

Can't bear it! Employing Culturally Sensitive Initiatives to Reduce Bear Bile Demand in Northern Vietnam

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the hive



AnimalsAsia

Abstract

Over the past 30 years, the combination of over-hunting, habitat loss, and increased bear bile demand has caused significant declines in Asiatic black bear (aka moon bear; *Ursus thibetanus*) and sun bear (*Helarctos malayanus*) populations. In Eastern medicine, bear bile is extracted from the gallbladders of bears and is then used to treat a wide range of inflammatory, liver, and degenerative ailments. However, the use of bear bile has had significant impacts on bear populations. Given that communities in Northern Vietnam have a lengthy history of using bear bile and bear bile is easily accessible, merely advocating for wildlife conservation is not an effective, culturally sensitive solution. This research took place one hour outside of Hanoi, Vietnam in a peri-urban bear bile farming community that is a bastion of bear farming. Human-centered design was trialed as a tool to identify culturally appropriate means to shift Vietnamese villagers away from using bear bile. During four months between 2018 and 2019, the research team used a combination of human-centered design and social science experimental research to survey community and identify influential community members and their motives for various health decisions. We then created and tested messaging and behavior change experiential prototypes aimed at reducing bear bile demand in the target bear farming community. In 2019, we iteratively tested and refined prototypes for the most accessible persona to our all-female team - the family matriarch (aka “Granny” persona) as a potential change agent in shifting the behaviors of the majority of community members - women and children - away from bear bile use. The final and most compelling design idea was a collection of herbal medicinal recipes collaboratively created by and for family matriarchs that would be shared through a recipe book and workshops to demonstrate how to harvest and create herbal medicinal alternatives to bear bile.

Keywords: human centered design, design thinking, wildlife conservation, moon bear, sun bear, Eastern medicine, traditional medicine, bear bile, health care, Vietnam

Abbreviations:

1. AA - Animals Asia
2. WU - Women’s Union
3. TMA - Traditional Medicine Association
4. TMP - Traditional Medicine Practitioner
5. HD - Health Day
6. POV - Point of view
7. HCD - Human Centered Design

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Introduction

Bear bile use in Asia

Animal products, such as pangolin scales, rhinoceros horns, tiger bones, and bear bile have been used in Asian traditional medicine for more than 2,000 years. Bear bile is extracted from the gallbladders of bears and used to treat a wide range of inflammatory, liver, and degenerative ailments (Feng et al. 2009, Li et al. 2016). Over the past 30 years, the combination of over-hunting, habitat loss, and increased bear bile demand has caused Asiatic black bear (aka moon bear; *Ursus thibetanus*) and sun bear (*Helarctos malayanus*) populations to decline by 30–49% and 30%, respectively (Fredriksson et al. 2008, Garshelis and Steinmetz 2016). As a result, moon bears and sun bears are currently listed as Vulnerable on the International Union for Conservation of Nature (IUCN) Red List.

Since the 1980's, the practice of “bear farming” - keeping bears captive for live extraction of bile - has grown significantly throughout Asia (Servheen et al. 1999). An estimated 23,000 bears remain in bear farms across China, Japan, South Korea, and Vietnam (Livingston, Gomez and Bouhuys 2018). In Vietnam, a government ban on live bile extraction from captive bears implemented in 1992 and again in 2006 led to a decrease of over 70% of captive bears (Nguyen 2007, Animals Asia 2011, Crudge et al. 2016, Wilcox et al. 2016, ENV 2017, Livingstone, Gomez and Bouhuys 2018). While it is 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.

In the 1980s, Vietnam's adoption of a market-based economy and the United States government's lifting of its trade embargo increased the affordability and accessibility of Western medicine, thereby leading to a decline in Traditional Medicine (TM). Despite this, healthcare options for low-income people of Northern Vietnam are still severely limited (Ensor and San 1996) and incur high out-of-pocket costs (van Doorslaer et al. 2007). Therefore, traditional medicine remains an accessible treatment scheme for common illnesses in rural areas (World Health Organization 2004).

Animals Asia, our NGO partner

In an effort to end bear farming, our partner organization, Animals Asia (AA), started an education campaign in bear farming communities about the problems with bear bile and bear farming. However, they soon realized their efforts were spurring animosity rather than advocacy. In 2010, AA pivoted their approach and partnered with the Traditional Medical Association of Vietnam (TMA) to provide free health consultations and sample herbal alternatives to bear bile

in bear farming villages. Thus, “Health Day” interventions were born. AA has now co-hosted Health Days with the TMA for nearly three years on a semi-monthly basis. Health Days target villages and peri-urban areas around Hanoi that have high concentrations of bear farms. At these Health Days, TM practitioners (TMPs) offer free walk-in consultations to any villagers and prescribe herbal medicine for their health conditions. Patients are also given an “Herbal Alternatives to Bear Bile” booklet co-produced by AA and TMA that describes a wide variety of bear bile alternative herbal plants they can grow in their garden. Additionally, patients are given a small bottle of an herbal medicine for pain relief. Pain relief is one of the most common uses for bear bile. Overall, the aim of Health Days is to provide a space for positive interactions between community members and AA by offering health care, a service that is often lacking and desired in rural Vietnam. Other initiatives from AA include planting herbal medicine gardens in community schools, educating TMPs on bear bile alternatives in partnership with the TMA, rescuing bears from bear farms, and operating a sanctuary for rescued bears in Tam Dao National Park.

Research location

This research took place in Hanoi and a peri-urban bear bile farming community one hour outside of Hanoi (Village X). Village X’s name is redacted for confidentiality purposes. Village X is split into 13 communes and 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.

Why use human-centered design?

Due to the fact that villagers in Northern Vietnam have a long history of bear bile use, and bear bile is easily accessible through bear farmers and in informal urban marketplaces, merely advocating for wildlife conservation is not an effective or culturally sensitive solution to reducing bear bile use. Human-centered design (HCD) grants us the opportunity to identify culturally appropriate means to shift Vietnamese villagers away from using bear bile.

Methods

2018 Design Methods

From June to July 2018, a Claremont Colleges research team implemented the HCD process, testing and iterating two rounds of prototypes with target audiences. HCD consists of five stages - empathize, define, ideate, prototype, and test. First, the team attempted to understand and empathize with community members through rapid analysis of quantitative survey results, qualitative interviews, and observations. The team identified three key “personas” who were influential regarding health decisions within the community. The three personas were “Granny” (influential family matriarchs), “Older Reputable Male”, and “Influential Traditional Medicine Practitioner.” From there, the team brainstormed and selected a few initial prototypes to test for each target persona. In addition to the HCD work, the team also surveyed participants at Health Day to obtain comparative data about population demographics, motivations for using bear bile, factors influencing health decisions in general, and opinions of Health Day.

2019 Survey Methods

Using convenience sampling, we surveyed 206 participants at five Health Days from 2018 to 2019. Since some of the Health Day participants were not literate, RAs read the questions and answer choices aloud to the participants. Tea and snacks were provided for participants to simulate an informal, conversational environment. All participants were read a consent form prior to each interview and survey and had the option to opt-out of the study at any point. IRB was obtained from Pomona College for this research.

Data was collected and stored securely in a password-protected file using KoBoToolbox, a digital data collection tool. All data analysis and data visualization was conducted using Python. The main purpose of the Health Day survey was to identify which demographic, lifestyle and Health Day experiential factors might affect bear bile use in this bear farming community. The dependent variables were (1) the number of times one had previously used bear bile, and (2) the number of people one personally knew who had used bear bile in the past 12 months. The independent variables were gender, education level, job, and primary medical issue. Since sample sizes were relatively small, we used Fisher's exact test on each possible pairing of dependent and independent variables.

2019 Design Methods

Through an assessment of the summer 2018 team's experience and conversations with Animals Asia, we decided that the Granny persona would be the most accessible and timely population to focus on for the summer 2019 design work. This assessment was made because AA was building a relationship with the Women's Union (WU) in Village X, and both the summer 2018 and summer 2019 teams were comprised of young women. Due to gendered and age-specific information sharing norms in Vietnam, our all-women teams were able to build trust and gain access to women more easily than men in the village. Building on the summer 2018 findings, the team worked iteratively through the ideate, prototype, and test phases of the HCD process. Given that unsanctioned gatherings were not allowed in Vietnam, AA asked and was granted permission from the village chief (highest ranking government official in Village X) for our team to work with the Women's Union.

