

**Regeneration After the Cambodian Genocide:  
Khmer Elders' Perspectives on PTSD and Gardening**

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**ABSTRACT**

Post-traumatic stress disorder (PTSD) is prevalent among war refugee populations. Intervention is imperative to help refugees who are still affected by physical and psychological traumas that result from living through wars. This study investigated Khmer elders' experiences under the Khmer Rouge, perspectives on PTSD, and gardening as a possible form of intervention to alleviate PTSD-related experiences. I conducted semi-structured interviews of Khmer elders in Long Beach, CA who survived the Khmer Rouge regime. I found that women tend to self-report greater affects from PTSD symptoms, and participants believed that gardening helped with their mental health by offering many benefits like social interaction, reconnection with nature, organic sustenance, exercise etc. This study suggests the need for future research to address gardening as a valuable therapeutic intervention for communities who are dealing with PTSD.

**KEYWORDS**

Gardening, Khmer Rouge, mental health, environmental health, refugees

## INTRODUCTION

In addition to the many challenges refugees experience before settling in a country, most refugees still face mental health problems after resettlement. As noted by the United Nation Refugee Agency, Syrian refugees for instance experience extreme mental and psychosocial disorder due to violence, stress of displacement, poverty, and uncertain future (Hassan et al. 2015). Mental obstacles like Post Traumatic Stress Disorder (PTSD) often lead refugees and their families to have difficulties in cultural assimilation and socioeconomic advancements due to broken social bonds and traumatic experiences. In Norway, one in four Vietnamese boat refugees had psychological disorder and 17.7% had depression; and there was no significant decline in the aforementioned mental challenges within three years (Hauff and Vaglum 1995). In the United States, PTSD exists in 6.8% of the adult American population, yet among Cambodian refugees in the United States who experienced trauma under the Khmer Rouge regime (Cambodian Genocide from 1972-1975), about 62% have PTSD (Marshall 2005). Despite the high prevalence of PTSD, few studies have investigated interventions in combating PTSD and associated challenges of cultural assimilation.

Urban gardening provides ecological and social benefits, including providing urban agricultural sites for community members and natural refuges to urban pollinators. Urban gardening often facilitates “spill-over” that allows indirect permeation of positive externalities like that of energy, resources, and organisms across habitats (Lin et al. 2015). For example, gardening helps to attract pollinators to urban environments by expanding a “network of small, natural habitat fragments across urban areas”(Cane 2001). This means that neighborhoods with numerous, nearby urban gardening sites often benefit in terms of pollination. Gardens are also often invaluable amenities to refugee communities. For example, urban gardening programs like the Seattle P-Patch garden program help immigrant families, especially those in low income communities, to integrate into the American culture (Read 2017). However, there few studies have elucidated the psychological benefits associated with urban gardening.

Besides ecological and personal nutritious/monetary benefits, green space like urban gardens can also provide opportunities for psychological support. Horticultural therapy, in which participants take parts in plant-based engagement activities, has been an been used to improve mental health of dementia-affected patients (Gigliotti et al. 2004). People’s mental health improves

when they are exposed to green space for a minimum of five minutes per day, and there is a correlation between diurnal decline in cortisol (stress hormone) and percent of green space (Barton and Pretty 2010, Ward Thompson et al. 2012). However, little research has assessed the effectiveness of gardening in helping Cambodian refugees affected by PTSD.

Hence, my primary objective in this study is to document Cambodian elders' perspectives regarding PTSD and urban gardening. Specifically, I posed the following two questions: 1) what is the self-reported prevalence of somatic and mental PTSD symptoms amongst the Cambodian elders? 2) what are the main perceived benefits of urban gardening among Cambodian elders? I expected that there would be common somatic and mental PTSD symptoms like chronic pain and fear amongst the study population, and that Cambodian American elders garden because growing extra food will alleviate their mental health.

## **BACKGROUND**

### ***Khmer Rouge***

The Cambodian Genocide (1975-1979) was one of the most atrocious genocides in the Cambodian history. In the 1970s, after the Indochina War spread to Cambodia, Lon Nol, a Cambodian general and eventual prime minister, led a coup against Prince Norodom Sihanouk, took control of the Cambodian government, and ended Sihanouk's neutrality in the Indochina War by siding with the United States and South Vietnam ("Lon Nol | president of Cambodia | Britannica.com" n.d.). In 1975, despite economic stability, Cambodian politics was erratic due to unpredictable government policies (Kinzie et al. 1984). Resentment towards the government grew as it continued to support the United States' secret bombing raids in Cambodia on approximately 40,000 Communist insurgents (Edwards 2004). Eventually in April 17, 1975, the Communist Party of Kampuchea, led by Pol Pot, took control of Cambodia and spread radical socio-economic reforms by starting the Khmer Rouge regime and by consequently putting an end to over "two thousand years of Cambodian history" (Clayton 1998). During Khmer Rouge, Pol Pot cut off international communication, evacuated urban areas, and forced people to work in the countryside under brutal supervision (Clayton 1998). On September 27, 1977, Pol Pot famously declared his support for the worker-peasants and stated his intentions:

*We take agriculture as the basic factor and use the fruits of agriculture to systematically build industry in order to advance toward rapidly transforming a Cambodia marked by a backward agriculture into a Cambodia marked by a modernized agriculture. We also intend to rapidly transform the backward agricultural Cambodia into an industrialized Cambodia by firmly adhering to the fundamental principles of independence, sovereignty and self-reliance. (Jackson 2014)*

Consequently, educated individuals and urbanites such as students, teachers, engineers, and doctors were deemed unfit for the communist agricultural regime, and most were executed (Clayton 1998). In addition, “religion was banned, monks were defrocked, markets and currency were abolished, and schools were demolished” or turned into prison and interrogation centers like the infamous Toul Sleng prison (Security Prison 21), where at least 12,000 people were tortured and murdered (Clayton 1998, Brewer 2015). Overall, between 1.671 and 1.871 million people, 21 to 24 percent of Cambodia’s 1975 population were killed by 1979 (Kiernan 2003). The Khmer Rouge left a history scarred by traumas, starvation, disease, execution, labor camps, separation of families, collapse of structural and cultural values that “destroyed the basic fabric of Cambodian culture (Kinzie et al. 1984).”

### ***Post-Traumatic Stress Disorder (PTSD)***

PTSD develops as a result of exposure to one or more traumas. The Diagnostic and Statistical Manual of Mental Disorder-5<sup>th</sup> edition (DSM-V), identifies the main PTSD symptom criteria as: A) exposure to actual/threatened death, serious injury, sexual violence; B) presence of intrusion symptoms associated with traumas; C) persistent avoidance of trauma-related stimuli; D) negative alterations in cognition and mood associated with trauma; and E) marked alterations in arousal and reactivity associated with traumatic events (APA 2013, Appendix 1).

### ***Past literatures***

Many studies have found that that most Cambodians who had experienced the Khmer Rouge were experiencing PTSD. Kinzie et al. (1984) found that Cambodian study participants, who had been previously diagnosed with depression, were also presented with PTSD. These patients had suffered PTSD symptoms for at least three years, during which time intensity had not

decreased, and most “patients were left with an overwhelming sense of powerlessness, to which they reacted with traditional non-confrontational or withdrawal behavior (Kinzie 1984).” Hinton et al. (2012) studied PTSD in rural Cambodia. Amongst 139 participants (village leaders, monks, traditional healers, villagers), all were found to be still suffering from PTSD, and all had elevated “somatic symptom and syndrome inventory” elements, including dizziness, khâl (wind-like fainting attack), “thinking a lot”, and “ghost pushing you down” experience (sleep paralysis) that highlighted trauma reexperiencing, avoidance and numbing, hyperarousal, and hypervigilance behaviors (Hinton 2012).

### **Cognitive Behavioral Therapy (CBT)**

Cognitive Behavioral Therapy (CBT) and pharmaceutical intervention are reliable interventions that alleviate mental health problems. With traditional medical interventions, patients often express avoidance and shame when talking about their pasts that make diagnosis and treatment difficult (Kinzie et al. 1984). CBT helps patients to understand their interpretations of events and the core beliefs they hold about their environment, themselves, and others (Paunovic and Öst 2001). There are limited data of using CBT to treat PTSD among traumatized refugees, and most CBT-treated PTSD evidence comes from studies of victims of sexual and non-sexual assaults, automobile or industrial accidents, or natural disaster (Hinton et al. 2005). One study found that “CBT completion was inversely related to severity of overall pretreatment measures of PTSD, avoidance, hyperarousal, depression, impaired social functioning, and borderline personality disorder (Zayfert et al. 2005).” Another found that CBT is effective in terms of treating Southeast Asian refugees who are dealing with PTSD, “owing to the similarity of Buddhist principles to core aspects of CBT” practices (Boehnlein 1987, Bemak and Epp 1996). For example, this CBT practices often include raising awareness of the spiral of panic and highlighting mindfulness by using muscle relaxation and diaphragmatic breathing techniques (Kinzie et al. 1984). Similar to CBT, pharmacological approaches including the use of propranolol, ketamine, prazosin, and methylenedioxymethamphetamine are also effective in helping patients who are dealing with PTSD (Cukor et al. 2009). Between CBT and pharmacotherapy, patients tend to prefer the latter due to convenience and/or lack of motivation or interest in CBT (Wiebe and Greiver 2005). Another study also emphasizes pharmacotherapy as an “attractive option” in dealing with

panic disorder and claims that drugs like Fluoxetine (a Selective Serotonin Reuptake Inhibitor that also treats depression, obsessive-compulsive disorder, and bulimia nervosa) work as an “effective first-line treatment of panic disorder that offers relatively quick onset of action and long-term maintenance of treatment and benefits (Antonuccio et al. 1997).” However, using Fluoxetine alone results in 33% higher expected costs than individual CBT and is inferior to CBT since the CBT reduces chance of side effects and has greater cost-effectiveness (Haby et al. 2004, Antonuccio et al. 1997).

