing health knowledge, these connections also provide patients access to knowledge regarding particular medicines, treatments, or doctors. Oftentimes social and geographic accessibility were intertwined as people who lived close to one another recommended geographically accessible health options.

One 77-year-old highly ranked local government leader in the community had been drinking bear bile with wine for the last 10 years. In addition to the bear bile wine, he had recently begun to take a pharmaceutical medicine for his high blood pressure. No one else in his immediate family drank bear bile wine nor had they expressed a desire to; his wife even urged him to stop. He explained that he continued to drink it because it was given to him by his relatives who owned a bear farm nearby. He felt that his TMP lived too far from his house, thus making it more inconvenient to purchase alternate medications.

Financial: Traditional medicine and folk medicine was often more affordable than Western medical treatments, with the exception of medicine purchased directly in pharmacies (without consulting Western medical experts). In addition to being more geographically accessible, cost was an important factor for most people making treatment choices in this community.

One 40-year-old woman characterized traditional medicine as something that "is safe for people's health and not very costly." She chose the treatment prescribed by the TMP because she couldn't afford the treatment initially suggested to her by her doctor (i.e. physical therapy). She was able to apply the medicine on herself without the supervision of a doctor or physical therapist. Her decision to contact a TMP after her accident was in part, related to her friend's positive experience, but also related to the financial accessibility of this option. For many other interviewees, the low-cost and self-administered nature of traditional medicine meant lower stakes and easier access.

c. Complexity

Nature of Health Condition

The complexity of a patient's condition played a big role in determining the type of treatment they sought. The longevity of the condition, the chronic or urgent nature also influenced people's health seeking behaviors. People valued and sought strong or reliable medicine when the condition was urgent. For chronic issues, they would often try several health approaches to attempt to address the issue.

One 40-year-old woman had to have knee surgery right after her motorbike accident. Her decision to have the surgery might be considered as a health decision driven by a more urgent health condition while her later decision to seek treatment from a TMP, months after her surgery, seemed to be motivated by financial and geographic accessibility needs for a chronic and more long-term condition.

One TMP highlighted that health conditions are becoming more complex and numerous today as compared to the past. This trend made some people more prone to seek Western medicine as most of these new diseases were framed from a Western medical model. "Now, the types of diseases that people come to get treatments have changed. For example, many people have cancers, tumors. Immune deficiency is also common. In the past, immune deficiency was not a known condition. Generally, health problems are getting more complicated. Certain things are getting out of control, like antibiotic resistance; there are cases when they tried all available antibiotics without any effect."

Nature of Treatment

The number of steps required for administering or preparing traditional medicine or treatments (primarily with traditional medicine) increased the complexity and drove some towards Western medicine while others, familiar with a multi-step traditional medicine approach, chose TM.

People were faced with a trade-off between fast acting treatments (i.e., Western) and gentler, slower-acting treatment without side effects (i.e., traditional medicine). Many people preferred to use Western medicine for pain related illnesses and then seek TM to treat side-effects. The unknown side effects of manufactured medicine (primarily with WM) drove some to use TM after, or in conjunction with, using Western medicine. "People normally try to get cured quickly, so they usually prefer Western medicine. After Western medicine, then they turn to TM. There are some people who are more used to TM, so they come to us first. However, the majority will use Western medicine; only a minority use TM." (Male TMP who has been practicing for four years)

On the other hand, TMPs also noticed that many people were returning to TM when they experienced negative side-effects from Western medicine. "The proportion of usage [of TM and WM] has changed noticeably. Western medicine remains dominant, especially anti-inflammatory and pain relief medicines, which work really well. They relieve pain very quickly but can cause side-effects. When [they] learn of these side-effects, more people try to find alternative treatments in TM. Particularly, some people think that bear bile is safe, so they use it. There is a demand for alternative treatment." (Female TMP who has been practicing for 19 years)

Key themes driving bear bile usage and perceptions

https://scholarship.claremont.edu/envirolabasia/vol2/iss1/3
DOI: 10.5642/envirolabasia.20190201.03

a. **Trust**

*Family and friend recommendations and experience***:** Patients appear to hear about bear bile through hearsay or folk knowledge; TMPs do not usually advertise or encourage it as the primary treatment. Many valued folk knowledge over medical expert knowledge. "Bear bile is typically used to treat bone and joint diseases, but it has also been rumored as a treatment for "modern diseases" such as cancer… That is not from [official] TM, but from rumor and hearsay. Even for thing like skin rash, people also use bear bile. Based on just folk knowledge and hearsay, bear bile has a huge range of uses. People often don't listen to doctors, just rumors." (TMA TMP)

Folk knowledge that does not match with bear bile usage falls out of use when family or friends or individuals experience poor or devastating outcomes from folk medicine. "Traditional medicine usage follows a trend. One person says something is good, then a whole lot of people repeat that it's good and use that one thing. For example, bear bile is hardly used anymore, not used to mix with alcohol to drink. After dozens of people died, pass out, or got liver problems, people stopped putting bear bile in alcohol to drink. That's a change in the last 5 years, people don't like drinking bear bile alcohol anymore." (TMA TMP)

Personal experience: All but one interviewee expressed a distaste for using bear bile, citing concerns related to its quality and authenticity. These interviewees included a former bear bile trader, and former bear bile users (both women and men) from age 40 to 84. Reasons cited by multiple people for the decrease in bear bile quality included the frequency of bear bile extraction (i.e., as often as every 10-14 days, in comparison with every 1-2 months in the past), the poor quality of food given to the bears, and the adulteration of the bile with non-bile liquids to increase the quantity available for sale and profit. "Bear bile is not used by many villagers here because they know about its quality. It is mainly for sale to outsiders because bile is extracted too often (3-4 times per month) while the diet for farmed bears is pretty poor. They are fed with maize mostly. The liquid extracted frequently from the farmed bear is not real bile, so it is not an effective treatment to certain kinds of health issues supposed to be treated with bear bile." (40-year-old woman)

*Medical Practitioners***:** Patients do not necessarily go to TMPs to receive bear bile if they are considering using it; but they will often consult TMP's for medical advice before taking a new medicine or a known medicine for a new health issue. A lot of patients come in to ask TMPs whether it is okay to be using it to treat X or Y things. Many who do not have close access to TMPs do not consult TMPs for health decisions: "Usually they say that, for example, someone gave them some bear bile. Is it okay to use?" [TMA TMP]

b. Accessibility

Social: Many patients who use animal products already have a source to obtain animal products or already possess them. Or someone they trust tells them that a particular product can help with their health condition.

4. Design personas and behavior change prototype testing results

The human-centered design phase involved incorporating the findings from the surveys and interviews to articulate several target audience personas, draw out their key needs, and develop prototypes of culturally appropriate messaging and outreach approaches. We began with six personas and, with AA's input, selected three to focus on for the design process. Personas help researchers and designers contextualize the users for whom they are designing by representing specific user populations with a unique potential to catalyze change in the attitudes of their community. Our work led us to three personas: **Granny**, **Older Reputable Male,** and **Bac Si**. We selected and tested behavior change prototypes with our three personas. The final prototypes discussed below were shaped through several cycles of ideation, testing, and revision for each **persona** with their respective **point of view statements** in mind.

a. Granny

Persona: Granny, an older woman of 60-70 years old, is the matriarch of her household and the primary caretaker for her family (Photos 1 and 2). Her day is usually filled with work, household chores, cooking, and childcare. During her rare leisure time, she enjoys socializing, exercising and gossiping with her friends away from family. She usually relies on a combination of folk knowledge and Western medicine for her and her family's health needs. She is open to trying out new health and medical treatments despite her preference for medication that her close friends and family members suggest.