Below is the description of the Granny persona, point of view, and design opportunity space.

Granny's Persona: Granny is an older woman (>50 years old) who is an influential matriarch of her household and the primary health caretaker for her family. Her day is usually filled with work, household chores, cooking, and childcare. In her leisure time, she enjoys socializing, exercising, and gossiping with her friends. 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 that her close friends and family members and doctors suggest because she trusts their experiences and expertise.

Granny's Point of View and Need: Granny is constantly taking care of her family, so she needs to feel agency to access and learn from others' experiences using multiple health and treatment options. She gains personal satisfaction and social recognition by sharing valuable folk health knowledge with other matriarchs. Granny also desires informal free time to socialize with friends, relax, and exchange valuable health knowledge.

Granny Design Opportunity Space: How might Granny share, access, and test up-to-date folk health knowledge with other matriarchs and possibly even TM experts in order to (1) feel empowered with her health knowledge for herself and her family and to (2) enjoy precious and hard to obtain time with her friends?

We brainstormed over 50 potential ways to meet Granny's need, then narrowed to the top three prototypes for each of the following categories: most likely to succeed, most delightful, and most breakthrough. Afterwards, the team met with AA to receive feedback on our proposed prototypes and selected five prototypes to test in the survey on Health Day:

1. Share recipes to treat health problems. Spotlight a Granny to lead workshops sharing their individual health knowledge at Health Day (Examples: Workshops on making homemade teas, cooking soups, and preparing medicines to treat illnesses);
2. Talk about health over tea and snacks. Host a Conversation Corner at Health Day with snacks and tea where women socialize and have meaningful dialogue about various aspects of life and health after their health consultations;
3. Lead field trip to medicinal garden. Train Grannies to harvest herbs and make medicine from the AA/TMA herbal medicine school garden;
4. Communal exercise class; and
5. Do-It-Yourself herbal medicine workshop, led by a traditional medicine doctor.

We also collected qualitative feedback on two design ideas that best complemented Animals Asia's work: sharing health information at a women's communal exercise class and developing a recipe book for health treatments. In order to give the grannies a physical prototype to engage and provide feedback, we presented them with two printouts: a flyer for a community exercise class and an example page from an herbal medicine recipe book (Figures 1 and 2). Then, we asked them questions concerning their exercise routine and their knowledge of herbal medicine. Overall, we were able to test the prototypes with a total of six grannies in 2019.

Design Results

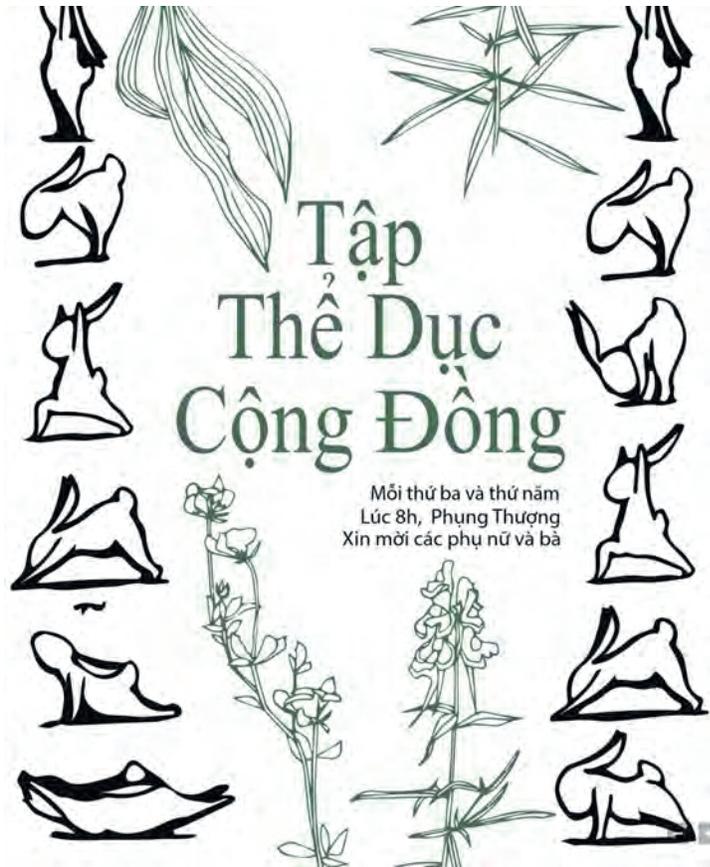


Figure 1: Flyer for communal exercise class

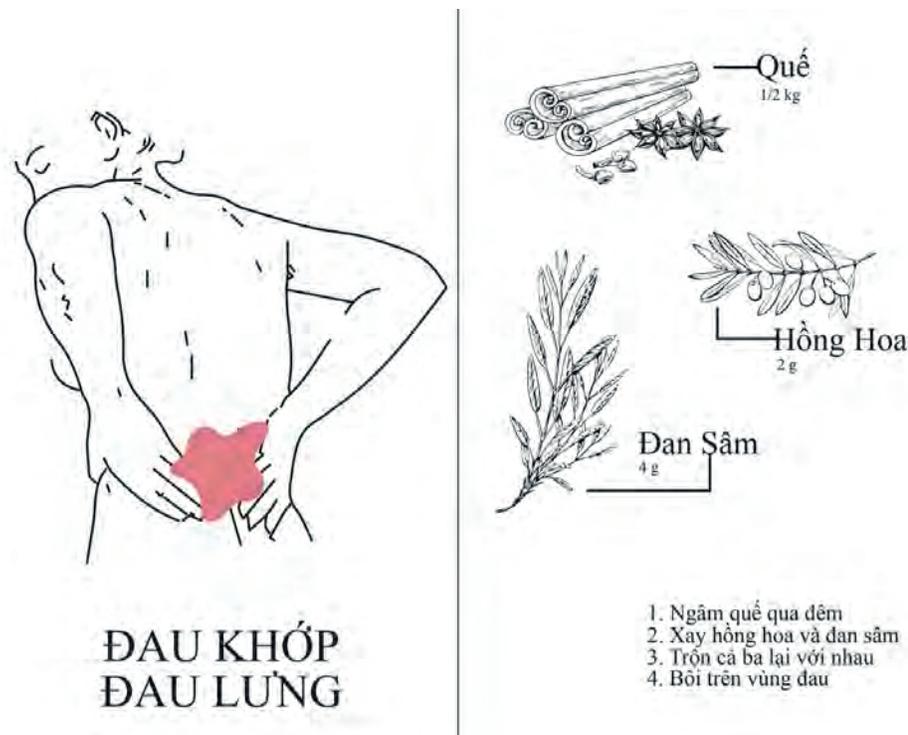


Figure 2: Herbal medicine recipe to treat back pain

Through our communal exercise prototype testing at the first Health Day, we found that most grannies exercised around 4-5 am in the morning before they went to the market. Although most grannies knew of an exercise program in town, most did not use it for various reasons: the time for the exercise class was inconvenient, they did not enjoy the overly intense exercise activity, or they preferred walking. Almost all grannies walked alone everyday for about 30 - 45 minutes. One person stated that she did not exercise because her work required a lot of manual labor already. Grannies generally had neither the time nor the energy to attend an exercise class.

Testing of an herbal medicine recipe booklet revealed that grannies did not actively use AA's "Herbal Alternatives to Bear Bile" booklet produced by Animals Asia and Traditional Medical Association and distributed at Health Day - they only browsed through the book in their free time. The grannies noted that they had a hard time identifying the herbs in the book. Most grannies stated that they used both Western and traditional medicine. They typically found out about health recipes through family and friends. Frequently, medicinal plants were either purchased from Vietnamese ethnic minority groups or grown at home. A few talked about how they cooked a simple herbal medicine mixture to soak their achy feet. A few also talked about using honey and lemon to treat their sore throat. In general though, most did not have easy access to medicinal plants. The grannies we interviewed were not aware of the community garden started by AA, which was intended to be available to all community members to freely pick medicinal plants. When asked if they would use a book that teaches you how to make herbal medicine, most grannies enthusiastically said, "Yes!"