### ***Horticultural therapy or urban gardening***

Like CBT, Horticultural Therapy (HT), or urban gardening, helps patients with mental disorders, but few studies have assessed the effectiveness of using HT with PTSD-affected patients. According to Steven Davis, an Executive Director of the American Horticultural Therapy Association, HT “is a process through which plants, gardening activities, and the innate closeness we all feel toward nature are used as vehicles in professionally conducted programs of therapy and rehabilitation (Davis 1998).” Past studies have highlighted the effectiveness of HT in dealing with patients’ stress and engagement (Gigliotti et al. 2004, Wichrowski et al. 2005). Thirty minutes of gardening has been shown to decrease in salivary cortisol levels during the stress recovery period (Van Den Berg and Custers 2011). Furthermore, HT improves self-esteem and sociality of individuals with chronic schizophrenia (Son et al. 2004). Despite the aforementioned benefits of HT on mental health, there have been few studies assessing the benefits of HT when dealing with PTSD. Due to its feasibility and cost-effectiveness, HT could help with PTSD-affected individuals, especially those who are traumatized war refugees.

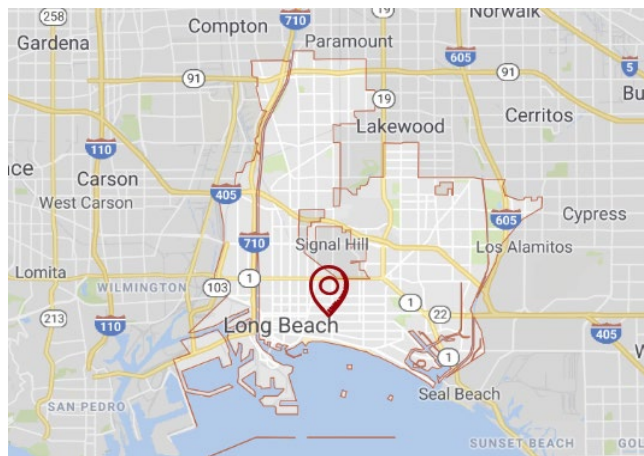
## **METHODS**

To conduct this study, I garnered 50 participants in Long Beach, CA through the assistance of Sinara Sagn, who worked at United Cambodian Community (UCC). We primarily conducted the interviews at the Maye Center and UCC. For each interview, we asked for the participant’s consent and informed participants that they could omit responses to any question or stop anytime.

## ***Site Descriptions***

### *Long Beach, CA*

Long Beach is one of 88 cities in Los Angeles County, California (Figure 1). The city has a median resident age of 33.6 years and an estimated median household income of \$60,075. In 1975, at most 1,000 Cambodian families resided in the United States, and the population was scattered throughout the country, with only about ten Cambodian families residing in southern California (Coleman 1987). Through the establishment of the Cambodian Association of America (CAA) in 1975, Cambodian residents in Long Beach, CA helped to mobilize the settlement of many Cambodian refugees in the city (Coleman 1987). The population of Cambodian residents grew due to the increased collective demand for US sponsorships and an increase in the immigration quota (Needham and Quintiliani 2007). Currently, there are about 20,000 Cambodian Americans in Long Beach, CA (Lun 2007), which has become both the symbolic and actual center of the worldwide Cambodian diaspora since the 1970s (Kinsie et al. 1984).

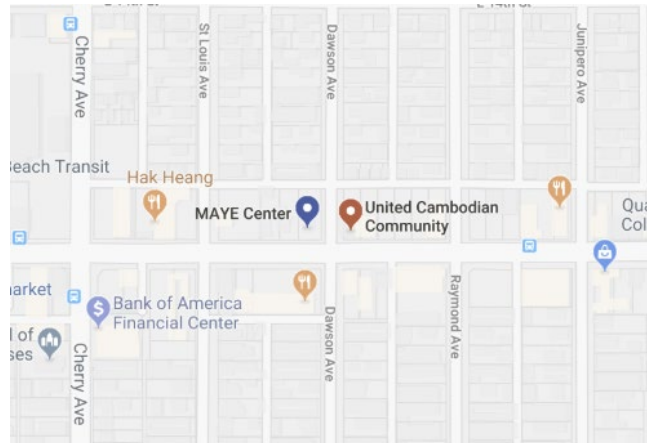


**Figure 1. The city of Long Beach, CA:** marked location pinpoints the locations of Maye Center and United Cambodian Community (courtesy of Google Maps)

### *Maye Center and United Cambodian Community (UCC)*

Maye Center and UCC are non-profit organizations that aim to support Cambodian Americans in Long Beach, CA through self-empowerment and advocacy (Figure 2, Figure 3). Maye Center, which was established in 2014 by Laura Som, a survivor of the Khmer Rouge,

aims to: 1) provide an environment where survivors and their families cultivate resiliency; 2) increase conversation between survivors and their families through activities that promote self-healing; and 3) promote the use of storytelling as the first step of self-healing in order to increase awareness and acceptance of participants (“Strategic Plan” n.d.). Maye Center offers programs and classes like Khmer social dance, sewing group, hata yoga flow, tai chi, organic gardening, etc. to participants. UCC was established in 1977, two years after the rise of the Khmer Rouge. The organization originally sought to help genocide refugees to resettle in in the United States. Presently, UCC’s mission is to promote and advocate for the well-being and advancement of the Cambodian Community by providing programs like health advocacy, youth development, community engagement, arts/volunteering programs, etc. (“Our Story – United Cambodian Community of Long Beach” n.d.).



**Figure 2. Location of Maye Center and UCC:** blue point indicating MAYE Center, red point indicating UCC (courtesy of Google Maps)



Figure 3. Maye Center (left) and UCC (right) (Sinareth Sagn)

## Study Subjects

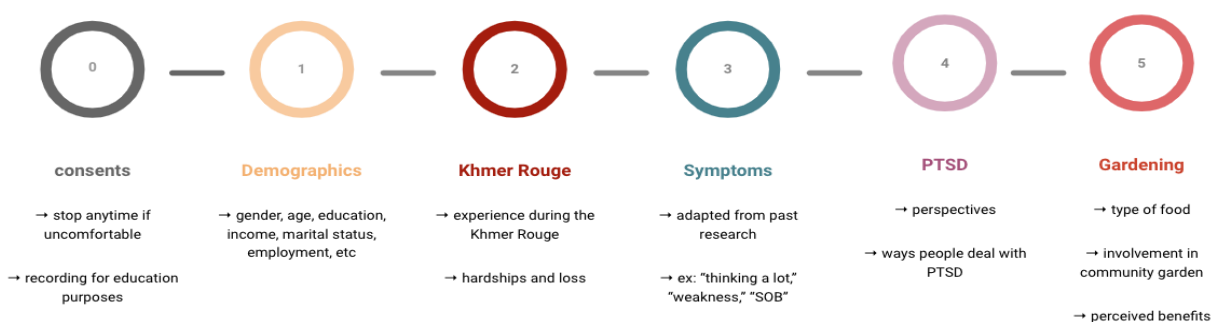
The study participants were Khmer Rouge survivors who resided in Long Beach, CA, and who had experienced the genocide. All respondents were at least 40 years old and were refugees/immigrants. Most genocide survivors in Long Beach, CA were from low income and low education backgrounds, with 69% of survivors having incomes less than 100% of the federal poverty levels and 72% receiving government assistance (Marshall et al. 2005).

## *Research design and analytical framework*

I used a qualitative research approach, focusing on semi-structured interviews focused on the participant's demographic data, experiences during the Khmer Rouge, PTSD-related somatic symptoms, and gardening experiences/perspectives (Figure 4). I specifically chose a semi-structure approach because, in doing so, I hoped the participants would feel less pressured when completing the interviews. To identify self-reported PTSD-related somatic symptoms, I used a Likert-Scale system because it provided easier comparison of the subcategories like gender and age in my population. For trauma-related questions, I employed open-ended questions because this gave participants more freedom when answering questions related to their vulnerabilities.