DOI: 10.5642/envirolabasia.20190201.03

Photos 1 and 2: Testing prototype ideas (left) and conducting interviews with women representing the "granny" persona (right; (Source: Shannon Randolph and Lena Tran, 2018)

Points of View

1. Granny **needs** to feel agency to access multiple health options for treating her own and her family's medical needs in order to be the expert of her own health and to positively influence others.
2. Granny **needs** to relax and engage with other women in the community in an informal space in order to temporarily disengage from her family duties and recharge.

Prototype Ideas:

1. Spotlight a "Granny" to lead workshops to share their individual health knowledge; (for example, workshops on making homemade teas, cooking soups, and preparing medicines to treat illnesses).
2. Host a Conversation Corner health exchange with snacks and tea where women socialize and have meaningful dialogue about various aspects of life and health after their health consultations.
3. Share health information at women's exercise group or at Health Day.

Testing/Feedback: When we prototyped a Conversation's Corner women's health exchange and gathering at Health Day, "grannies" reported loving this idea. They suggested that the best time/place for AA to attract these women would be at Health Day or a similar informal community event such as an evening women-only exercise group. As women already gather at the Health Day while waiting to be seen by the TMPs, they entertain each other through animated conversation. The informally organized conversation with free snacks appealed greatly to them and would require very little extra effort as an intervention. Women preferred to frame this space as an informal gathering rather than as part of a formally organized and sanctioned women's union. One female interviewee said her husband wouldn't like the idea of her joining a sanctioned women's group. She cautioned that the government also might not like a sanctioned, formal gathering for fear of this leading to "social unrest."

Based on our conversations with women in the community and Animals Asia staff, promoting any ideas/products in villages in Vietnam is strictly regulated. As a result, it seems AA might need to frame the women's health exchange gathering events around health and wellness information and herbal alternative medicine as opposed to animal welfare. It also seems important to emphasize the event as a voluntary gathering where women are already informally congregating. Altogether, the women liked giving their input and appreciated how valued it

made them feel. They wanted to be part of the conversation and enjoyed talking about themselves and their lifestyles.

b. Older Reputable Male

Persona: Older reputable male (55+ and often retired) is the patriarch of his family. Given his role, he feels the need to maintain a masculine front for the sake of his (and thus his family's) reputation (Photos 3 and 4). He often reports being in fairly good health, but from time to time, he will open up about his health accomplishments (e.g. overcoming a condition, regaining strength). These victory stories play a huge role in influencing how his peers, especially his male peers, perceive him. More importantly, his stories inform how these men make their own health decisions. Likewise, in order for him to try out a new medication or invest time in an unfamiliar health practice, he needs to hear similar testimonials from his male peers. Privately, these men might be experiencing a long-term physical ailment but, on the outside, they want to maintain the "older, strong man" persona. They seem most comfortable sharing their stories with other men who have experienced a similar ailment they suffer from. They want to share their knowledge and be appreciated by and gain status in the eyes of the recipient.

Photos 3 and 4: Men representing the "older reputable male" persona (Source: Shannon Randolph, 2018)

https://scholarship.claremont.edu/envirolabasia/vol2/iss1/3
DOI: 10.5642/envirolabasia.20190201.03

Points of View:

1. He **needs** to feel strong and in control when making medicine choices. Choosing medicine that is easy to implement and "strong" (Western medicine and animal parts medicine is perceived to be stronger than herbal medicine as it is fast-acting) will allow him to uphold the "older strong man" persona (and not reveal the "sick patient" persona) and self-image.
2. He **needs** to know that a man of similar status has experienced sickness before he will share his own experience of being sick and healing from using a particular medicine. He cannot risk showing weakness to other men; he could lose status. Conversely, by sharing information that can heal another man, he could gain status in the eyes of the other man.
3. He **needs** to have impressive success stories to share with his male peers to gain status (similar to old man's version of sharing success stories in work or battle) that will promote his reputation in the community. His reputation is made stronger by sharing vital, reliable information with his male peers.

Prototype Ideas:

The ways in which males perceive and maintain their health is greatly shaped by their fear of seeming weak, incapable, or un-masculine. For example, a lot of males drink bear bile wine because it is perceived as a masculine past time. Most of the prototype ideas here were aimed at destigmatizing health maintenance practices for males in the community by reframing how men perceive health and health maintenance:

a. Promote posters, billboards, motorcycle stickers, etc. that make health maintenance/herbal alternatives more enticing to men.
b. Market herbal alternatives as a commodity. Emphasize the lengthy, skilled process to grow high quality, pesticide-free medicinal plants and prepare ancient family traditions of herbal concoctions. Using this approach will make men more inclined to purchase and boast about the product to their peers in the community.
c. Create platform for reputable men to share their "Herbal Alternative Success Stories." Identify reputable men in the community who have used herbal alternatives to heal their sicknesses to share their experiences.

Testing/Feedback:

The main obstacle for these men to adopt herbal bear bile alternatives over bear bile or Western medicine was patience. However, given their age, they were concerned about the side-effects of "strong" Western and animal-parts medicine. When they perceived the long-lasting positive effects of high-quality herbal medicine without the side effects, some well-respected, older men in this persona were convinced to shift their behavior and preferences. Working with these men to spread their stories to other men who respect their opinions could have a cascade effect to shift other older men's demand away from bear bile. Because their reputation of being strong, respected leaders is very important, elite men don't want to waste time using medication that appears mediocre, weak, or gentle. Ultimately, they need to be certain that whatever new health

regime they're trying out will be worth it - not just for the individual, but for the community which they advise.

Although we ran out of time to test our final prototypes (described above) with this persona group, we learned quite a lot about what did not resonate and what would be more meaningful to older men from testing earlier prototypes (i.e., packaging of herbal medicine products, a "bears for exercise equipment exchange" program, and a subscription herbal medicine service). Testing and iteration of these earlier prototypes led us to the three final prototypes above.

c. Bac Si (leading traditional healer)

Persona: Bac Si is a well-respected and experienced traditional medical practitioner (Photos 5 and 6). In Vietnamese, Bac Si means "doctor." Bac means "Uncle" and Si means "Doctorate." In Vietnam, TMPs are seen, revered, and trusted like close members of their community (hence, the title of bac or "uncle"). Bac Si can procure long lists of patients who can attest to his expertise, high quality of care and years of practice. He believes that his duty is to use his medical knowledge to treat patients, regardless of money and profits. As a result, despite all his accolades and high demand for his services, he maintains affordable pricing for his medicine while still acknowledging his own needs to provide for his family and maintain respect for his name. In the future, he plans to pass down the herbal medicine tradition to his son and, eventually, his grandson. Finally, as an older reputable male himself, he can understand how much status is at stake for men of his status to be seeking medical treatment. The Bac Si acknowledges that Western medication is much more affordable and fast-acting in comparison to his services, and he is aware that some people purchase his medicine, dilute it, and re-sell it for profit.

https://scholarship.claremont.edu/envirolabasia/vol2/iss1/3
DOI: 10.5642/envirolabasia.20190201.03

Photos 5 and 6: Man representing the "Bac Si" persona (Source: Shannon Randolph and Lena Tran, 2018)
Photo Credit:

Point of View

1. Bac Si **needs** to feel respected and renowned for having a natural medicine practice that is equally or more effective than Western and animal parts medicines in healing people because his family name and reputation depend on it, and he wants to show that herbal medicine can be strong without side-effects.