The survey data revealed that two of the five tested prototypes were the most popular among grannies: (1) share recipes to treat health problems (n=32, 63%), and (2) talk about health over tea and snacks (n=31, 61%). We decided to move forward with the recipe book because it was the most feasible, culturally appropriate, and popular prototype.

For the recipe book prototype, we focused on the goals of increasing accessibility to medicinal plants, helping the grannies identify medicinal plants, and fostering trust in AA/TMA. Since health knowledge is typically passed down orally in Vietnamese society, fostering the grannies' trust within a written recipe book would be challenging. We brainstormed a few prototypes aimed at meeting these goals and consolidated our thoughts and ideas into a three-step prototype to present to AA for feedback:

1. Collect the TMA's and/or Grannies' recipes to share in a book,
2. Create a recipe book that focused on general health, alternatives to bear bile, or health issues for which bear bile could be used, and
3. Host a recipe workshop at the community medicinal plant garden.

The aims of this prototype were to:

- Increase grannies' accessibility to medicinal plant alternatives to bear bile,
- Teach grannies how to identify medicinal plants,
- Incentivize grannies to create their own herbal medicine, and
- Create a space and time for grannies to relax and converse about health.

After discussing our prototype with AA, they informed us that it would be nearly impossible to access the TMA's recipes. The traditional medical practitioners (TMPs) at the TMA wanted to keep their recipes secret in order to preserve their business, so the book would highlight recipes from influential grannies in the community, in collaboration with the Women's Union.

Unfortunately, the WU leaders were busy with time-sensitive matters and were unable to meet with our team during our entire research period. Since we could not obtain recipes directly from the WU, we redesigned a template recipe from AA's "Herbal Alternatives to Bear Bile" booklet, to test the layout at a second Health Day. One of our AA partners noted the commonly grown plants from the booklet, so we chose a recipe with plants accessible to grannies.

Iteration 1

For the first iteration (Figure 3), we wanted to cut down on the amount of information in the original recipe since it read much like a scientific plant summary. Our prototype testing suggested that the recipe would benefit from being user-friendly. Furthermore, we wanted the visuals to look hand-drawn, so the booklet could feel more personal and handmade. However, upon reflection, we decided that the visuals were not realistic enough for readers to easily identify the plant.

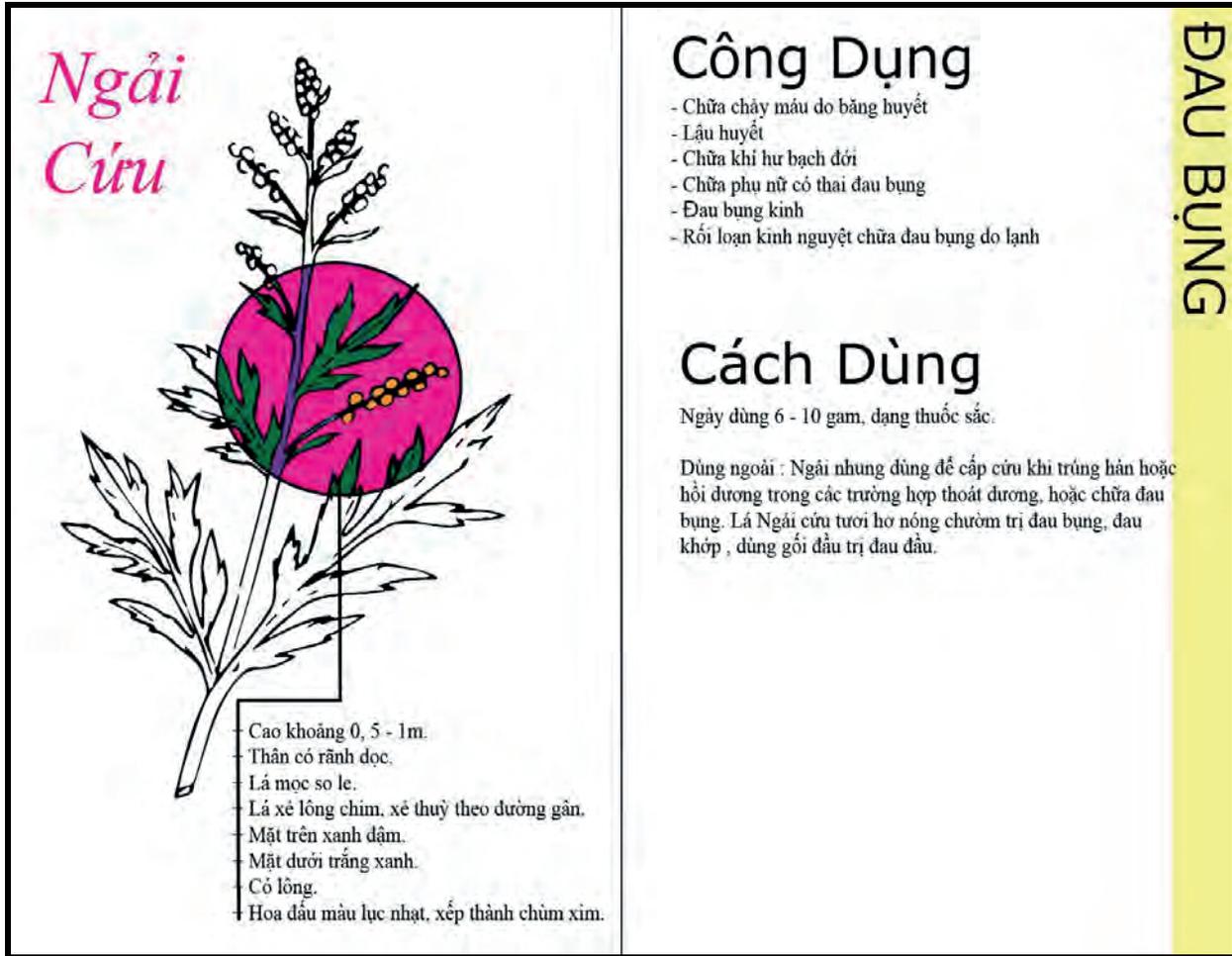


Figure 3: First iteration of recipe book prototype.

Iteration 2

For the second iteration (Figure 4), we wanted to add realistic visuals of the plant, while still trying to maintain some hand drawn elements. Also, we increased the font size and visibility of the titles to be more accessible to the Granny persona. However, upon reflection, we decided that the hand drawn elements were taking an excessive amount of time to design. While we originally wanted the hand drawn visuals to invoke a personalized feeling, we decided to only use realistic plant images moving forward for the sake of efficiency.

Ngải Cứu



- + Cao khoảng 0,5 - 1m.
- + Thân có rãnh dọc.
- + Lá mọc so le.
- + Mặt trên xanh đậm.
- + Lá xẻ lông chim
- + Mặt dưới trắng xanh.
- + Có lông.
- + Hoa đầu màu lục nhạt.

Công Dụng

- Chữa chảy máu do băng huyết
- Lậu huyết
- Chữa khí hư bạch đới
- Chữa phụ nữ có thai đau bụng
- Đau bụng kinh
- Rối loạn kinh nguyệt chữa đau bụng do lạnh

Cách Dùng

Cách làm 1.0
 Nấu nước sôi.
 Luộc lá trong 5-10 phút.
 Dùng rây lọc để bỏ bã lá và hoa.
 Uống nóng.

Nguyên liệu 1.0
 6 - 10 gam lá khô
 500 ml nước

Cách làm 2.0 (Dùng ngoài) :
 Ngải nhưng dùng để cấp cứu khi t
 rúng hàn hoặc hội dương trong các
 trường hợp thoát dương, hoặc chữa
 đau bụng.
 Lá Ngải cứu tươi hơ nóng chườm trị
 đau bụng, đau khớp, dùng gói dầu
 trị đau đầu.

Nguyên Liệu 2.0
 6 - 10 gam lá tươi
 500 ml nước

Figure 4: Second iteration of recipe book prototype.