## Survey

To understand my population, I created a PTSD/Gardening Perspective Survey (PTSD/G-PS) (Appendix B). The beginning of the survey PTSD/G-PS included participant's consent agreement and 12 questions relating to my participants' demographics, experiences during the genocide, PTSD-related somatic symptoms, PTSD perspectives and gardening experiences/perspectives. For example, I gathered data on participants' gender, age, income level, marital status, etc., and on their experiences with the Khmer Rouge such as possible hardships like labor camp, sickness, malnutrition, family loss, etc. I also included PTSD-related somatic questions, which I adopted from a previous study that focused on PTSD, somatic complaints, and cultural syndromes among rural Cambodians (Hinton et al. 2012). These complaints and cultural syndromes included dizziness, poor appetite, shortness of breath, khyâl (wind-like fainting attack), thinking a lot (associated with dysthymia or persistent depressive disorder), etc. Question 5 was based on a Likert Scale system with 5 indicating that the participant was experiencing the symptom "all the time," and 1 indicating that the participant had "never" experienced the symptoms. Question 6 and 7 focused on participants' perspectives of PTSD to understand what the participants think PTSD was, and to find out what ways the participants thought people used to cope with PTSD. Question 8-12 asked the participants about their gardening experiences and perspectives. For example, Question 11 inquired the participant in what ways did they think gardening help with their mental health (Appendix B).



**Figure 4. Flow Map of Interviewing Procedure**

### ***Data Distribution, Collection and Analysis***

I employed the PTSD/G-PS survey through two measures: 1) going to Maye Center and UCC, and 2) using UCC's referrals by using a snowball sampling method. The data gathering process lasted from December 2018 to April 2019. During the aforementioned period, I primarily worked with the Maye Center (33.7827, -118.1657) and UCC (33.7827, -118.1653) to gather the data because these two non-profit social services often attracted noteworthy amounts of Cambodian clients and participants. In addition, due to distance/financial limitation, I particularly worked with Sinara Sagn, who worked for UCC and who conducted most of the interviews. After obtaining the data, she posted the pictures and recordings of the surveys onto a private Facebook group page to facilitate the translation process while maintaining participants' confidentiality. After obtaining the data, I primarily used Google Spreadsheet to organize, visualize, and qualitatively analyze my results.

## **RESULTS**

The study had 50 participants, with 38% of respondents being male and 62% female. The average interview time was 12-15 minutes. 98% of participants reported that they had physically experienced the Khmer Rouge. The age distribution was as follows: 12% in their 40s, 18% in their 50s, 38% in their 60s, 28% in their 70s, and 4% in their 80s (Figure 5a). Most of the participants had high school as their highest level of education (42%) and had income between \$10,000-20,000 (74%) (Figure 5b, Figure 5c). Only 18% declined to answer when asked about their income levels. For marital status, 76% indicated that they were married or in a domestic partnership, 18% widowed, 4% single/never married, and 2% divorced. For employment, 56% answered that they were unemployed, 26% employed, 16% retired, and 2% stayed at home. No one indicated that they were actively looking for work. In addition, 70% reported that they had children or grandchildren at home, and 88% said that they still had family in Cambodia. Furthermore, 78% of the participants used combination of containers and plots to grow vegetables and fruits at home, and 90% said that they did not use alcohol and/or tobacco when asked.

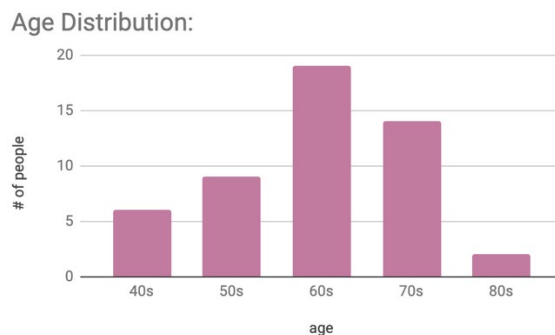


Figure 5a. Age distribution of participant

## Education

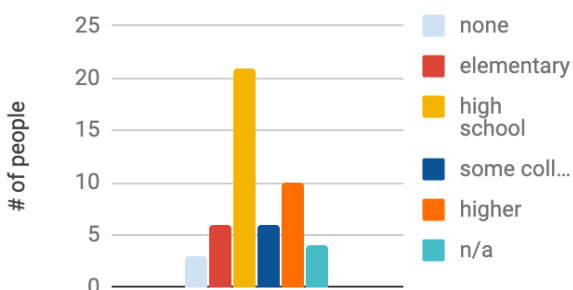


Figure 5b. Level of education of participants

## Income level

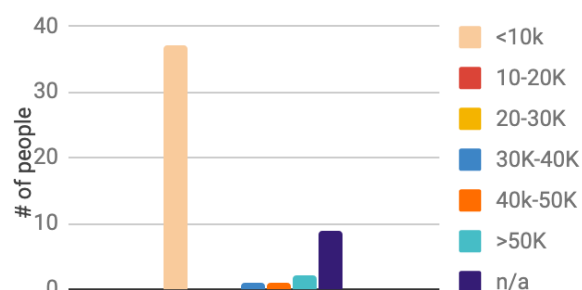


Figure 5c. Income distribution of participants

Participants described numerous hardships that they experienced during the Khmer Rouge. The most common hardships were immediate family loss (74%), malnutrition (58%), growing/harvesting rice (40%), sickness (20%), and digging trenches/ carrying dirt (34%). Other hardships included breaking rocks, experiencing separations, making steel, facing execution, etc. Three personal histories of hardships from the participants were as followed:

Response 1 (Mr. S): *During the Khmer Rouge, they moved me three times. Once away from my birth place. Then to the forest. It was a miserable time in the forest. There was no house. Then, they moved me to [another town]. At that time, I had two children. They stayed at the house. A house, but in reality, just a resting shack in the farm or orchard. I worked at a different job than my wife did. We never met. The children were at home. My wife had to look after farm animals near the town. She tried to come to the house during the evenings. My children were miserable. They were little. They went to the kitchen place. People saw they didn't have parents, so people gave the portions of food they wanted to give to the children. There was no crying or yelling. Nothing at all. I had another small*

*child. It was another harrowing story. When I talked about it, I wanted to cry. During that time, they moved me to another town. My child was little--just learned how to walk. They took my child and gave him to the elders to watch after him. As what I knew, the people, who were looking after my children, didn't feed my child at all. They kept my child's portion for themselves. In addition, I heard that that they tied my child by the leg. People saw it. They tied my child so that he wouldn't fall, trip, that there would be no trace of mistreatment. My child eventually fell ill. I came back to the house during the night. My child died due to starvation. After my child's death, they moved me to another place. It was a miserable time. . .*

*Response 2 (Mrs. T): They made Auntie (referring to herself) do a lot of stuff. Auntie doesn't remember very much, and Auntie went to a lot of different places. . . Well, they made Auntie harvest rice, plant rice, grind rice . . . and the likes. Cook rice. . . I ran away to Pursat. I worked at the cooking place where I cooked rice for a couple of months. . . I woke up for work at 7:00 am. They made me the leader of the rice planting workers because I was quick, and I didn't stop a lot. I asked them: "how could I be a leader when I didn't know any letters or anything?" They replied: ". . . doesn't matter. Mit (comrade) worked very quickly. You could do it." I worked for a while until I got sick. . . I was sick because of khyâl or something for a little. I did coining, and the sickness was gone. I didn't have malaria because I was young during that time. I was okay, but a lot of people near me got sick and died. They were young and old. . . You couldn't try to eat food behind their watch. They would execute us. . . I lost all of my family members. My mom died when I was 13 years old. My father, during the Khmer Rouge, died when he stayed with my big brother. My father-in-law . . . I lived with him. . . died on my arms in 1975. . .*

*Response 3 (Mrs. O): They took my parents away. I was forced to carry dirt. I frequently got sick. Mostly fever and shivers. Not a lot of diarrhea. The Khmer Rouge woke me up at 3:00 am to work to carry dirt because I was a daughter of a well-to-do person before the Khmer Rouge. They wanted to punish me. They took me to a place where "kong pi seh" ("special force") worked. For porridge, I only got a bowl. I didn't know how much specifically, but probably seven cups for two pots. That was what I heard. . . I lost all of my family [during the Khmer Rouge]. Father. Mother. Sibling(s). Only a couple members survived, but we got separated, just to be united in 1979, 1980s, or 1990s. . .*

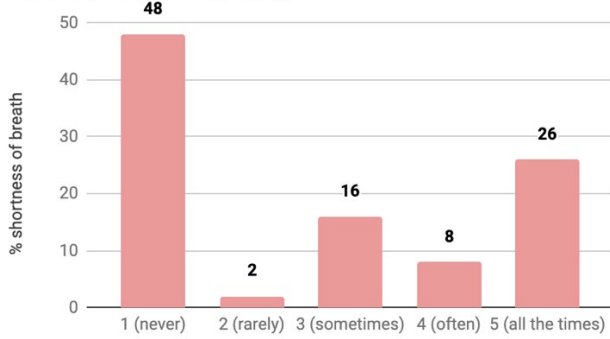
The most common PTSD symptoms that respondents most commonly described with "4" (often) or "5" (all the time) on the Likert Scale were 64% "thinking a lot," 44% for blurry vision, 44% for general weakness, and 34% for shortness of breath (Figure 6, Figure 7a, Appendix C). For male participants, the percentage for people indicating "4" or "5" for the aforementioned symptoms were as follows: 54.17% for "thinking a lot," 26.32% for blurry vision, 32.58% for general weakness, and 22.05% for shortness of breath (Figure 7b). For female participants, the

percentage of people indicating “4” or “5” were as followed: 77.42% for “thinking a lot,” 54.84% for blurry vision, 52.61% for general weakness, and 41.94% for shortness of breath (Figure 7b). For age, the percentage for people indicating “4” or “5” were: 10.61% for people in their 40s, 21.21% in their 50s, 35.41% in their 60s, 44.81% in their 70s, and 36.36% in their 80s (Figure 7c).