Prototype Ideas: The prototypes that we designed for Bac Si are generally aimed at helping doctors like him reach and serve larger audiences, particularly rural communities. With better access to health knowledge, rural patients will have more knowledge, options, and overall control for their health ailments.

1. Health Consultation Hotlines to connect bear bile users who live in rural areas of Vietnam and often lack easy access to preferred traditional medicine practices to doctors like Bac Si, who readily give free health consultations over the phone to new patients.
2. Patenting Bac Si's medicines so that they can be sold widely for an affordable price. This would make traditional medicine accessible for rural communities and allow Bac Si's to expand their business.
3. Showcasing Patient Reviews using a centralized database such as a web page, phone application, newspaper, tv, or radio station to allow community members to help those around them to make more informed health decisions.
4. Traditional Medicine Convening to create spaces where younger TMPs can learn about entrepreneurial strategies (branding and production) within traditional medicine.

Testing

We did not have the time or geographic accessibility with Bac Si to test these ideas with him, as he was located six hours drive from our base in Hanoi.

IV. Discussion

Survey and interview discussion

Health seeking behavior was shaped largely by (1) trust in personal experiences, family and friends' advice and trusted medical experts' advice (both TM and WM); (2) geographic, social and financial accessibility; and (3) the type and complexity of health condition and treatment. People also made decisions based upon their preferred health system (Western or traditional). These factors need to be considered when shaping health outreach efforts. For example, word-of-mouth is a powerful tool to spread information, especially when targeted to particular audiences from an influential member of that demographic group (e.g. older, well-respected men to other older men). Vietnamese culture values community collaboration and cohesion. Thus, building upon an infrastructure of communication that already exists (i.e., word of mouth advertising) could prove effective. Both survey and interview results also revealed an awareness of the risks and downsides of using bear bile. People with this knowledge and personal experience could be engaged as partners to spread knowledge and promote alternatives to bear bile that are available locally.

Furthermore, demographic hierarchy structure needs to be considered when designing effective behavior change campaigns in Vietnam. For example, male status's association with "strong" wild meat and medicinal animal product use (Drury 2011, Davis et al. 2016) poses a challenge in shifting male perceptions and behaviors regarding bear bile, whereas women were much more open to trying an assortment of health approaches. Men who had shifted their behavior away from bear bile did so based on key influencers' personal experiences relayed to them. These two approaches to behavior change point to the opportunity to build upon existing information sharing social networks for behavior change approaches within key demographic groups.

Survey results discussion

The importance of quality when choosing medicine paired with growing concerns over the dropping quality of bear bile offers an opportunity for organizations such as TMA and AA to provide or support the provisioning of quality-controlled herbal alternative medicines such as the herbal alternative given at the Health Days for sale in peri-urban pharmacies. People were quite pleased with both the sample medicine and the Health Days, so these approaches could be built upon for further outreach efforts and alternative medicine provisioning.

https://scholarship.claremont.edu/envirolabasia/vol2/iss1/3
DOI: 10.5642/envirolabasia.20190201.03

AA's current behavior change approach focuses on adoption of herbal traditional medicine alternatives. However, given that the majority of people preferred Western medicine but used no medicine or used TM for body pains – the primary health issue cited at Health Days and the primary reason for bear bile use – it would be wise for any behavior change campaign to consider engaging WM experts as well as TM experts to promote alternatives. Furthermore, while many rural behavior-change programs emphasize distributing seeds to the public, in peri-urban and urban areas, people may prefer to buy medicine from a geographically accessible place, like a pharmacy. it could be beneficial for TMA to partner with pharmacies to sell herbal TM and meet this demand. While AA does not engage celebrities in their behavior change approach, many other animal parts trade social marketing campaigns focus on celebrity endorsements and legal status of animals; however, this study indicates that celebrity endorsements and emphasis of legal status may not resonate with peri-urban consumers.

Men were more likely to report use of bear bile, as were people with secondary school education, indicating a key target audience to engage. Conservatively, over a third of the older demographic attending the Health Days had used bear bile in this community. We expected a high percentage of bear bile users given the socially and geographically accessible nature of bear bile in this community. Self-reported bear bile use could be underreported, reflecting a fear of reporting and an opportunity to engage. Future surveys could employ randomized response technique (RRT) or a similar hidden response questioning approach to encourage honest responses regarding behavior people may want to hide.

Women and older generations were more represented in this study. Interviews revealed that women were more apt to attend free, social events where they could socialize, and they were more likely to seek help publicly for health ailments. This could explain why women were more represented in this study, as they were more likely to attend HD. Older generations were more likely to have health ailments for which they wanted to seek treatment at the Health Day, so this could explain the over-representation of older respondents in this study.

Given the relatively small sample size, many of the results were not statistically significant. We recommend expanding the sampling efforts and increasing the sample size (e.g. to at least 200) both before and after implementation of interventions to gage before and after perceptions and behaviors, and impact of interventions.

Design results discussion

Influential grannies were most excited to exchange ideas in fun gatherings where they were out of earshot of men and could gossip and complain freely. These settings, like evening exercise groups or health days, would be good places for Animals Asia staff to engage older women about how to promote their own and their family's health in the village. The conversation should begin with their health and include phasing out bear bile.

Influential older males with similar health issues (chronic, debilitating body pain) were swayed when their well-respected male friends told them in private that a particular herbal medicine from a reputable TMP worked or recommended that they go to a TMP like Bac Si. Thus, highly visible community members such as a headmaster, successful businessman or government leader (i.e. hamlet heads), who previously used bear bile in the past but no longer do, could be good candidates to fill this role. Men should be engaged in small gatherings in private spaces where they can discuss important personal health issues and choices without worry that other males not experiencing similar health issues will overhear the conversation.

Everyone expressed a strong need to have better access to reliable, good quality and safe medicine in rural areas. If AA/TMA can help them achieve this by engaging Bac Si-like TMPs across the country, they will win important advocates and partners in the fight against bear farming.

Reflection on mixed methods approach with human-centered design

AA found the combination of surveys interviews and human-centered design to fit well with their approach. From their perspective, environmentalists often aim to convince people to change something familiar to something unfamiliar and thus develop behavior change approaches from culturally-skewed perspectives. Without gaining a deep sense of empathy and understanding of the target audiences' needs, organizations' goals can regress rather than move forward. However, a behavior change approach that fits the daily routines and implicit needs from the target audiences perspectives (inductively illuminated through in-depth observations and interviews) is much more likely to lead to a successful behavior change solution or campaign strategy (Davis et al. 2016). The HCD process encourages one to fail early and to keep the human aspect of problem-solving in the forefront. No matter what solution the researcher thinks will work best, if individuals in the target audience do not use it, then the solution does not work.

