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Alan Hai Guo 4/17/2022

What's HAPIN-ing in Guatemala? An analysis of the impact of the COVID-19 pandemic-related lockdowns on the food insecurity and the economic and lifestyle practices of the HAPIN study participants in rural Jalapa, Guatemala

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Abstract

What's HAPIN-ing in Guatemala? An analysis of the impact of the COVID-19 pandemic-related lockdowns on the food insecurity and the economic and lifestyle practices of the HAPIN study participants in rural Jalapa, Guatemala

By Alan Hai Guo

Background: During the COVID-19 pandemic-related lockdowns, economic disruptions increased difficulties in accessing food and fuel globally. In rural Jalapa, Guatemala, households in the intervention group of the Household Air Pollution Intervention Network (HAPIN) study continued to receive a free stove and continuous supply of liquified petroleum gas (LPG) fuel while the control group relied on biomass cooking fuels that they collected or purchased. This study aimed to determine the effect of the pandemic-related lockdowns on food insecurity levels, frequency of cooking practices, difficulties in accessing resources, and to assess whether the HAPIN intervention impacted any such effects. We hypothesized the pandemic-related lockdowns adversely affected these outcomes while the HAPIN intervention had a protective effect on our outcomes of interest.

Methods: A supplementary COVID-19 survey was administered between July to November 2020 to 453 participants HAPIN participants. The survey included questions on an internationally-recognized food insecurity measure and difficulties in accessing resources such as food, fuel, and medicine during the COVID-19 pandemic. It also assessed lifestyle practices, household economics and participant COVID-19 knowledge. Descriptive analysis and regression modeling of the COVID-19 survey data was done to examine differences between the intervention and control groups of the study.

Results: Food insecurity changed minimally for the study population during the pandemic with no difference between the intervention (β=0.03782, P =0.541) and control group (β=0.04639, P=0.452). Intervention group participants reported fewer difficulties in accessing food (P=0.008), fuel (P<0.001), and transportation (P=0.025) compared to the control group. Intervention group participants were also more likely to report having no difficulties at all (P<0.001) compared to the control group. There were no statistically significant differences in the frequency of cooking practices (P=0.624), difficulties in accessing health care visits (P=0.490), medications/vaccines (P=1.000), caregiving responsibilities (P=1.000), finances (P=0.452), or receiving of economic assistance (P=0.572) between groups.

Conclusions: Food security changed minimally during pandemic-related government lockdowns overall and was not mitigated by the HAPIN intervention. However, the intervention did reduce difficulties in accessing food, fuel and transportation suggesting that the intervention had some protective effect ensuring access to cooking fuel and could relieve some financial and social burdens for participants.

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1. Intro

1.1. The COVID-19 Pandemic

After rapidly spreading across the world, COVID-19 was declared a pandemic by the WHO on March 11, 2020 (WHO, 2021). Two years later, as of March 2022, there have been over 452 million confirmed cases of COVID-19 and 6.0 million deaths globally (WHO, 2020). In Guatemala, 804,000 confirmed cases of COVID-19 and 17,000 deaths have occurred (JHUM, 2022). COVID-19, caused by the novel coronavirus SARS-CoV-2, is transmitted by exposure of infectious respiratory fluids via three major pathways: 1) inhalation of droplets/aerosol particles containing the virus 2) deposition of respiratory fluids on exposed mucous membranes in the mouth, nose, and eyes, and 3) touching mucous membranes with hands that have been contaminated with virus-containing respiratory fluids (CDC, 2021). Preventative measures to limit the spread of the virus have been promoted by governments and health organizations including getting the COVID-19 vaccines, wearing masks around others, maintaining 6 feet of physical distance from others, washing hands with soap and water, avoiding crowds indoors with poor ventilation, covering coughs/sneezes, and cleaning and disinfecting high touch surfaces (CDC, 2021).

The global progression of COVID-19 began in Wuhan, China, in December 2019, when Chinese hospitals were treating mysterious cases of pneumonia that resulted in the first associated death in January 2020 (Taylor, 2021). As of 2022, scientists have focused on the Huanan Seafood Wholesale Market as the location of anthroponotic origin of COVID-19 as research and mapping have suggested that the earliest evolutionary branches of the coronavirus were present in the live animals sold at the market in late 2019 (Zimmer & Mueller, 2022). COVID-19 spread quickly and confirmed cases were present in Taiwan, South Korea, and the United States by January 21, 2020 (Kantis et al., 2022). The WHO declared a global health emergency on January 30, but COVID-19 would soon be present across the world with first cases in Europe (January 24), Australia (January 25), the Middle East (January 29), Africa (February 14), and South America (February 26) following shortly (Taylor, 2020; Kantis et al., 2022). On March 13, 2020, Guatemala reported its first case of COVID-19 with the first death following two days later (Kantis et al., 2022). After the WHO's declaration of the pandemic, several countries around the world began lockdown

and stay-at-home orders to curb the spread of COVID-19 including the EU, India, and the United States (Taylor, 2021). However, as COVID-19 spread, various countries across the world would become "hotspots" for the virus including China, the United States, Italy, Russia, Iran, Brazil, Uruguay, and India (Al-Arshani, 2021; Taylor 2021). Globally, national and local lockdowns and re-openings would occur over the next two years resulting in the continued spread of COVID-19 and key milestones including 6 million deaths by March 7, 2022, and 400 million cases by February 9, 2022 (Kantis et al., 2022; Abraham & B, 2022)