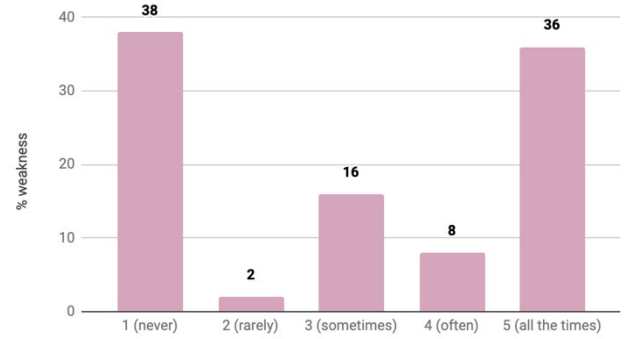
PTSD Symptom	dizziness	poor appetite	blurry vision	headache	shortness of breath	cold hands and feet	weakness	khyâl	weak heart	thinking a lot	sleeping paralysis
1 (never)	22	31	10	20	24	26	19	26	26	7	25
2 (rarely)	5	2	6	5	1	4	1	3	4	2	5
3 (sometimes)	10	8	12	11	8	5	8	9	9	9	7
4 (often)	4	5	6	2	4	2	4	4	3	2	4
5 (all the times)	9	4	16	12	13	13	18	8	8	30	9
total	50	50	50	50	50	50	50	50	50	50	50

**Figure 6. Number of participants’ self-reported scores for PTSD symptoms (Question 5)**

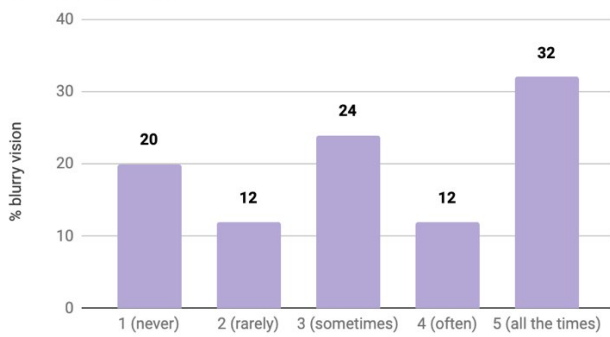
5i. shortness of breath



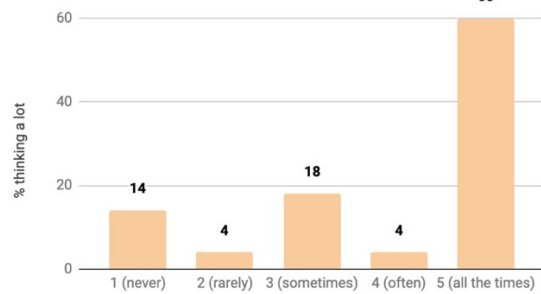
5ii. weakness



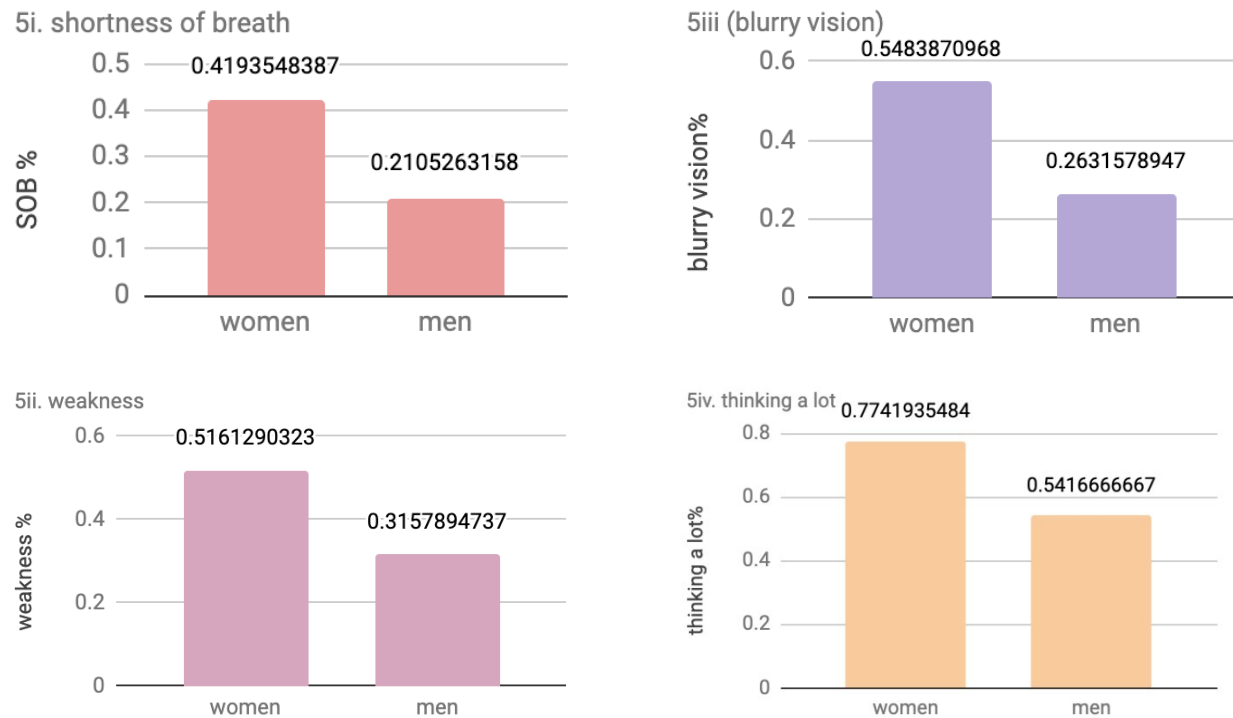
5iii. blurry vision



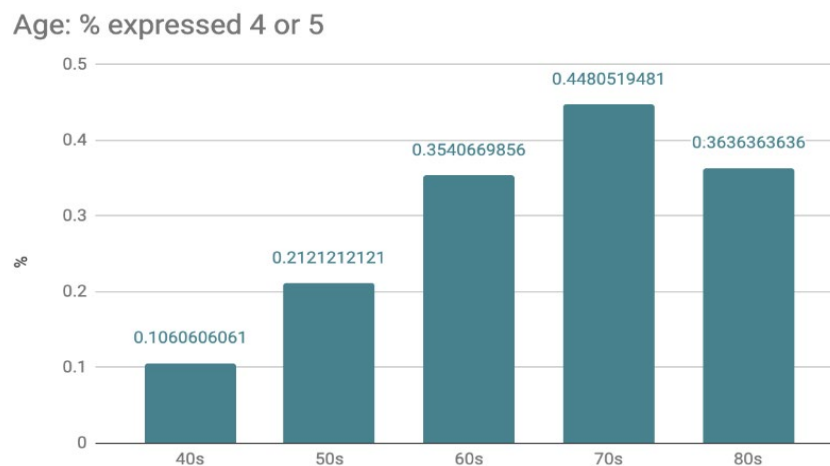
5iv. thinking a lot



**Figure 7a: number of participants self-reported score for four PTSD Symptoms Likert-Scale: N = 50.** Graph 5i, 5ii, 5iii, and 5iv respectively represent the percentages of self-reported scores for short of breath, weakness, blurry vision, and thinking a lot.



**Figure 7b. percentage of participants' self-reported score for four PTSD Symptoms Likert-Scale by gender: N = 50 (female = 31, male = 19).**



**Figure 7c. percentage of participants' self-reported "4" or "5" score for four PTSD Symptoms Likert-Scale by age. N = 50.**

The majority of the participants believed that PTSD affected those who had gone through the Khmer Rouge. Common themes of the responses included: psychological effects, recurrent thoughts, avoidance symptoms (Table 1).

**Table 1. Common responses to PTSD perspectives**

- 
- Lasting sadness/fear (after hearing communism, Khmer Rouge)
  - Nightmares (Khmer Rouge trying to capture after running into the forest)
  - Still exists in friends and family members who had gone through the genocide
  - Those who didn't lose family tend to be affected less
  - Tend to worry a lot/ easily startled
  - People avoid re-visiting places that remind them of the Khmer Rouge
  - Young people tend to be less affected
- 

The majority of participants were able to identify ways that they and/or people who were affected by PTSD used to alleviate their experiences. Common themes of the responses included avoidance, acceptance, recreation (Table 2).