Our application of mixed methods and HCD has some similar and distinct elements to popular approaches currently employed for environmental behavior change (i.e., conservation marketing and environmental education) and thus may lead to different proposed behavior change approaches. Using the HCD process initially identifies needs from the perspective of individual target audiences being met through the targeted behavior to change. It then identifies influential individuals within each target audience group who have already made the desired behavior shift or who take on new behaviors readily through particular experiences and messaging approaches. Finally, it develops and tests prototypes for behavior change approaches that build on existing behaviors, experiences and messaging approaches already employed by influential individuals. The target audience is more apt to view these behavior and attitudinal changes as beneficial to their lived experiences and thus desirable as they come not from an outside source but rather from trusted, influential individuals within their social sphere.

https://scholarship.claremont.edu/envirolabasia/vol2/iss1/3
DOI: 10.5642/envirolabasia.20190201.03

Summer 2019 design work and research

In order to assist AA to develop, test and evaluate the effectiveness of behavior change approaches based on this applied research, we will send a new team of three Claremont Colleges students with close advising from Dr. Randolph and funding from the Claremont Colleges to do the following during the 2019 summer (June-August):

(1) Conduct 100 surveys in June to increase sample size of health and bear bile perceptions and behaviors before interventions are tested.
(2) Test the most effective interventions (experiences, services and programs) to incentivize the adoption of sustainably and humanely harvested medicine for select key persona groups identified during the summer 2018 research.
(3) Design a scaled implementation plan for 1-3 most salient behavior change strategies with Animals Asia.
(4) Evaluate the perceptions of interventions on attitudes and behaviors by surveying men and women of all adult ages.
(5) Document process and results, describing and picturing HCD testing, and perceptions of HCD intervention through an ongoing blog, multimedia presentations, and publications.

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https://scholarship.claremont.edu/envirolabasia/vol2/iss1/3
DOI: 10.5642/envirolabasia.20190201.03

Appendix of 2017-2018 Survey Results (n=118)

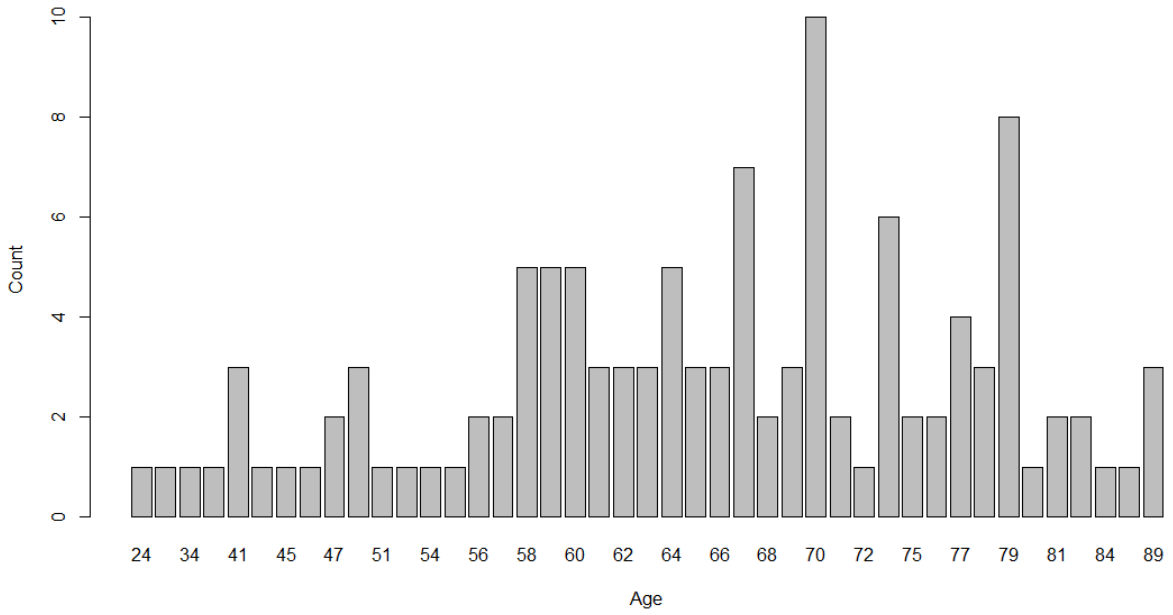

Figure 1. Age distribution of participants.

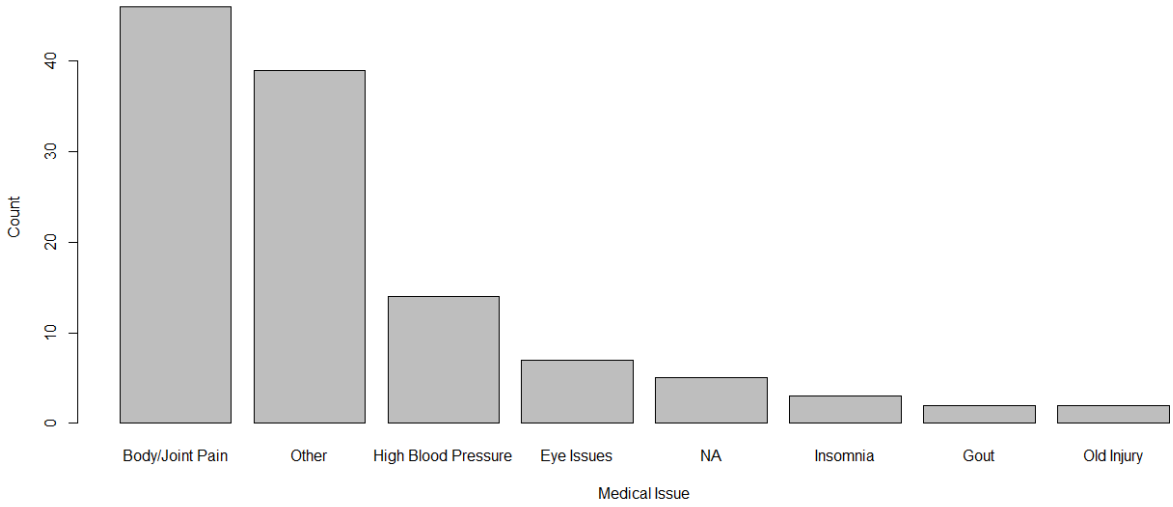

Figure 2. Distribution of reported medical issues.