Iteration 3

For the third iteration (Figure 5), we used many realistic images of the plant. During our prototype testing at Health Day, the grannies mentioned that they had a hard time identifying the plants from AA's booklet. Therefore, we designed the visuals to take up the majority of the page space. We printed out copies of iteration 3 and tested it in Hanoi with grannies, given that we had not been permitted access to Village X outside of Health Days. We approached women who appeared to be over 50 years old and asked a total of four grannies for their feedback on the prototype. Overall, the grannies did not like speaking with us perhaps because being approached by researchers is not as commonplace in Vietnamese society as compared to Western societies. From our own observations, the grannies immediately looked at the pictures on the left side, but after that, seemed confused about where to look on the printouts.

Huyết Dụ

Thân mảnh to bằng ngón tay cái, mang nhiều vết sẹo của những lá đã rụng.

Lá dài 20 - 35cm, rộng 1, 2 - 2, 4cm, màu đỏ tía.

Có thứ lá mặt trên màu đỏ, mặt dưới màu xanh.

Hoa màu trắng pha tím, mọc thành chùy dài ở ngọn thân.

Cây cao khoảng 1 - 2m.

Công Dụng

Chữa chấn thương huyết ứ sưng tấy, thổ huyết, khái huyết, niệu huyết, rong huyết, băng huyết, lậu huyết, kinh nguyệt ra quá nhiều, ỉa ra máu.

Nguyên Liệu

- 4-5 gam lá và hoa
- 500 ml nước

Cách Dùng

- Rửa sạch lá và hoa.
- Nấu nước sôi.
- Luộc lá và hoa trong 5-10 phút.
- Dùng rây lọc để bỏ bã lá và hoa.
- Uống nóng.

Figure 5: Third iteration of recipe book prototype.

Iteration 4

In all iterations, the left page was meant to assist grannies in identifying the plants, while the right page specified the illnesses the plant treated, the ingredients, and the cooking instructions. From testing iteration 3, we found that people's attention was first drawn to the pictures on the left page. Since cooking the recipe is the recipe's main purpose, we decided to minimize the plant pictures on the left page and add colorful icons on the right page. We also decided to add icons on the right page to decrease the amount of reading required.

When testing iteration 3, people seemed confused about where to look on the printout after they saw the pictures. Therefore, for iteration 4, we highlighted the titles with contrasting colors so that people could find the sections more easily. Also, previous testing suggested that participants were suspicious of us and our research, so we added a testimonial from a Granny with the aim of promoting trust in the recipe.

Hanoi grannies found the template recipe easy to follow. However, they admitted that they would not use a recipe book because they already had easy access to TMPs and doctors. It is

important to note that geographic access and financial accessibility to doctors is much more limited in Village X than in Hanoi. Furthermore, Hanoi grannies expressed that they did not have enough time to plant and pick their own medicinal herbs. However, two grannies recognized that people from rural areas may benefit from the recipe book since they have more time to plant and pick their own herbs, and they do not have wide access to the internet for health information. Also, participants did not explicitly acknowledge the Granny testimonial, which may indicate that the testimonial had no effect or was not easily seen.

We did a final round of testing in Village X on five grannies during a second Health Day. We asked grannies for feedback on the prototype and also asked them if they would be interested in attending a workshop to learn how to cook traditional medicine. Summer 2018 research and summer 2019's survey revealed that grannies wanted to socialize and relax together, while discussing health issues. We wanted to test to see if this workshop could fulfill that desire, while also making the recipe book feel more dynamic and personal.

Overall, we found that most grannies at Health Day used traditional medicine. Grannies typically obtained medicinal herbs from TMPs or their own garden. Since it was common for people to pick herbs from their own garden, we suspected that they would likely use AA's medicinal herb garden if they knew about it and it was easily accessible. Therefore, the recipe book should include herbs from AA's garden in order to promote the book's and garden's inter-usage. Granny testimonials may not be necessary, but further explicit testing of testimonials in the recipe book would clarify their utility.

Furthermore, most grannies at Health Day thought the recipe book was easy to understand and they would use it. Most expressed interest in attending a workshop, but stated that it would have to be accessible in terms of location and time. We also asked a few grannies who should lead the workshop. They were a bit confused by this question; one Granny said that she usually just listens to her doctor's orders. We infer that it is not typical for patients to question their doctor's orders, likely because these patients do not feel qualified enough (due to their relatively lower income status, minimal education, and minimal health care access). Therefore, a workshop led by a TMP may hinder honest and natural conversation. It may be more beneficial to have a workshop led or co-led by a Granny or another female figure familiar to the grannies. The most appropriate and appealing workshop leader should be further tested. Alternatively, Animals Asia could experiment with hosting a health day in the medicinal garden space with a concurrent workshop on herbs to familiarize people with the herbs they have access to to treat their ailments.

Huyết Dụ



Lá mặt trên màu đỏ, mặt dưới màu xanh.

Thân mảnh to bằng ngón tay cái.

Thân mang nhiều vết sẹo của những lá đã rụng.

Lá dài 20 - 35cm, rộng 1- 4cm.

Hoa màu trắng pha tím.

Cây cao khoảng 1 - 2m.



"Tôi đã sử dụng công thức này được 3 năm để điều trị đau bụng!"

Công Dụng



- rong huyết
- băng huyết lậu huyết
- kinh nguyệt
- ra quá nhiều
- ỉa ra máu

- chấn thương huyết
- ứ sưng tấy
- thổ huyết
- khái huyết
- niệu huyết

Nguyên Liệu



4-5 gam lá và hoa



500ml nước



Lá và hoa tươi

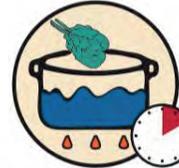
Cách Dùng



Rửa sạch lá và hoa.



Nấu nước sôi.



Luộc lá và hoa trong 5-10 phút.



Uống nóng.

11
Thương Huyết

Figure 6: Final iteration of recipe book prototype.

Survey Results

Survey results are described below and depicted in Figures 7-18.

Demographics

Of the 206 people surveyed, 75.12% were women (Figure 8). Most participants were in their late 50s to early 80s (Figure 7). Figure 9 shows that the majority of participants had either primary school education (n=68, 33.01%), secondary school education (n=63, 30.58%), or no education (n=45, 21.84%). Figure 10 shows that the most represented occupational status was unemployed/retired (n=106, 51.46%) followed by agricultural workers (n=78, 37.86%).

Health issues

Figure 11 shows that the most represented health issues people sought consultation for at Health Day were body, joint, and back pain (n=82, 45.81%) and high blood pressure (n=31, 17.32%). The majority of health issues (58%) reported were chronic (lasting more than two years), and people were thus more open to trying different approaches to address their pain.

Medical treatments sought

More participants used Western medicine (n=101, 46.54%) than traditional medicine (n=74, 34.10%) to treat their primary illness (Figure 13). Likewise, when participants were asked which type of medicine they trusted, more participants chose Western medicine (n=85, 47.22%) than traditional medicine (n=58, 32.22%; Figure 14).

Health seeking behavior

When asked what motivated people to seek particular types of medical treatment for their primary medical issue, medical expertise from traditional healers and Western medical experts (n=121, 54.75%) was the most commonly named reason (Figure 15). Medical advice from family and friends (n=47, 21.27%) was also sought and oftentimes pointed people to particular types of medical experts. Positive previous experience with a particular health approach (n=28, 12.67%) also motivated people's choices.

Bear bile usage of the participants and people they knew

The majority of people (n=136, 66.67%) reported never having personally used bear bile, followed by 17.65% (n=36) having used bear bile 1-5 times, 2.94% (n=6) having used bear bile 6-10 times, and 12.75% (n=26) having used bear bile more than 10 times (Figure 17). Regarding the number of people participants knew who had used bear bile, the majority (n=109, 55.33%) reported knowing no one, followed by 24.37% (n=48) knowing 1-5 people, 5.58% (n=11) knowing 6-10 people, and 14.72% (n=29) knowing 10 or more people (Figure 16).

Figure 18 shows that the primary reasons given for not using bear bile were diminishing quality of bear bile (n=32, 21.48%) and preference for different medicine (n=31, 20.81%). 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 could not be trusted. Others preferred wild bile because it was perceived to be stronger and better quality.