**Table 2. Common responses to PTSD alleviations**

- 
- Forgetting the past and living in the present/ thinking good thoughts
  - Chemical dependency like smoking and drinking
  - Talking to people/ going outside to see other people/ becoming more involved in the community/ trying not to be alone
  - Recreation like making arts, listening to music, shopping, watching comedies, reading
  - Exercise
  - Thinking of karma and making the experience into life lessons
  - Not sure/ people are still experiencing the traumas
  - Going to pagoda/ church/ hearing monks chanting
  - meditation/ yoga/ community garden
  - Sleeping
  - Looking after children and/or grandchildren
  - Trying to be strong-willed/ facing your fear
- 

Most of participants regarded gardening as an important form of psychological and physical relief for those who were affected by PTSD. More than half of the participants claimed that gardening helped with their mental health. Common answers in regard to mental health included the ability to forget about the past and to live in the present by doing gardening-related tasks. Other responses claimed that growing their own vegetables allowed them to have convenient

access to nutritional, medicinal, and organic food. Of those who had access to gardening, most participants indicated that they mostly grow common Southeast Asian crops like lemongrass, mustard greens, bananas, gourds, longans, herbs, etc. (Table 3). Others emphasized that gardening in community plots helped them to be more stress free by interacting and cooperating with others. Participants also mentioned that gardening helped them exercise and increased their productivities. In addition, there were responses indicating that spending time alone in the gardens helped participants feel happiness by observing natural interactions and greenery and by following the natural process of growth. Overall, most of the participants indicated that they would like to become involved in a community garden that was close by to their homes.

**Table 3: crops grown by participants**

Lemon	Gourd	Garlic
Herbs	Cucumber	Aloe
Mango	Lemongrass	Lychee
Papaya	Longan	Eggplant
Lettuce	Guava	Mustard green
Green onion	Apple	Taro
Basil	Loquat	Persimmon
Pepper	Pumpkin	Kaffir lime
Banana	Watermelon	Kale
Dragon fruit	Tomato	Beet

## DISCUSSION

The goal of this study was to understand the impacts of the Khmer Rouge regime on participants, and to determine if gardening could alleviate their struggles. The participants had faced numerous struggles under the Khmer Rouge, and I found that PTSD-related symptoms were present in this population. Furthermore, most participants believed that they or people in their generations who had experienced the Khmer Rouge were affected by PTSD. Related symptom severity. In respect to possible PTSD alleviation, participants believed that gardening helped with their mental health by offering many benefits like social interaction, reconnection with nature, sustenance, exercise etc. These findings further helped to shed light on present problems that were affecting the Khmer Rouge survivors and to assess the effectiveness of gardening as a form of intervention.

## **Khmer Rouge Experiences**

The participants faced many arduous challenges under the Khmer Rouge, many of which were centered around the Khmer Rouge agrarian communist ideology. They reported that families were separated so there would be uniform divisions of labor, food was limited, and people had to perform excruciating work. People were mistreated, punished, and/or tortured due to alleged acts of treason or past histories before the Khmer Rouge took place. Anyone who resisted the authority was sent to “kar sang” (construction), which was a euphemism for execution.

According to one participant, Mrs. R, most people didn’t question when a family member went missing after “kar sang”. Mrs. R recounted the time when the Khmer Rouge came and took her father to “kar sang.” After her father went missing, her family readily accepted that her father was gone. Mrs. R said that father’s request for her to put the blanket away became a memory of their father’s existence.

Participants also recounted times when they were malnourished. Even though Khmer Rouge survivors were allowed to grow vegetables around their houses, they were not allowed to privately consume their grown vegetables. Doing so would be a treason against “angkar” (“organization”) or the Khmer Rouge regime. One participant, Mrs. S, explained that people would come and spy under her family’s shack during the night to listen to their craving stories and wishes and to see if they had committed treasons by stealing crops, etc. Frequently, the participants recounted their daily sustenance under the Khmer Rouge. Some indicated that most people ate porridge. In certain villages, a porridge of rice was diluted with water so that it could be fed to at least twenty people. Others explained that their porridge portions contained tiny pebbles. People who lived in fishing villages and the war-front reported better daily sustenance due to greater resource availability or because the Khmer Rouge wanted to provide them with enough energy to work more.

Survivors lived to tell the stories of their labors. The majority of the participants reported that they had worked in rice paddies, harvesting and planting rice. Some remarked that they had to wake up very early in the morning, long before sunrise, to go to the rice paddies. For example, Mr. C remembered the time when he had to wake up around 3:00 AM. He recalled that, during the monsoon season, he and others had to plant rice with water up to their necks. People were afraid

of being ill, which could disable them and making them prone to disease. If people were not contributing to the regime, they could face execution.

## **PTSD Symptoms**

There were two very noticeable trends regarding PTSD symptoms affecting the participants. In this study, women were more likely than men to self-report “4” or “5” for the eleven somatic and psychological symptoms. Specifically, women reported greater than 20% difference than men did for “poor appetite (25.81%),” “blurry vision (28.52%),” “headache (28.18%),” “shortness of breath (20.88%),” “cold hands and feet (22.92%),” “weakness (20.03%),” “khyâl (21.73%),” and “thinking a lot (23.25%).” This suggests that women were more affected by the symptoms (Chung and Bemak 2012). Similar findings have been reported for Vietnamese, Cambodian, and Laotian refugees (Chung and Bemak 2010), while other studies have found no difference in reporting of PTSD symptoms between male and female refugees from the former Yugoslavia, Middle East, and Sub-Saharan Africa (Bogic et al. 2015). These differences suggest that the latter study is less applicable to our study than the former Chung and Bemak 2005 was due to possible cultural differences.

As age increased, the percentage of reported “4” or “5” for the PTSD symptoms also increased. This suggested that people’s exposure to the hardships during the Khmer Rouge played an important role in predicting their self-reported PTSD symptoms, reflecting findings that prolonged exposure to hardships may lead to higher levels of corticotropin-release and imprinted memories (Rainnie et al. 2004). This meant that traumatic memories were less forgettable if a person experienced the hardship for a long time. The only age subset that didn’t fit this trend was that of the people in their 80s because their self-reported score was less than those reported in their 70s, which may due to small sample size (only two people in their 80s) in the sample.

## **PTSD Perspectives**

Overall the participants’ PTSD experiences and perspectives fit the three sub-categories of symptoms: reexperiencing, avoidance, hyperarousal. Re-experiencing included flashbacks, nightmares, frightening thoughts; avoidance included shunning reminders of past traumatic

experiences, feeling emotionally numb, losing previously liked activities; and hyperarousal included getting easily startled, feeling tense, having difficulty sleeping and/or having angry outburst (Mahan and Ressler 2012). For example, one participant, Mrs. T, recounted her daily life and described that she was usually very afraid. She would often have nightmares about the Khmer Rouge trying to catch her in the forest. She remembered the time when her hands and feet became shaky after hearing people were getting executed. Mrs. C still re-experienced the time when she was punished and kicked by a Khmer Rouge officer for stealing corn. She couldn't imagine what it would feel like to be one of the people who lost their children. Participants like Mrs. C2, Ms. N, and Mrs. N expressed avoidance perspectives. They believed in doing activities and thinking of activities to avoid thinking about the past. Furthermore, Ms. N exclaimed that she moved to the United States because she was still fearful and did not want to relive her experience in Cambodia. Nevertheless, some participants, like Mrs. S and Mrs. R, believed that the Khmer Rouge was not something that one could forget. They believed that one should forgive the experiences. They found it easier to believe that their times under the Khmer Rouge were part of their "kam" (karma) and that acceptance was necessary to move onward. In addition to language and cultural barriers, due to these social withdrawals and numbing experiences, Khmer Rouge refugee-patients often lack the energy to advocate for their well-beings (Kinzie and Fleck 1987).

### **Gardening Perspectives**

Study participants had positive attitudes towards gardening. Most believed that gardening helped with their mental health. Many explained that gardening often helped them to live more in the present because, unlike during the Khmer Rouge period, they were able to garden at their own pace. Some explained that doing gardening tasks even helped them to forget about their past. In addition, participants expressed what I called "green happiness." Many articulated that they felt joy when gardening because they were able to oversee the natural process of growth like seeing plants grow and bear fruits that the participants were able to actually consume and share with people afterwards. One participant, Mrs. S, recalled the benefits of gardening:

*I do believe so [that gardening helps with mental health] . . . You know whatever I do, I want to see the results. . . you start from the scratch and it grows. . . it doesn't matter what happened. They start all over again. . . The season is not*

*working for you? . . . you learn from your experience and do something much better next time.*

Another, Mr. S, explained that gardening was an integral part of his life:

*By most, [I grow] Asian crops. . . for herbs, I have every type. . . I grow to make medicine too, like tea. . . [gardening helps] a lot. After I come from work at 3:00 AM . . . all my life, I work at night . . . I immediately, before going to sleep or relax, water my crops first because I [usually] wake up at 9:00 or 10:00 AM already . . . I really take care [of my plants]. My crops are like my soul. . .*

Thus, the urban gardening was totally different from the forced agricultural labor that they experienced during the Khmer Rouge era. Not everything was based on survival anymore. Instead, participants had the opportunity to practice patience and to reflect the natural world.