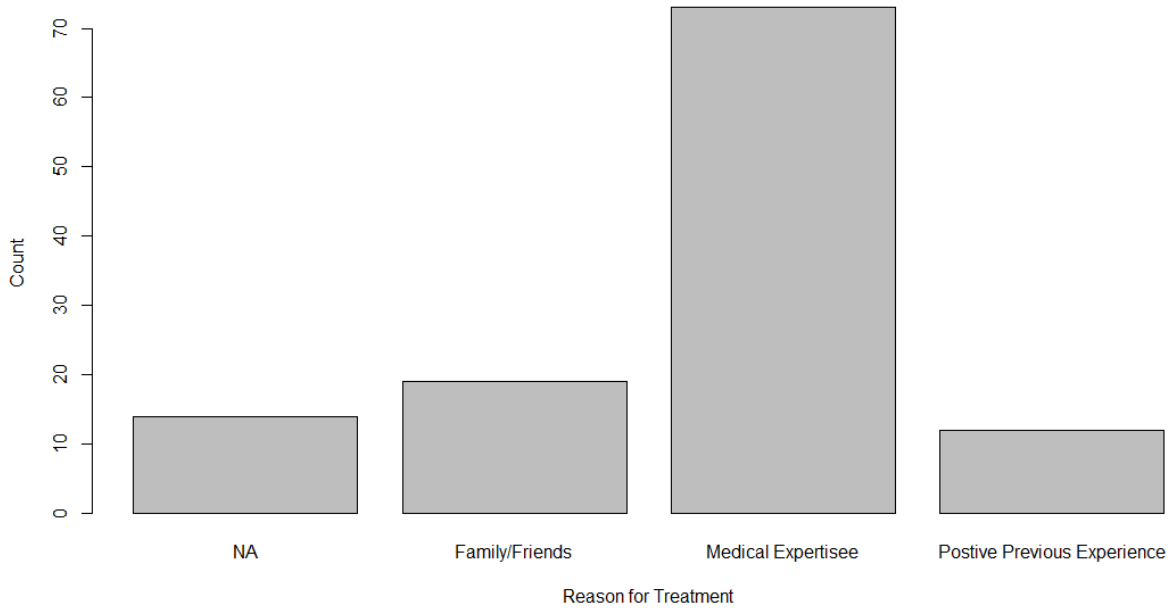

Figure 3. Distribution of motivation to use either Western or tradition treatments.

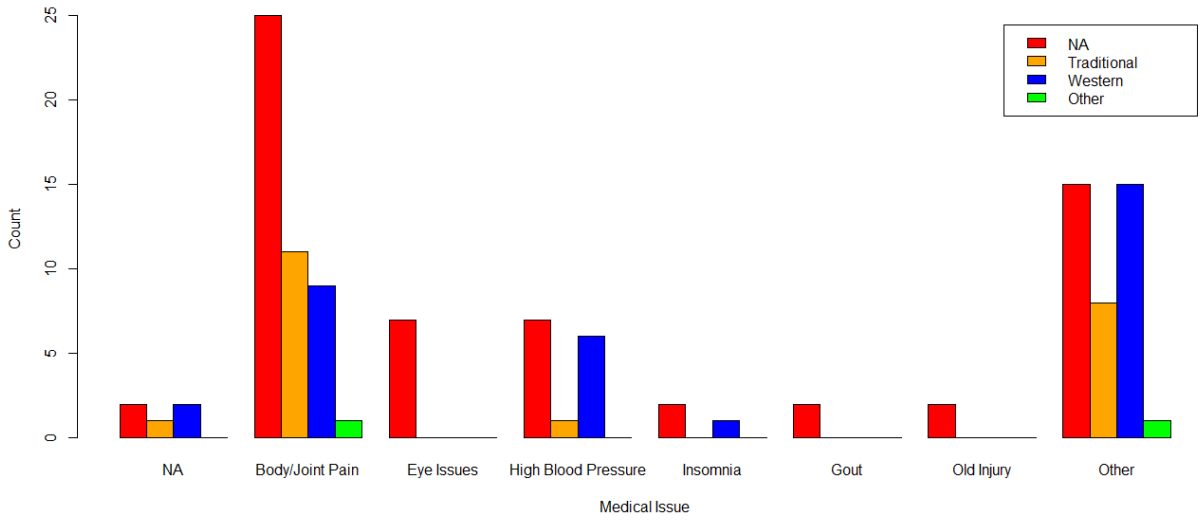

Figure 4. Distribution of medicinal treatment sought by medical issue.

https://scholarship.claremont.edu/envirolabasia/vol2/iss1/3
DOI: 10.5642/envirolabasia.20190201.03

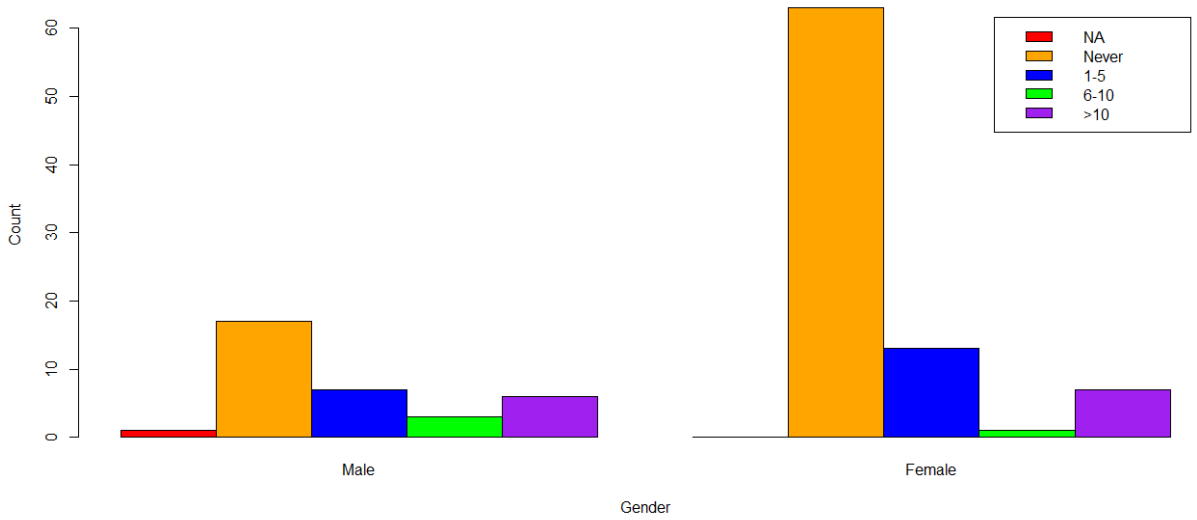

Figure 6. Distribution of bear bile usage on self by gender.

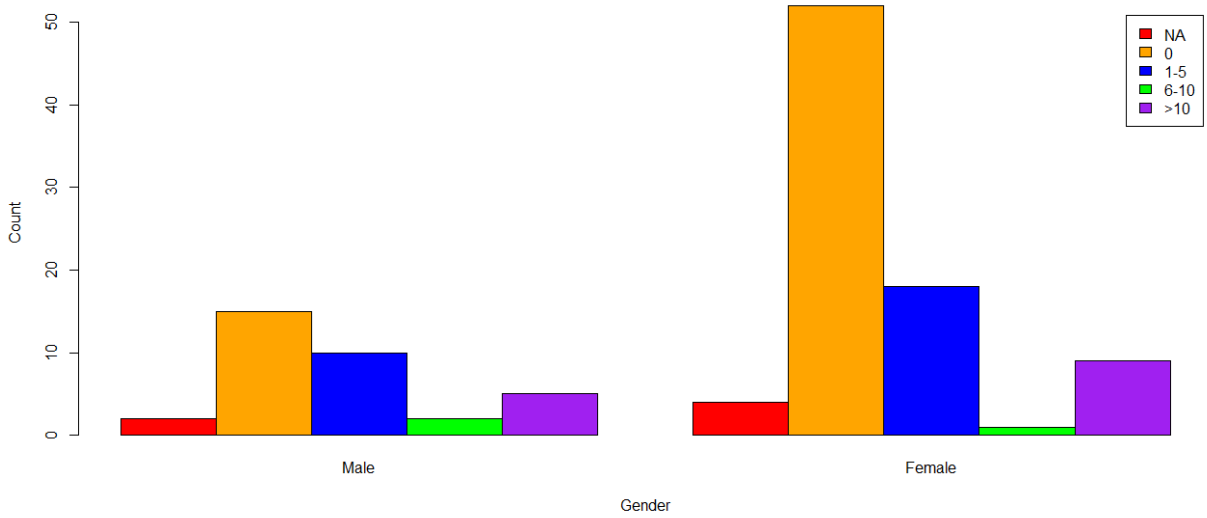

Figure 7. Distribution of bear bile usage by people they know by gender.