Factors influencing bear bile use

The main purpose of the Health Day survey was to identify which demographic and lifestyle factors affect bear bile use. The dependent variables were (1) the number of times one had previously used bear bile, and (2) the number of people one personally knew who had used bear bile in the past 12 months. Performing Fisher's exact test revealed that gender and education level were significantly associated ($p < 0.05$) in a participant's personal bear bile use (Table 1). Looking at the cross table in percentages revealed that men were more likely to use bear bile and knew more people who used bear bile (Tables 2 and 3). A larger sample would be necessary to determine which specific education levels were significantly associated with personal bear bile use. However, of the three most reported education levels, secondary school educated participants were more likely to report previous bear bile usage than people with either primary school or no formal education.

Table 1: Results from Fisher's exact test

n=206	DV 1	DV 2
IVs	How many times have you used bear products in your lifetime?	How many people do you personally know that have used bear products in the past 12 months?
Gender	p-value = 0.004498	p-value = 0.05247
Education level	p-value = 0.01649	p-value = 0.7746
Job	p-value = 0.07896	p-value = 0.5022
Medical issue	p-value = 0.8591	p-value = 0.2109
Why did you choose this treatment?	p-value = 0.2279	p-value = 0.1509

Table 2 and 3: Cross tables in percentages for the dependent variables vs gender

How many times have you used bear products in your lifetime?	Female	Male
Never	71.9	50.0
1-5 times	16.34	22.0
6-10 times	1.31	8.0
>10 times	10.46	20.0

How many people do you personally know that have used bear products in the past 12 months?	Female	Male
0 people	60.54	38.78
1-5 people	21.77	33.65
6-10 people	4.76	8.16
>10 people	12.93	20.41

Conclusion

Reducing bear bile demand in Village X, a bear-farming village in Northern Vietnam is a complex challenge because of the village's limited access to health care and lengthy history of bear bile usage. Our prototypes were targeted towards grannies in Village X because they were influential informal health advisors of the majority of the population (women and children). Additionally, they were open to experimenting with different health approaches.

While we started with many possible prototypes, our final design was a collection of the grannies' herbal medicinal recipes, aimed for public distribution in Village X. We had several reasons to choose a recipe book as our final design. According to our survey, over one-third of survey participants had used traditional medicine to treat their current medical issue, demonstrating that traditional medicine is commonly used. This was further confirmed in our qualitative testing of grannies at Health Days. We also learned that grannies were usually busy buying groceries, cooking meals, and caring for grandchildren from about 4am-7pm. Therefore, we understood that we had to provide an easily accessible health resource. Additionally, since health knowledge is typically passed down orally within families and among same-age peer groups in Vietnamese culture, we specifically wanted to use real folk recipes that were alternatives to bear bile from actual grannies in Village X. Summer 2018 research demonstrated that grannies liked to share their health knowledge and help their community members, which were the ultimate intentions of the recipe book. Throughout our human-centered design research, we constantly considered how we might best match our prototypes to the needs of the grannies in Village X, and the Vietnamese cultural context. Overall, we hope that the herbal medicinal recipe book and paired workshop concept can be an accessible, trustworthy health resource for the members of Village X.

Combining surveys, interviews, observations, and iterative human-centered design assured that we targeted the most appropriate audiences in our design work. Ideally, in the future, a pre- and post-survey approach could be employed to gauge the impact of design initiatives on grannies or other influential behavior change target audiences. Randomized response technique (RRT) or another technique aimed at procuring honest responses on sensitive or confidential issues would be helpful for future survey questions pertaining to sensitive behaviors such as bear bile usage.

Future Work

During our summer 2019 design research, we were able to create an initial design spread for an example recipe. Future work should entail collecting real recipes from grannies in Village X, creating a physical recipe book to distribute within the community, and testing out the most effective workshop format to collect and share grannies' recipes. Alternative approaches to information sharing should also be tested, such as a more interactive engagement with Animals Asia's medicinal community gardens and herbal medicine workshops. In order to collect recipes, researchers should build a relationship with grannies first. This recommendation is echoed by AA staff as well, who are well-versed in fostering good relations with Village X. Building rapport with grannies could include planting flowers with them and participating in community

events. Since bear bile and health are sensitive topics, fostering the community's trust of the researchers is essential for implementing further research and design interventions.

During this summer's prototype testing, we experienced great difficulty surveying random grannies in Hanoi because they were unaccustomed to the process. Compared to the Western societies, the concept of conducting surveys and research is still developing in Vietnam. For future prototype testing, researchers could utilize personal networks or those of AA staff in Hanoi to recruit test subjects. Additionally, future design work engaging the Women's Union would be better facilitated by notifying AA early enough for them to prepare for meetings with the WU. If researchers want to collaborate with any community members in Village X, it is important to notify AA at least two months before the research starts so they can receive permission from the local government and resolve any scheduling conflicts.

During our research, the frequent prototype testing required an advanced level of Vietnamese language proficiency. For future research teams, it is extremely helpful to have at least one team member who is advanced in speaking and listening to Vietnamese. All student researchers in the summer 2019 team were Vietnamese-American, which greatly helped the team understand cultural norms. For future research, researchers should have at least a basic understanding of Vietnamese culture, whether that be through personal experience or through prior independent research.