Other participants stated that gardening helped them to exercise and interact with other people more. Since most of the participants came from lower income backgrounds, it was understandable that they would have limited access and/or time to exercise and spend time with friends. Participants who had experiences in the Maye Center, where they came to grow organic foods, explained that being active helped them from getting sick and bored. One participant, Mrs. V, explained that even though she did not like gardening, she really liked sharing fruits that were already growing in her backyard:

*Gardening helps well [with mental health] because when it's the season . . . when they have flowers and fruits, like we are happy. . . really happy when [the fruits are] ripe . . . like pomegranates really have sweet flavors. [I] would pick them and show them to the yeay-yeay [grandmas] saying my pomegranates are sweet! My dragon fruits are good! . . . That's all. . . just picking and sharing with people . . .*

By growing food together at the community garden or just by sharing food, participants were able to become more active and to be less likely to feel isolated. Most of the participants grew Asian crops like lemongrass, mustard greens, kaffir limes, etc. By growing and sharing their crops, participants and other immigrants would have greater access to more culturally appropriate food. In addition, the participants would have fewer financial difficulties in regard to their nutritional intake. They had more opportunity to tackle other post-immigrant problems like temporary visa status, discrimination, employment, etc. that make resettlement undesirable (Li et al. 2016). These problems could cause greater financial and emotional instability that exacerbate the feeling of social isolation amongst the participants. Community garden alone could contribute

between \$500 and \$2,000 worth of produce per family per year (Baedecker 2010). Gardening together not only provided them with sustenance that eases participants' financial burdens, but emotional fulfillment as well.

## **Limitations**

Even though my sample size was sufficient for a qualitative study, I did not have an even distribution of sub-populations in terms of gender and age to conduct statistical analysis of my results. Due to distance, I was unable to frequently visit Long Beach, CA and help my sister conduct the interviews. Furthermore, past studies suggest that due to avoidance symptoms, retrieving from Khmer elders is difficult (Frye and D'Avanzo 1994). I did face this problem, but most of the elders were open to talk about their experiences and perspectives. Hence, a larger and more evenly-distributed sample size would have further strengthened my argument.

## **Future Directions**

Future studies should aim to garner bigger sample size with more even sub-population distributions. Even though it is hard to quantify something as complex as one's emotions and struggles, a quantitative analysis through the implementation of statistical tests would help to elucidate different angles that might be very useful. In addition to bigger sample size, we should also aim to investigate if PTSD could indirectly affect a person or another generation. Numerous studies have investigated the effects of PTSD on populations like war refugees, veterans, accidents survivors, etc., but few have explored the effects of vicarious or secondary trauma on children or spouses of the Khmer Rouge survivors. By studying vicarious trauma, we could further understand the long-lasting impacts of trauma exposures and PTSD, for example by determine the mechanisms and capacity of how PTSD spreads, etc. This further understanding of PTSD would enable us to figure out better alleviation protocols and to provide more effective resources for those who are in need.

## **BROADER IMPLICATIONS**

PTSD still remains as a common struggle in war refugee communities like the Cambodian American community in Long Beach, CA. Even though Cambodian war refugees may have found a place in Long Beach, CA, some are still mentally traumatized due to violence, abuse, and loss of family members during the Khmer Rouge. In addition, language barriers and limited education often hinder these war refugees from social and economic advancement, even after decades of settlement in the United States (Marshall, 2005). Cambodian women immigrants have reported rape/sexually abuse, loss of children and/or partners through violence, starvation, and kidnappings. Many ultimately reported their traumas only by going through several years of therapy and culturally sensitive treatments (Mollica et al. 1987). Hence, there are many barriers preventing people with PTSD from seeking the help they need. So, policy-makers, social workers, and community advocates should try to make PTSD-related struggles more transparent in order to help the Cambodian and other war refugee populations that often suppress their past traumas. Further research needs to address gardening as a possible form of PTSD therapeutic intervention since gardening provides direct and low-cost benefits, when respectively compared to passive green exposures and expensive cognitive behavioral therapy, etc. In addition, useful information from similar studies will also provide influential inputs to help city planning policies to allocate lands for public gardens and to espouse other measures to combat PTSD and possibly other mental disorders that are prevalent in war refugee populations.

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## APPENDIX A

**Table A1: DSM V PTSD criteria.** Note: the following criteria apply to adults, adolescents, and children more than 6 years.

**Criterion A: Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:**

1. Directly experiencing the traumatic events(s).
2. Witnessing, in person, the event(s) as it occurred to others.
3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family or friend, the event(s) must have been violent or accidental.
4. Experienced repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse)

**Note:** Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

**Criterion B: Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:**

1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s)

**Note:** in children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.

2. recurrent distressing dreams in which the content and/or effect of the dream are related to the traumatic event(s)

**Note:** In children, there may be frightening dreams without recognizable content.

3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)

**Note:** In children, trauma-specific reenactment may occur in play.

4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s)
5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s)

**Criterion C: Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:**

1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s)

**Criterion D: Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:**

1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).
2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., “I am bad,” “No one can be trusted,” “the world is completely dangerous,” “My whole nervous system is permanently ruined”).
3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.
4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).
5. Markedly diminished interest or participation in significant activities.
6. Feelings of detachment or estrangement from others.
7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

**Criterion E: Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:**

1. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.
2. Reckless or self-destructive behavior.
3. Hypervigilance
4. Exaggerated startle response
5. Problems with concentration.
6. Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).

**Criterion F: Duration of the disturbance (Criteria B, C, D, and E) is more than 1 month.**

**Criterion G: the disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.**

**Criterion H: the disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.**

(APA 2013)

## APPENDIX B: Survey

### PTSD/Gardening Perspective Survey (PTSD/G-PS)

→ Please give disclaimer and ask for consent. Inform that participants are able to stop the interview or skip questions at any time if they feel uncomfortable.

#### 1. Demographic

a. Sex: m/ f

b. Age:

c. Where did you come from in Cambodia?

d. Education level

- none
- Elementary
- High school
- Some college
- Higher (bachelor/ doctorate/ etc.)

e. Income level (\$)

- Not available
- Less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - up

f. Access to garden at home?

- Containers
- Plots
- No access

g. What is your marital status?

- Single/ never married
- Married/ domestic relationship
- Widowed
- Divorced

h. What is your current employment?

- Employed/ self-employed
- Homemaker
- Retired
- Unemployed/ disability
- Looking for work
- Not available

i. Do you have children/grandchildren at home? (Y/N)

j. alcohol/smoking (Y/N)

k. Do you still have family members in Cambodia? If so, how close are they?

2. Did you personally experience the Khmer Rouge?

3. If possible, are you willing to share your hardship during the Khmer Rouge? (subjected to labor camp, sickness, malnutrition, diseases, etc.)?

4. Did you lose any family/friend during the Khmer Rouge? If so, how many?

5. Do you currently feel or had experienced any of the following? (1 = never, 2 =rarely, 3 = sometimes, 4 = often, 5 = all the time)

- 
- |                       |   |   |   |   |   |                                     |
|-----------------------|---|---|---|---|---|-------------------------------------|
| • Dizziness           | 1 | 2 | 3 | 4 | 5 |                                     |
|                       | 1 | 2 | 3 | 4 | 5 |                                     |
| • Poor appetite       |   |   |   |   |   | • Weakness                          |
|                       | 1 | 2 | 3 | 4 | 5 |                                     |
| • Blurry vision       |   |   |   |   |   | • Khyâl (wind-like fainting attack) |
|                       | 1 | 2 | 3 | 4 | 5 |                                     |
| • Headache            |   |   |   |   |   | • Weak heart                        |
|                       | 1 | 2 | 3 | 4 | 5 |                                     |
| • Shortness of breath |   |   |   |   |   | • Thinking a lot                    |
|                       | 1 | 2 | 3 | 4 | 5 |                                     |
| • Cold hands and feet |   |   |   |   |   | • Sleeping paralysis                |
|                       |   |   |   |   |   |                                     |
- 

6. What do you think PTSD is?

7. Describe any ways you think people use to deal with PTSD.

8. Do you grow your own food? If so, do you grow your food alone or with other people such as family members or friends?

9. Do you have any experience in the local community gardens? If not, do you think you would like to visit/volunteer at a community garden in the future?