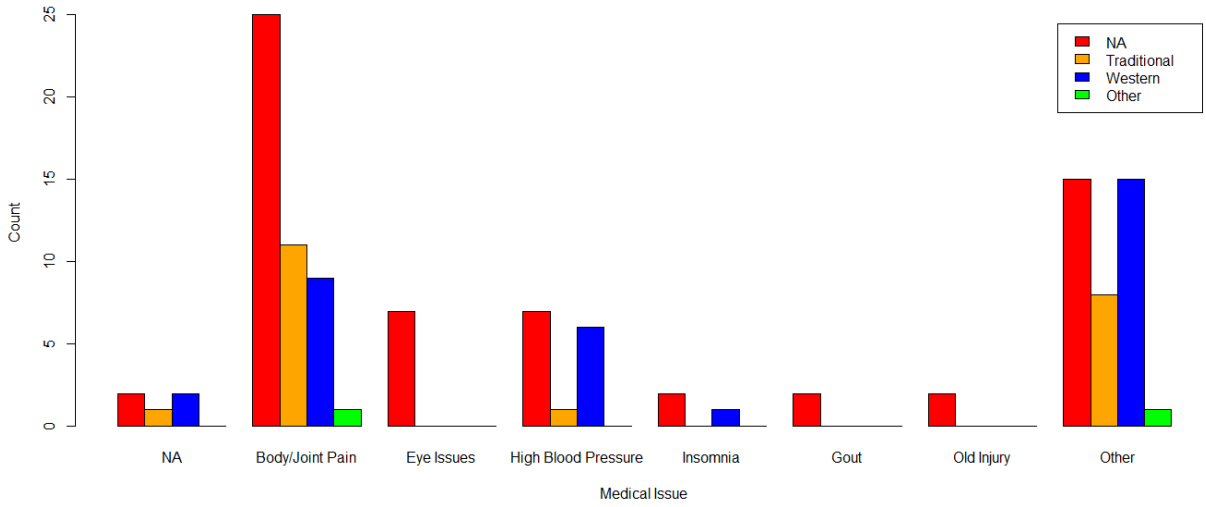

Figure 8. Distribution of type of medicine participants trusted for each medical issue experienced.

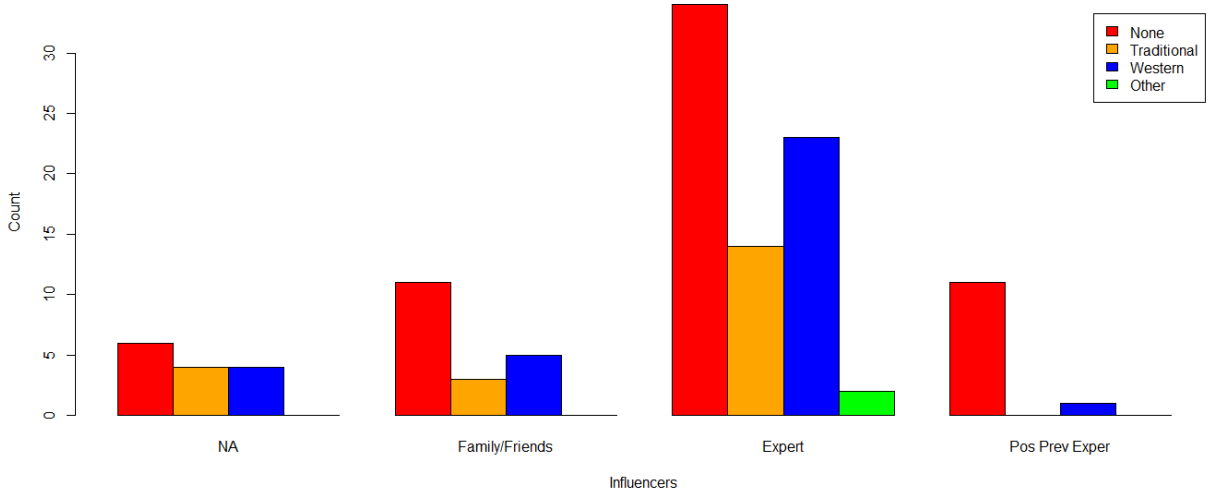

Figure 9. Distribution of type of medicine participants trusted based on each influencer.

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DOI: 10.5642/envirolabasia.20190201.03

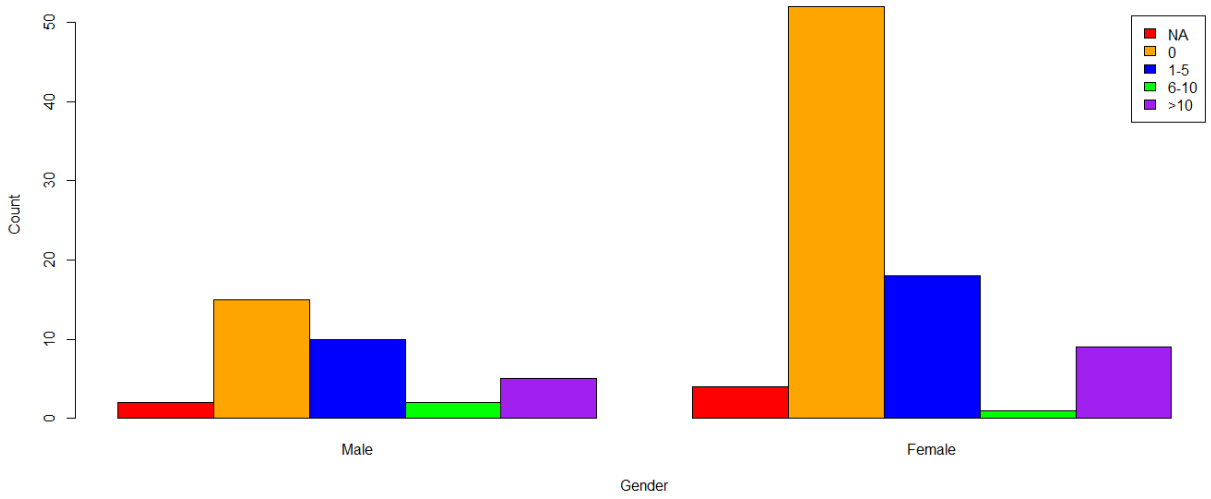

Figure 10. Number of people known using bear bile for each gender.