Survey Figures

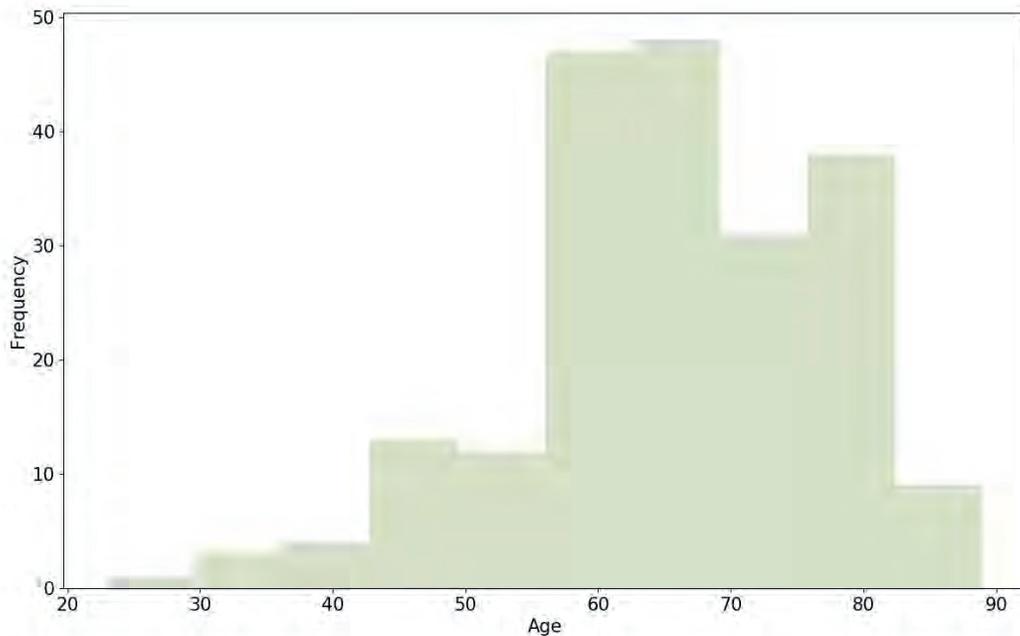


Figure 7: Age histogram

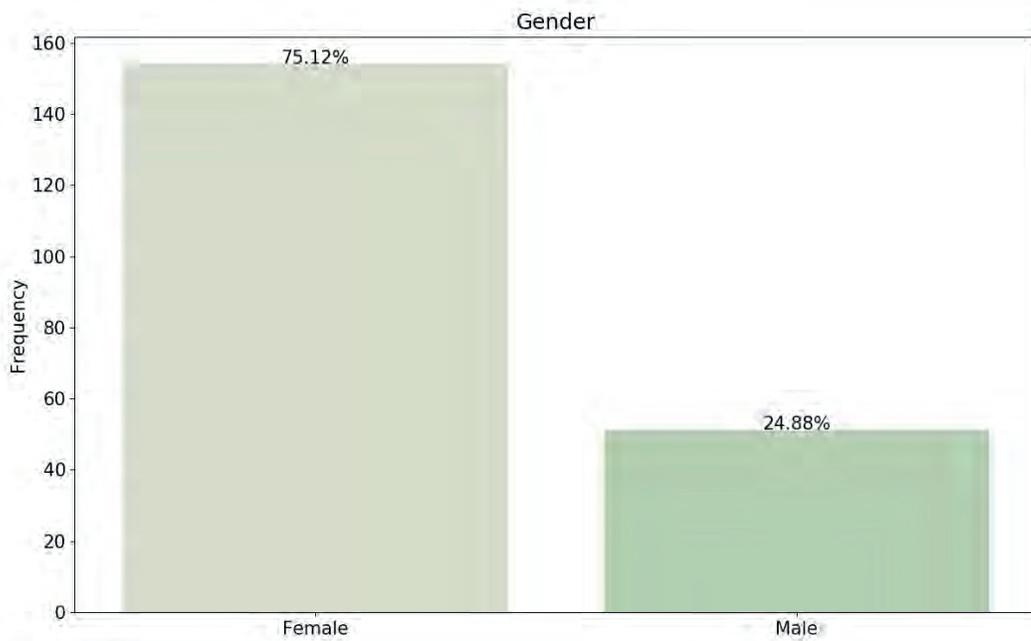


Figure 8: Proportions for gender

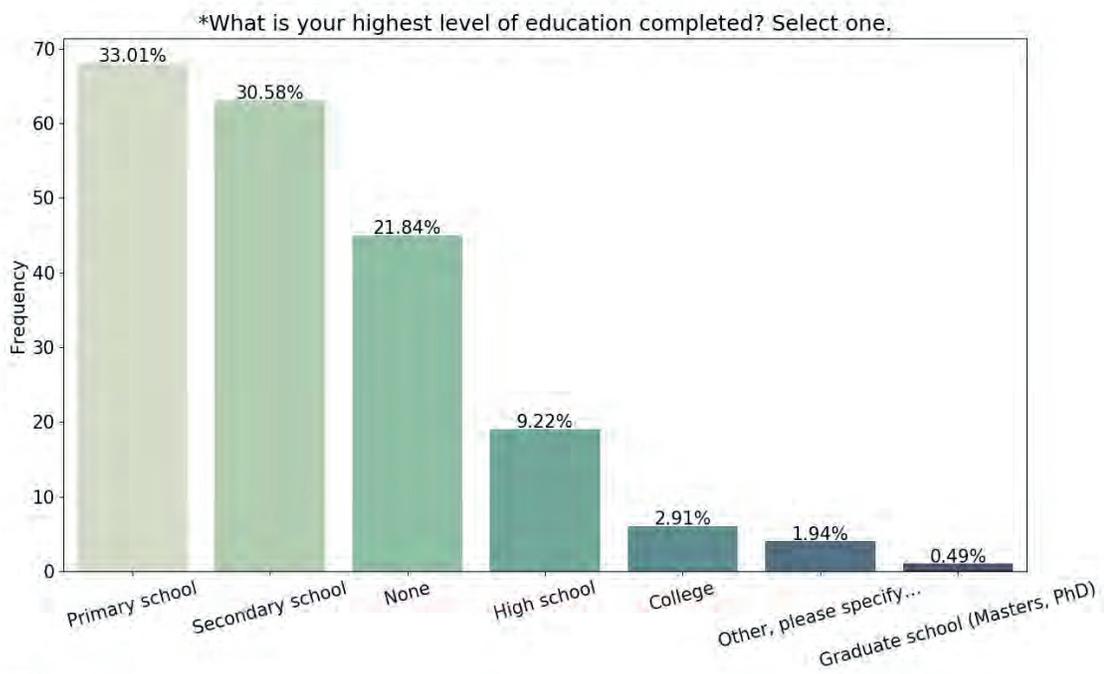


Figure 9: Proportions for educational level

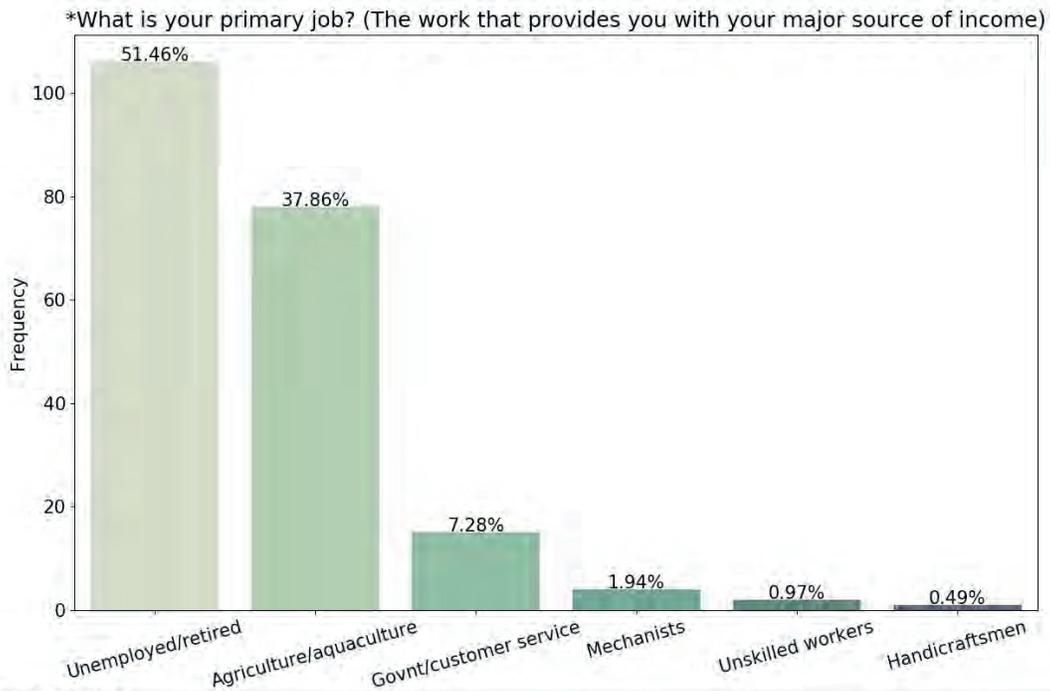


Figure 10: Proportions for primary job

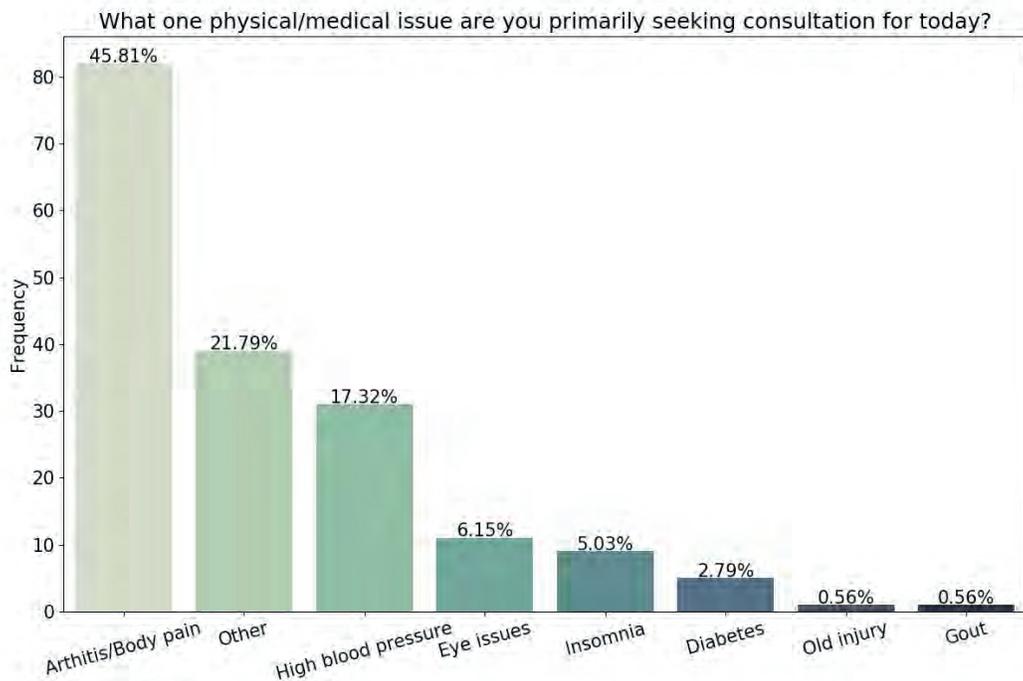


Figure 11: Proportions for primary medical issue

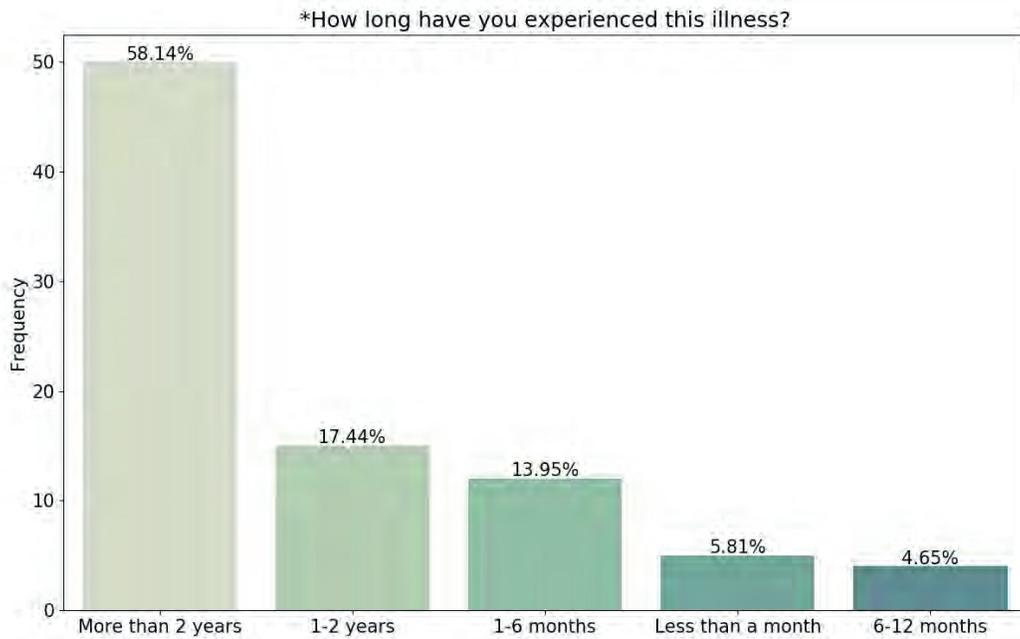