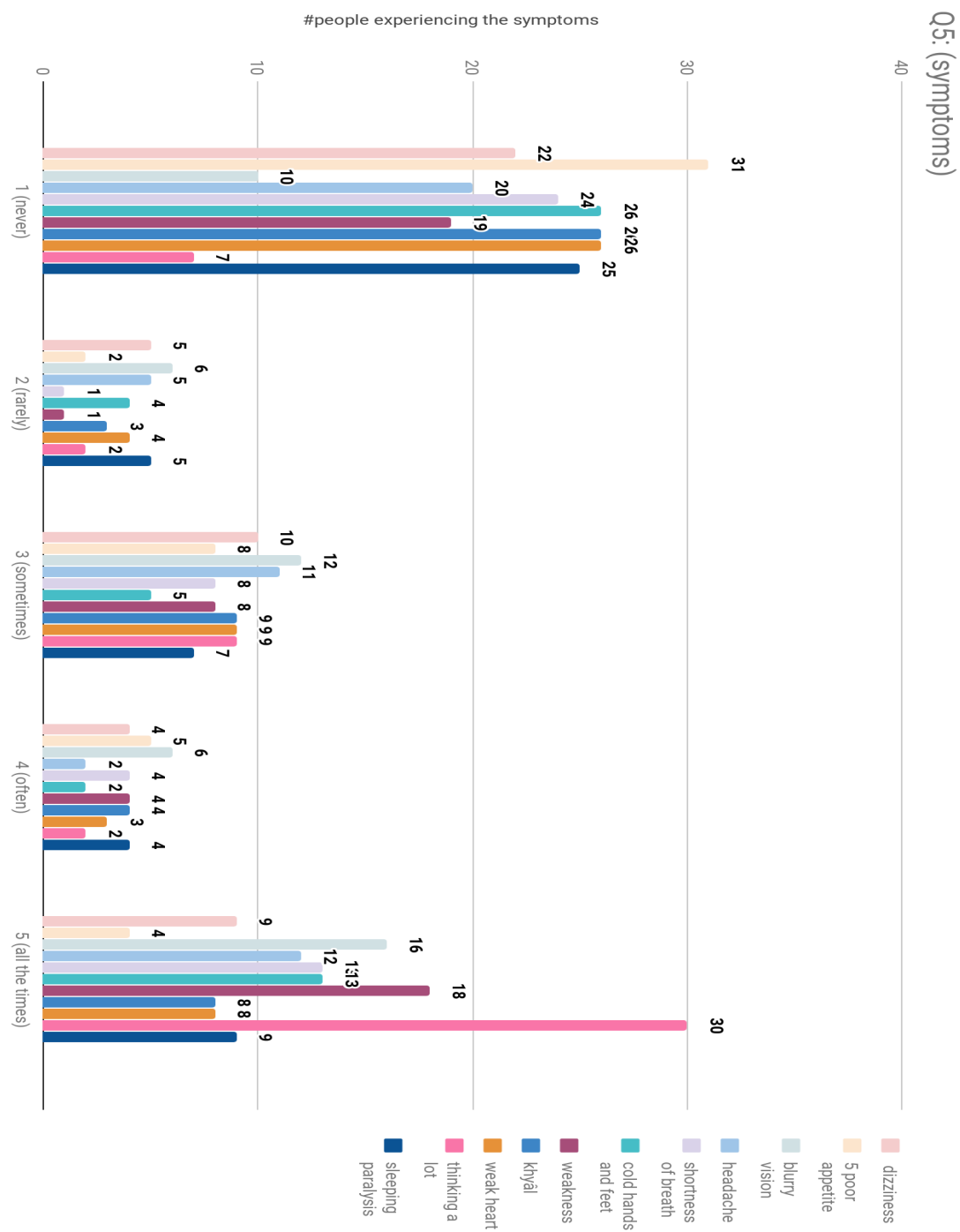
10. Do you normally grow Southeast Asian or western crops? Name the crops, if possible.

11. Do you think gardening help with your mental health? What 3 aspects of gardening do you enjoy the most? (mental health, organic gardening, exercise, convenience, etc.)