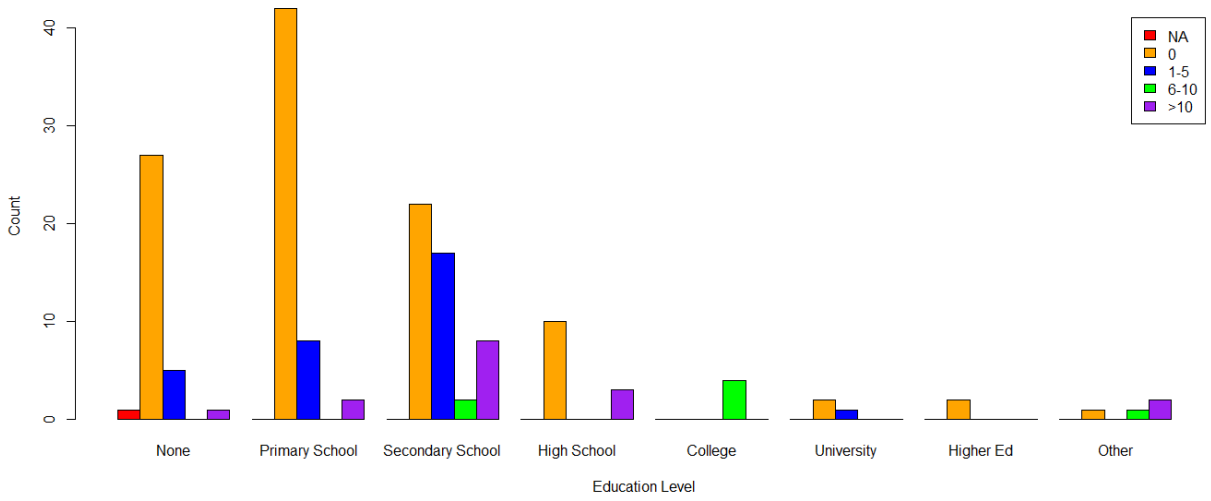

Figure 11. Number of people known using bear bile based on participant's education attainment level.

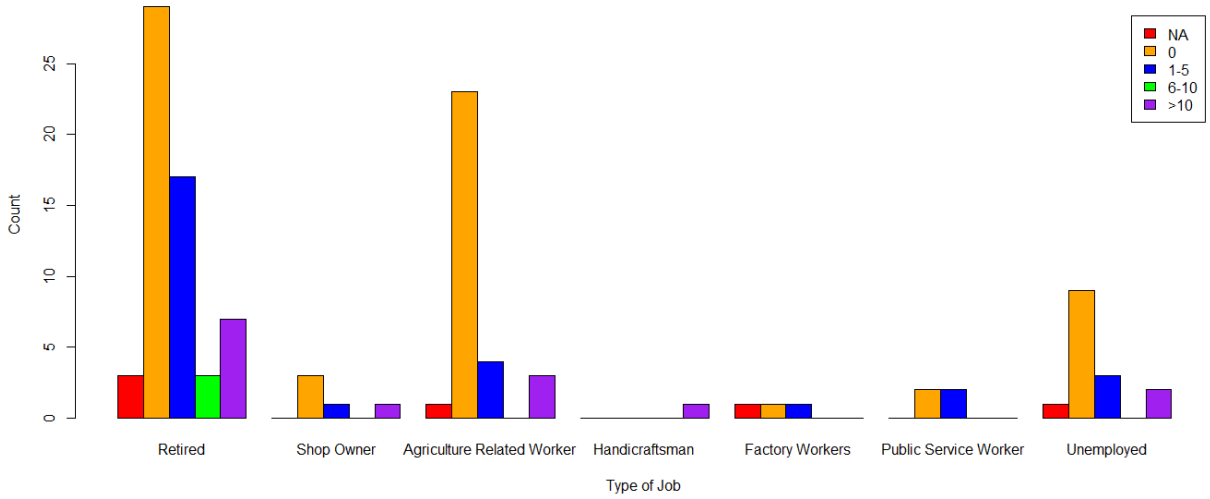

Figure 12. Number of people known using bear bile based on participant's job.

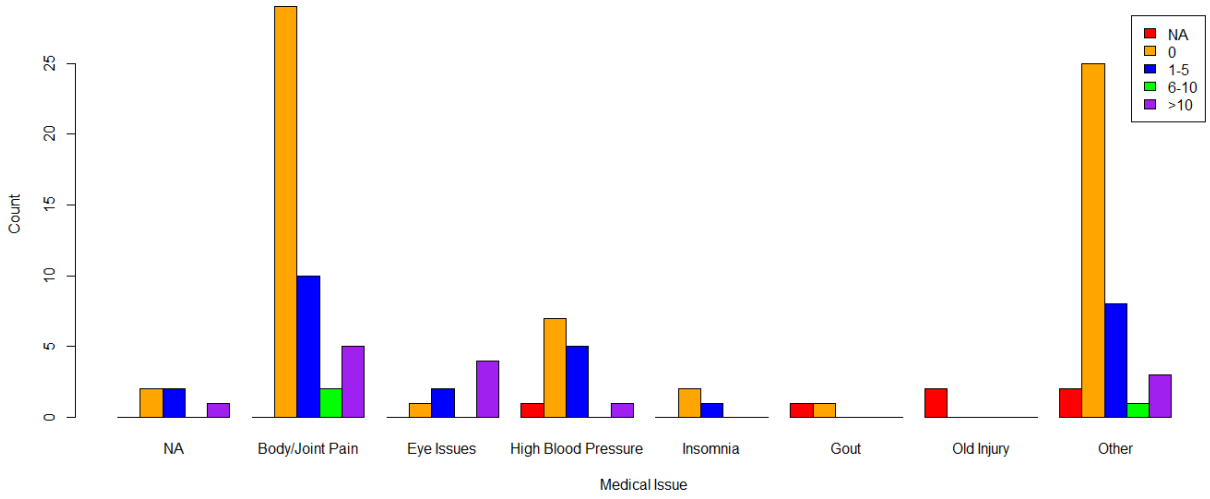

Figure 13. Number of people known using bear bile based on participant's medical issue.

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DOI: 10.5642/envirolabasia.20190201.03

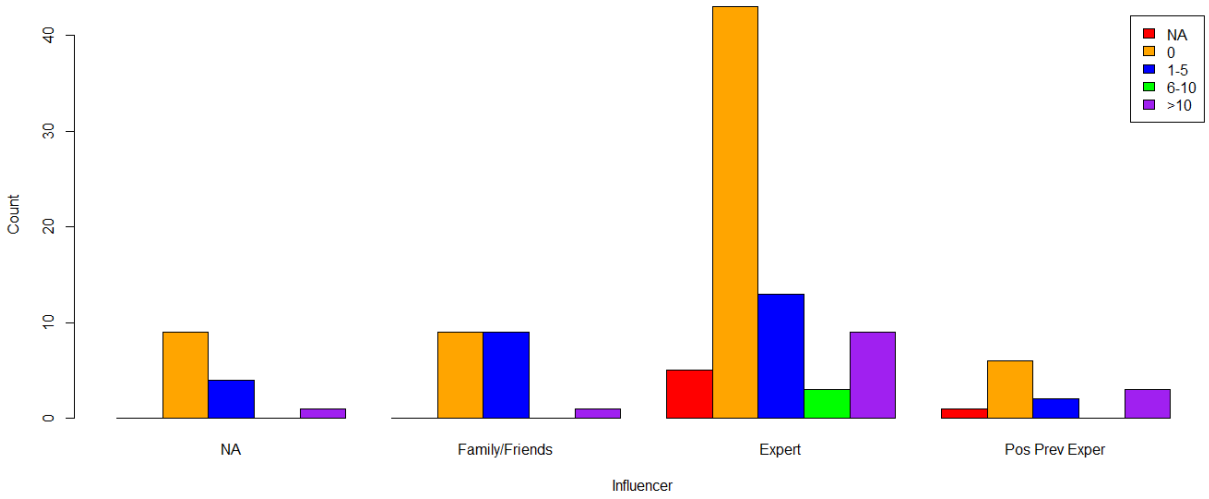

Figure 14. Number of people known using bear bile based on participant's influencer.