Figure 12: Proportions of years the participant experienced their primary illness

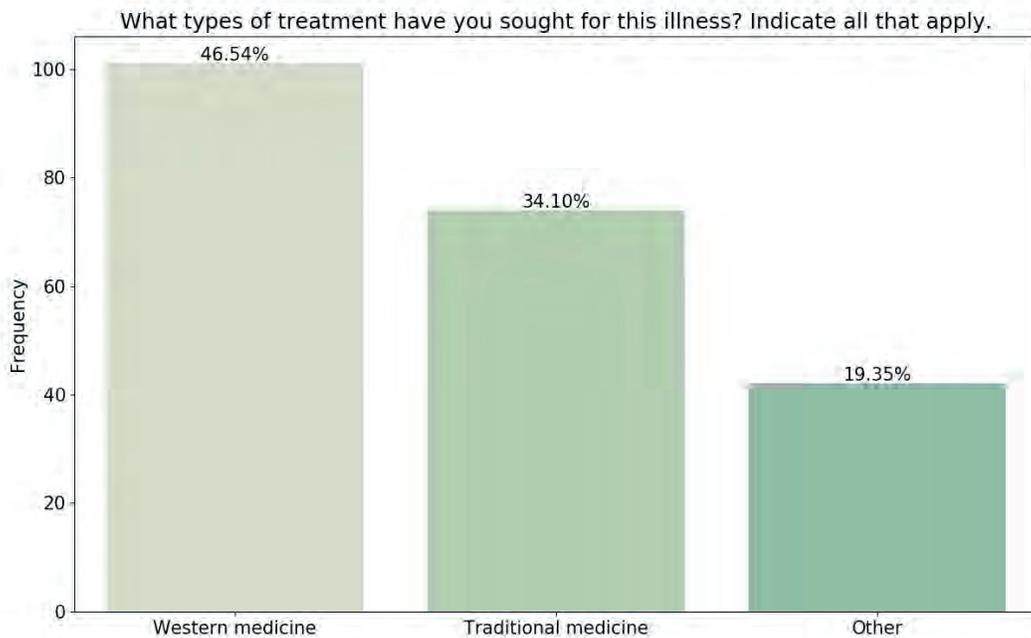


Figure 13: Proportions for types of medicine sought for the participant's primary illness

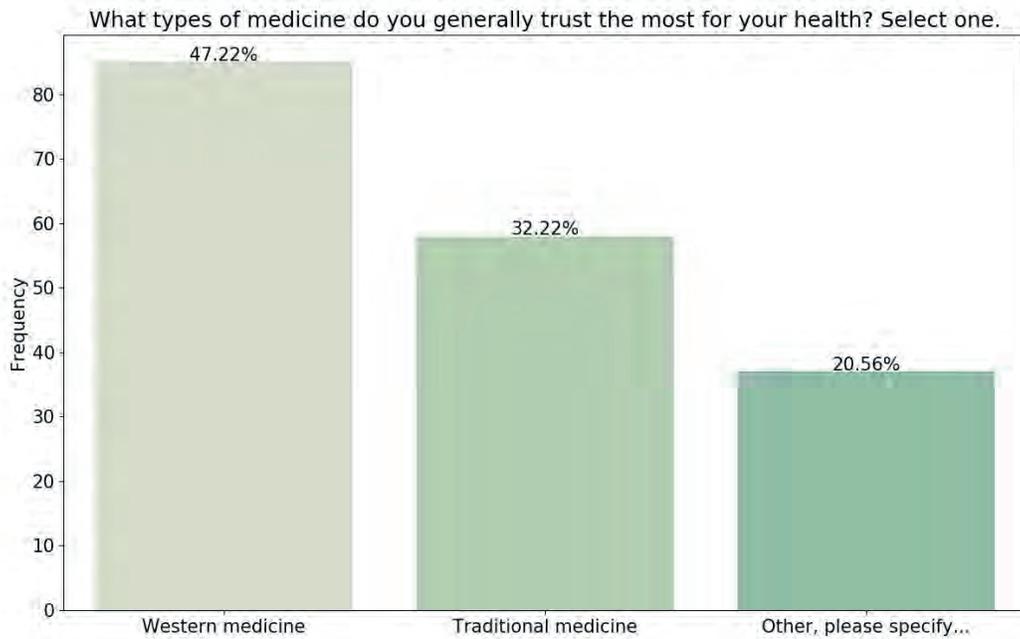


Figure 14: Proportions for types of medicine trusted

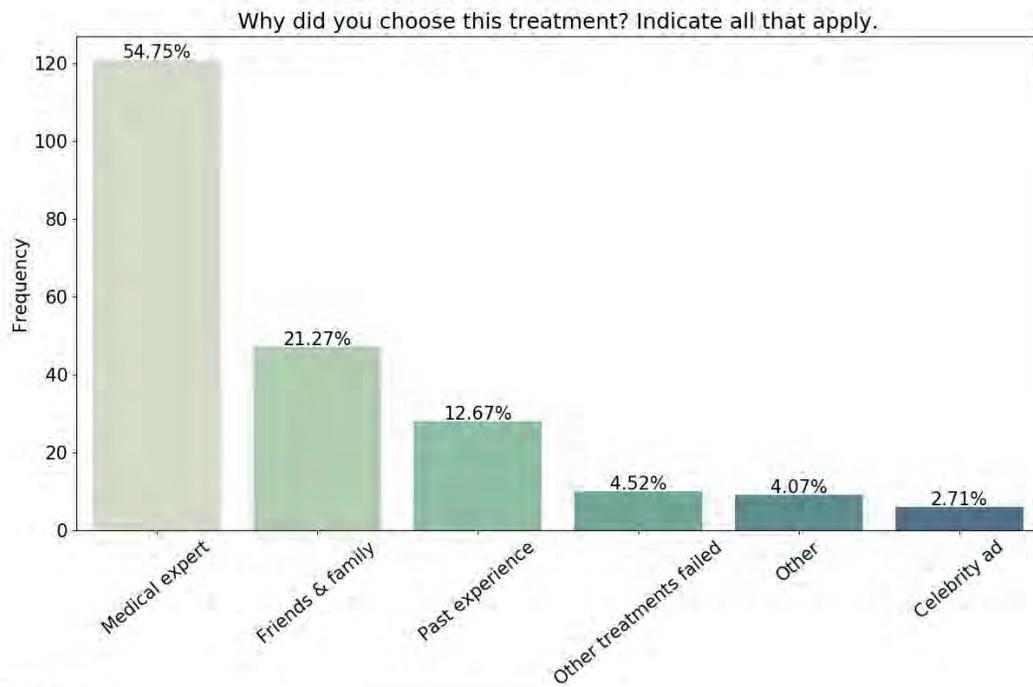


Figure 15: Proportions of reasons for choosing treatment

*How many people do you personally know that have used products made from bears in the past 12 months?