12. What other factors do you think help your mental health?

## APPENDIX C

Figure C1. Graph of participants self-reported score for 11 PTSD symptoms



## APPENDIX D: Spreadsheet of survey responses

ID	General Information			Performance Metrics			Resource Allocation			Compliance & Audit			Risk Management			Reporting & Documentation		
	Name	Category	Status	Score	Rating	Index	Type	Count	Value	Unit	Area	Frequency	Level	Impact	Severity	Owner	Reviewer	
1	John Doe	Software	Active	95	A+	100	Dev	10	1000	h	IT	Weekly	Low	Minor	Low	John Doe	John Doe	
2	Jane Smith	Hardware	Active	88	A	90	Ops	5	500	h	IT	Daily	Low	Minor	Low	Jane Smith	Jane Smith	
3	Michael Chen	Software	Active	92	A+	95	Dev	8	800	h	IT	Weekly	Low	Minor	Low	Michael Chen	Michael Chen	
4	Sarah Johnson	Hardware	Active	85	A	85	Ops	3	300	h	IT	Daily	Low	Minor	Low	Sarah Johnson	Sarah Johnson	
5	David Kim	Software	Active	90	A	90	Dev	6	600	h	IT	Weekly	Low	Minor	Low	David Kim	David Kim	
6	Emily White	Hardware	Active	82	A	80	Ops	2	200	h	IT	Daily	Low	Minor	Low	Emily White	Emily White	
7	James Brown	Software	Active	87	A	88	Dev	4	400	h	IT	Weekly	Low	Minor	Low	James Brown	James Brown	
8	Alice Green	Hardware	Active	80	A	75	Ops	1	100	h	IT	Daily	Low	Minor	Low	Alice Green	Alice Green	
9	Robert Lee	Software	Active	83	A	82	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Robert Lee	Robert Lee	
10	Olivia Taylor	Hardware	Active	78	A	78	Ops	1	100	h	IT	Daily	Low	Minor	Low	Olivia Taylor	Olivia Taylor	
11	William Davis	Software	Active	86	A	85	Dev	5	500	h	IT	Weekly	Low	Minor	Low	William Davis	William Davis	
12	Isabella Wilson	Hardware	Active	75	A	72	Ops	1	100	h	IT	Daily	Low	Minor	Low	Isabella Wilson	Isabella Wilson	
13	Benjamin Moore	Software	Active	89	A	90	Dev	7	700	h	IT	Weekly	Low	Minor	Low	Benjamin Moore	Benjamin Moore	
14	Mia Garcia	Hardware	Active	70	A	68	Ops	1	100	h	IT	Daily	Low	Minor	Low	Mia Garcia	Mia Garcia	
15	Ethan Martinez	Software	Active	84	A	83	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Ethan Martinez	Ethan Martinez	
16	Ava Hernandez	Hardware	Active	72	A	70	Ops	1	100	h	IT	Daily	Low	Minor	Low	Ava Hernandez	Ava Hernandez	
17	Noah Lopez	Software	Active	81	A	80	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Noah Lopez	Noah Lopez	
18	Charlotte King	Hardware	Active	76	A	74	Ops	1	100	h	IT	Daily	Low	Minor	Low	Charlotte King	Charlotte King	
19	Liam Scott	Software	Active	87	A	86	Dev	5	500	h	IT	Weekly	Low	Minor	Low	Liam Scott	Liam Scott	
20	Amelia Adams	Hardware	Active	73	A	71	Ops	1	100	h	IT	Daily	Low	Minor	Low	Amelia Adams	Amelia Adams	
21	Lucas Baker	Software	Active	85	A	84	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Lucas Baker	Lucas Baker	
22	Sophia Nelson	Hardware	Active	71	A	69	Ops	1	100	h	IT	Daily	Low	Minor	Low	Sophia Nelson	Sophia Nelson	
23	Benjamin Hall	Software	Active	82	A	81	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Benjamin Hall	Benjamin Hall	
24	Olivia Young	Hardware	Active	74	A	72	Ops	1	100	h	IT	Daily	Low	Minor	Low	Olivia Young	Olivia Young	
25	William King	Software	Active	86	A	85	Dev	5	500	h	IT	Weekly	Low	Minor	Low	William King	William King	
26	Isabella Lee	Hardware	Active	77	A	75	Ops	1	100	h	IT	Daily	Low	Minor	Low	Isabella Lee	Isabella Lee	
27	Benjamin Scott	Software	Active	83	A	82	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Benjamin Scott	Benjamin Scott	
28	Mia Adams	Hardware	Active	70	A	68	Ops	1	100	h	IT	Daily	Low	Minor	Low	Mia Adams	Mia Adams	
29	Ethan Baker	Software	Active	84	A	83	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Ethan Baker	Ethan Baker	
30	Ava Nelson	Hardware	Active	72	A	70	Ops	1	100	h	IT	Daily	Low	Minor	Low	Ava Nelson	Ava Nelson	
31	Noah Hall	Software	Active	81	A	80	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Noah Hall	Noah Hall	
32	Charlotte King	Hardware	Active	76	A	74	Ops	1	100	h	IT	Daily	Low	Minor	Low	Charlotte King	Charlotte King	
33	Liam Scott	Software	Active	87	A	86	Dev	5	500	h	IT	Weekly	Low	Minor	Low	Liam Scott	Liam Scott	
34	Amelia Adams	Hardware	Active	73	A	71	Ops	1	100	h	IT	Daily	Low	Minor	Low	Amelia Adams	Amelia Adams	
35	Lucas Baker	Software	Active	85	A	84	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Lucas Baker	Lucas Baker	
36	Sophia Nelson	Hardware	Active	71	A	69	Ops	1	100	h	IT	Daily	Low	Minor	Low	Sophia Nelson	Sophia Nelson	
37	Benjamin Hall	Software	Active	82	A	81	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Benjamin Hall	Benjamin Hall	
38	Olivia Young	Hardware	Active	74	A	72	Ops	1	100	h	IT	Daily	Low	Minor	Low	Olivia Young	Olivia Young	
39	William King	Software	Active	86	A	85	Dev	5	500	h	IT	Weekly	Low	Minor	Low	William King	William King	
40	Isabella Lee	Hardware	Active	77	A	75	Ops	1	100	h	IT	Daily	Low	Minor	Low	Isabella Lee	Isabella Lee	
41	Benjamin Scott	Software	Active	83	A	82	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Benjamin Scott	Benjamin Scott	
42	Mia Adams	Hardware	Active	70	A	68	Ops	1	100	h	IT	Daily	Low	Minor	Low	Mia Adams	Mia Adams	
43	Ethan Baker	Software	Active	84	A	83	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Ethan Baker	Ethan Baker	
44	Ava Nelson	Hardware	Active	72	A	70	Ops	1	100	h	IT	Daily	Low	Minor	Low	Ava Nelson	Ava Nelson	
45	Noah Hall	Software	Active	81	A	80	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Noah Hall	Noah Hall	
46	Charlotte King	Hardware	Active	76	A	74	Ops	1	100	h	IT	Daily	Low	Minor	Low	Charlotte King	Charlotte King	
47	Liam Scott	Software	Active	87	A	86	Dev	5	500	h	IT	Weekly	Low	Minor	Low	Liam Scott	Liam Scott	
48	Amelia Adams	Hardware	Active	73	A	71	Ops	1	100	h	IT	Daily	Low	Minor	Low	Amelia Adams	Amelia Adams	
49	Lucas Baker	Software	Active	85	A	84	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Lucas Baker	Lucas Baker	
50	Sophia Nelson	Hardware	Active	71	A	69	Ops	1	100	h	IT	Daily	Low	Minor	Low	Sophia Nelson	Sophia Nelson	
51	Benjamin Hall	Software	Active	82	A	81	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Benjamin Hall	Benjamin Hall	
52	Olivia Young	Hardware	Active	74	A	72	Ops	1	100	h	IT	Daily	Low	Minor	Low	Olivia Young	Olivia Young	
53	William King	Software	Active	86	A	85	Dev	5	500	h	IT	Weekly	Low	Minor	Low	William King	William King	
54	Isabella Lee	Hardware	Active	77	A	75	Ops	1	100	h	IT	Daily	Low	Minor	Low	Isabella Lee	Isabella Lee	
55	Benjamin Scott	Software	Active	83	A	82	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Benjamin Scott	Benjamin Scott	
56	Mia Adams	Hardware	Active	70	A	68	Ops	1	100	h	IT	Daily	Low	Minor	Low	Mia Adams	Mia Adams	
57	Ethan Baker	Software	Active	84	A	83	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Ethan Baker	Ethan Baker	
58	Ava Nelson	Hardware	Active	72	A	70	Ops	1	100	h	IT	Daily	Low	Minor	Low	Ava Nelson	Ava Nelson	
59	Noah Hall	Software	Active	81	A	80	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Noah Hall	Noah Hall	
60	Charlotte King	Hardware	Active	76	A	74	Ops	1	100	h	IT	Daily	Low	Minor	Low	Charlotte King	Charlotte King	
61	Liam Scott	Software	Active	87	A	86	Dev	5	500	h	IT	Weekly	Low	Minor	Low	Liam Scott	Liam Scott	
62	Amelia Adams	Hardware	Active	73	A	71	Ops	1	100	h	IT	Daily	Low	Minor	Low	Amelia Adams	Amelia Adams	
63	Lucas Baker	Software	Active	85	A	84	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Lucas Baker	Lucas Baker	
64	Sophia Nelson	Hardware	Active	71	A	69	Ops	1	100	h	IT	Daily	Low	Minor	Low	Sophia Nelson	Sophia Nelson	
65	Benjamin Hall	Software	Active	82	A	81	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Benjamin Hall	Benjamin Hall	
66	Olivia Young	Hardware	Active	74	A	72	Ops	1	100	h	IT	Daily	Low	Minor	Low	Olivia Young	Olivia Young	
67	William King	Software	Active	86	A	85	Dev	5	500	h	IT	Weekly	Low	Minor	Low	William King	William King	
68	Isabella Lee	Hardware	Active	77	A	75	Ops	1	100	h	IT	Daily	Low	Minor	Low	Isabella Lee	Isabella Lee	
69	Benjamin Scott	Software	Active	83	A	82	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Benjamin Scott	Benjamin Scott	
70	Mia Adams	Hardware	Active	70	A	68	Ops	1	100	h	IT	Daily	Low	Minor	Low	Mia Adams	Mia Adams	
71	Ethan Baker	Software	Active	84	A	83	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Ethan Baker	Ethan Baker	
72	Ava Nelson	Hardware	Active	72	A	70	Ops	1	100	h	IT	Daily	Low	Minor	Low	Ava Nelson	Ava Nelson	
73	Noah Hall	Software	Active	81	A	80	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Noah Hall	Noah Hall	
74	Charlotte King	Hardware	Active	76	A	74	Ops	1	100	h	IT	Daily	Low	Minor	Low	Charlotte King	Charlotte King	
75	Liam Scott	Software	Active	87	A	86	Dev	5	500	h	IT	Weekly	Low	Minor	Low	Liam Scott	Liam Scott	
76	Amelia Adams	Hardware	Active	73	A	71	Ops	1	100	h	IT	Daily	Low	Minor	Low	Amelia Adams	Amelia Adams	
77	Lucas Baker	Software	Active	85	A	84	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Lucas Baker	Lucas Baker	
78	Sophia Nelson	Hardware	Active	71	A	69	Ops	1	100	h	IT	Daily	Low	Minor	Low	Sophia Nelson	Sophia Nelson	
79	Benjamin Hall	Software	Active	82	A	81	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Benjamin Hall	Benjamin Hall	
80	Olivia Young	Hardware	Active	74	A	72	Ops	1	100	h	IT	Daily	Low	Minor	Low	Olivia Young	Olivia Young	
81	William King	Software	Active	86	A	85	Dev	5	500	h	IT	Weekly	Low	Minor	Low	William King	William King	
82	Isabella Lee	Hardware	Active	77	A	75	Ops	1	100	h	IT	Daily	Low	Minor	Low	Isabella Lee	Isabella Lee	
83	Benjamin Scott	Software	Active	83	A	82	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Benjamin Scott	Benjamin Scott	
84	Mia Adams	Hardware	Active	70	A	68	Ops	1	100	h	IT	Daily	Low	Minor	Low	Mia Adams	Mia Adams	
85	Ethan Baker	Software	Active	84	A	83	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Ethan Baker	Ethan Baker	
86	Ava Nelson	Hardware	Active	72	A	70	Ops	1	100	h	IT	Daily	Low	Minor	Low	Ava Nelson	Ava Nelson	
87	Noah Hall	Software	Active	81	A	80	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Noah Hall	Noah Hall	
88	Charlotte King	Hardware	Active	76	A	74	Ops	1	100	h	IT	Daily	Low	Minor	Low	Charlotte King	Charlotte King	
89	Liam Scott	Software	Active	87	A	86	Dev	5	500	h	IT	Weekly	Low	Minor	Low	Liam Scott	Liam Scott	
90	Amelia Adams	Hardware	Active	73	A	71	Ops	1	100	h	IT	Daily	Low	Minor	Low	Amelia Adams	Amelia Adams	
91	Lucas Baker	Software	Active	85	A	84	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Lucas Baker	Lucas Baker	
92	Sophia Nelson	Hardware	Active	71	A	69	Ops	1	100	h	IT	Daily	Low	Minor	Low	Sophia Nelson	Sophia Nelson	
93	Benjamin Hall	Software	Active	82	A	81	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Benjamin Hall	Benjamin Hall	
94	Olivia Young	Hardware	Active	74	A	72	Ops	1	100	h	IT	Daily	Low	Minor	Low	Olivia Young	Olivia Young	
95	William King	Software	Active	86	A	85	Dev	5	500	h	IT	Weekly	Low	Minor	Low	William King	William King	
96	Isabella Lee	Hardware	Active	77	A	75	Ops	1	100	h	IT	Daily	Low	Minor	Low	Isabella Lee	Isabella Lee	
97	Benjamin Scott	Software	Active	83	A	82	Dev	4	400	h	IT	Weekly	Low	Minor	Low	Benjamin Scott	Benjamin Scott	
98	Mia Adams	Hardware	Active	70	A	68	Ops	1	100	h	IT	Daily	Low	Minor	Low	Mia Adams	Mia Adams	
99	Ethan Baker	Software	Active	84	A	83	Dev	3	300	h	IT	Weekly	Low	Minor	Low	Ethan Baker	Ethan Baker	
100	Ava Nelson	Hardware	Active	72	A	70	Ops	1	100	h	IT	Daily	Low	Minor	Low	Ava Nelson	Ava Nelson	

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