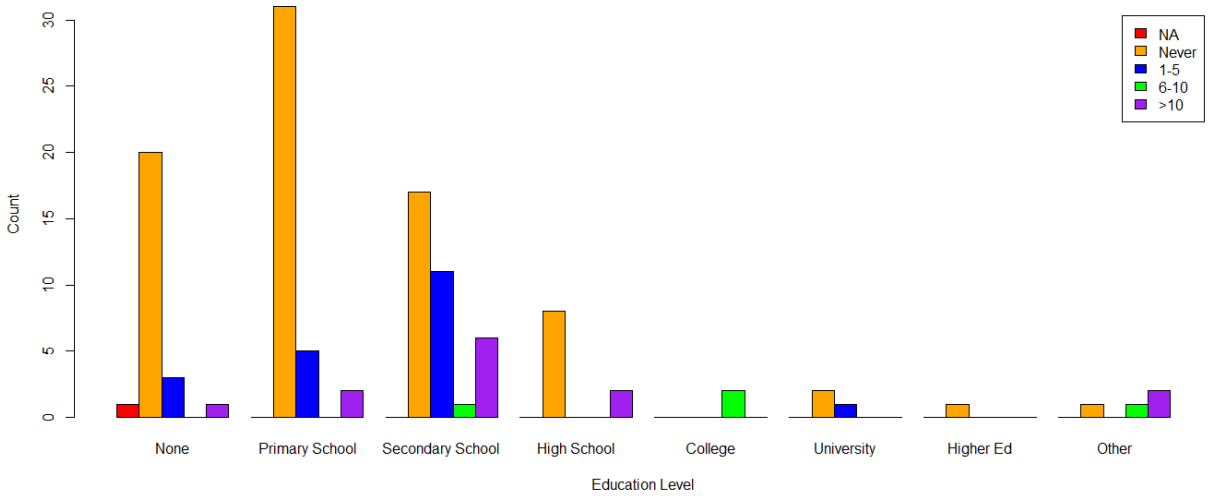

Figure 15. Number of times participants used bear bile by education level.

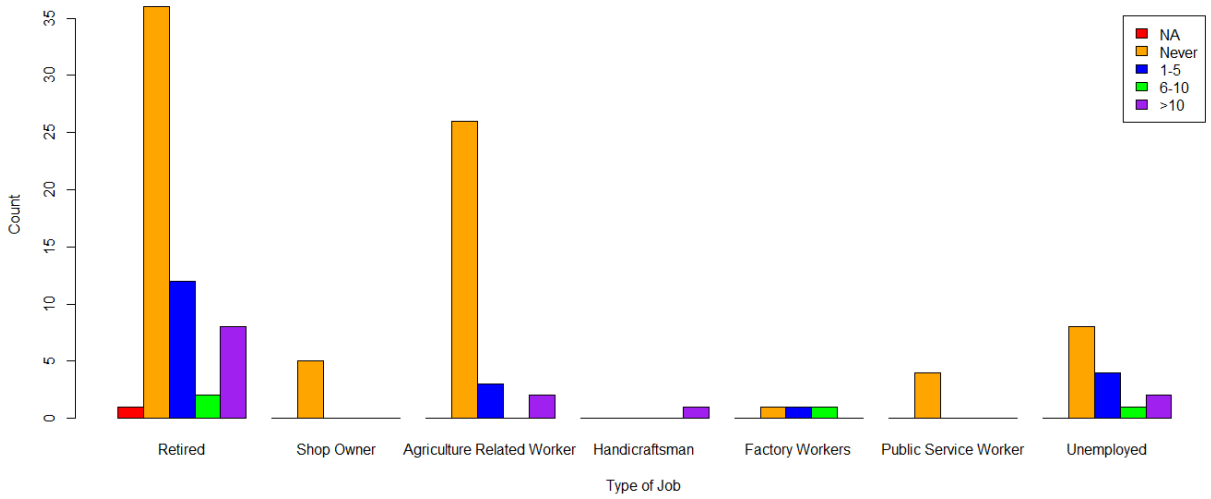

Figure 16. Number of times participants used bear bile by type of job.

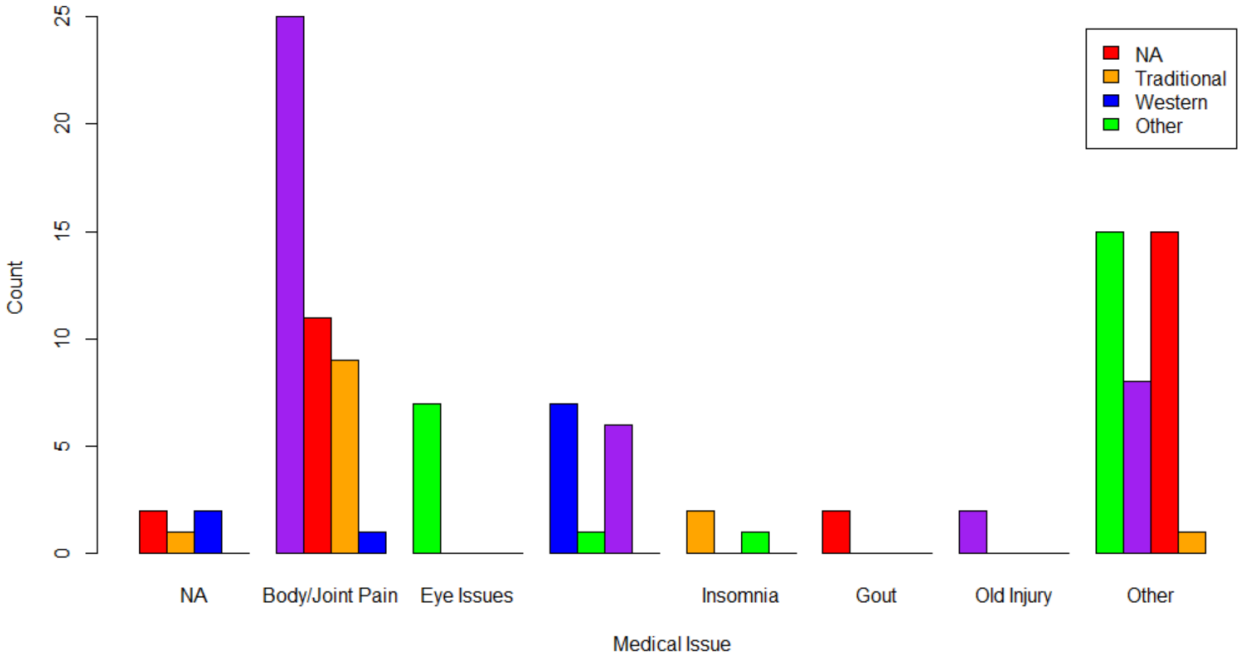

Figure 17. Number of times participants used bear bile by medical issue.

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