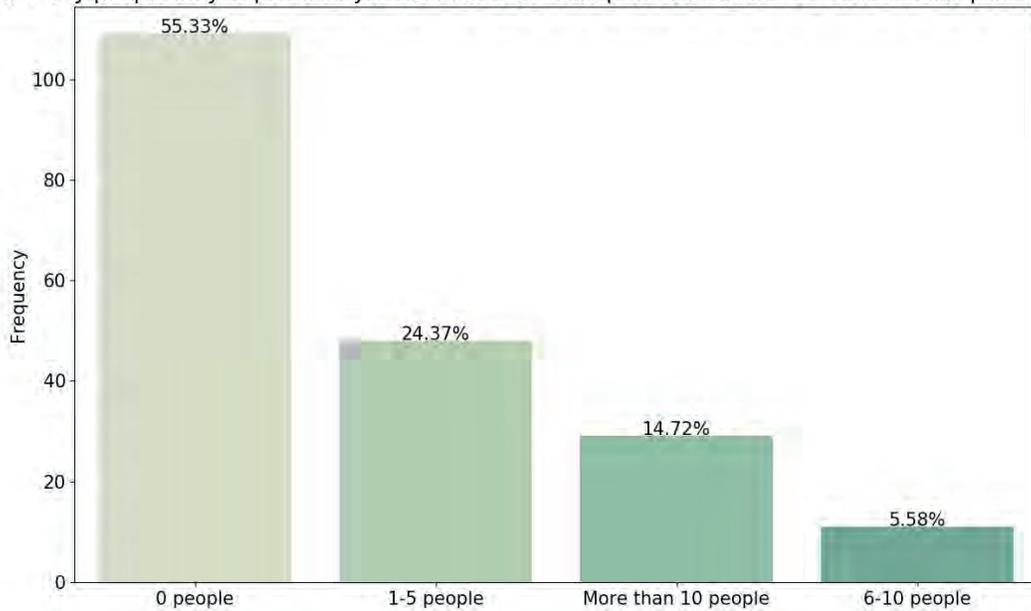


Figure 16: Proportions for number of people participant knows who has used bear products

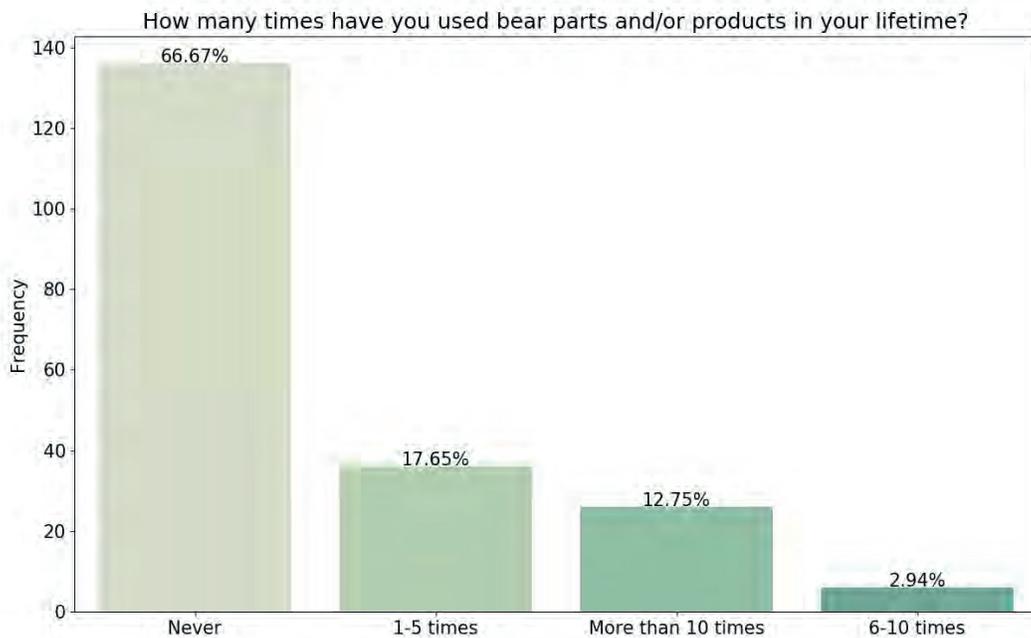


Figure 17: Proportions for the amount of personal usage of bear products

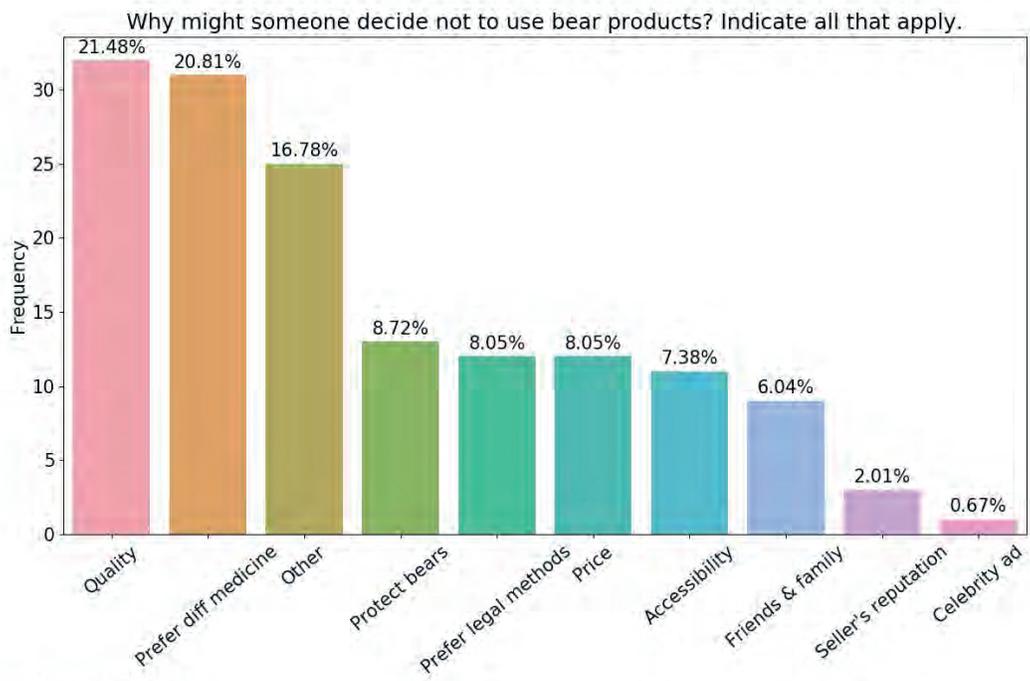


Figure 18: Proportions for reasons someone would not use bear products

Appendix



Figure 19: Prototype testing in Hanoi with a Granny who owns a stationary shop.



Figure 20: Prototype testing in Hanoi with a Granny selling fruit on the street.



Figure 21: Prototype testing at Health Day in Village X with a Granny watching over her grandchildren.



Figure 22: Research assistants distributing our survey to Health Day participants.

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