During the COVID-19 pandemic-related lockdowns, households in the intervention group of the HAPIN study continued to receive free LPG fuel while the control group obtaining fuel through their usual sources: via traveling vendors, markets, or by collecting the fuel themselves. Because of the continued, free distribution of LPG fuel for HAPIN participants, we hypothesized that the HAPIN intervention would have protective effects on the participants' ability to obtain cooking fuel during the COVID-19 pandemic-related lockdowns. Additionally, we hypothesized that reduced fuel insecurity among the intervention group, among other factors, can result in monetary savings that can be used for other resources/services such as additional food, health care services, and transportation costs. In this way, the HAPIN intervention could have a protective effect to buffer participants from shocks and stressors associated with the pandemic and accompanying lockdowns.

The primary objective of this study was to understand the effect that the HAPIN intervention had on food insecurity levels, frequency of cooking practices and difficulties in accessing food and fuel during the COVID-19 pandemic-related lockdowns in rural Guatemala. Secondary objectives of this research were to understand the effect that the pandemic-related lockdowns had on the lifestyle practices and economic changes of the participants. We used quantitative survey questions during phone and in-person interviews throughout rural Jalapa, Guatemala to record participants' experiences as COVID-19 was spreading across the country and lockdown/stay-at-home orders were implemented. The knowledge from this research can help highlight deficiencies in the services provided during the COVID-19 pandemic and

provide recommendations for future pandemic, disaster, or emergency planning and policies which can improve the livelihood of marginalized populations with limited resources.

1.2. Background

1.2.1. Economic and social impact of lockdowns

By April 2020, over half of the world's population, or 3.9 billion people across 90 countries, was placed under various forms of stay-at-home orders (Sandford, 2020). Across the world, governments implemented lockdown measures to limit the spread of the virus including large-scale physical distancing as well as limitations on movement and commercial activity (WHO, 2020). However, the limitations of commercial activity had negative impacts on individuals, especially within marginalized communities, as economic disruptions led to unemployment and increased difficulty in accessing food, fuel, transportation, and health care services (Kantamneni, 2020). For instance, in India, lockdowns restricted the availability of public transportation but also created an increase in the need to transport migrant workers back to their hometowns (Kim, 2021). In Sweden, risk and/or fear of getting sick decreased public transportation ridership by 40-60% (Kim, 2021). For food, the global supply chain faced labor availability issues and panic buying which resulted in lowered production of food and reduced availability of goods in markets across the world (Aday & Aday, 2020). Lastly, in Nigeria, as part of a health survey study, over 35% of respondents managing chronic illnesses noted that they had difficulties accessing essential medications during the COVID-19 pandemic-related lockdowns (Awucha et al., 2020).

Access and availability of fuel and household energy have been also become increasing concerns during the COVID-19 pandemic in lower- and middle-income countries (LMICs). Due to lockdown measures, access to clean cooking fuel, such as LPG, has been hindered in areas such as rural and remote India (Ravindra et al., 2021). Lack of access to clean cooking fuels has led to higher rates of dietary changes and cooking practices which include increased uses of solid biomass fuel, decreased consumption of more expensive food groups (meat/fish, milk, etc..) and decreased cooking in general in both rural Kenya and urban China (Shulper et al., 2021; Du et al., 2021).

1.2.2. Food Insecurity

Food security, as defined by the United Nations, refers to the physical availability of food, economic and physical access to food, food utilization, and the stability of the three mentioned attributes over time (FAO, 2008). When one or more of the attributes of food insecurity is hindered, households are subject to various degrees of food insecurity. Food insecurity is one of the largest issues prevalent at the global scale. In fact, the United Nation's Sustainable Development Goal (SDG) 2 focuses on food insecurity across the world by committing to "*End hunger, achieve food security and improved nutrition and promote sustainable agriculture"* by 2030 (UN, 2022). Currently, the number of people who are undernourished has been increasing since 2015, with over 680 million people suffering from hunger (UN, 2022). Over 135 million people are suffering from acute hunger, primarily due to man-made conflicts, climate change and economic troubles, but figures have been predicted to double due to the COVID-19 pandemic (UN, 2022).

During the COVID-19 pandemic, food insecurity has occurred in LMICs including Bangeldesh, India, Kenya, Jordan, and Mexico at rates between 30-90% of the surveyed populations (Elsahoryi et al., 2020; Gaitan-Rossi et al, 2021; Hamadani et al., 2020; Jaacks et al., 2021; Shupler et al., 2021). Several key social and economic factors have been linked to food insecurity including gender, age, households with children, education, marital status, house ownership, and poverty (Elsahoryi et al., 2020; Gaitan-Rossi et al, 2021; Grimaccia & Naccarato, 2019). Changes to food insecurity due to the factors include:

- Gender – In both higher and lower income countries (United States and Ethiopia), women are more likely to experience food insecurity than men when controlling for household food insecurity and income (Grimaccia & Naccarato, 2019).
- Age – In Jordan and India, adolescent to young adults (18-30 years old) face higher odds of being food insecure compared to other ages (Elsahoryi et al., 2020; Grimaccia & Naccarato, 2019).
- Households with children – Food insecurity is more prevalent in households with children, and with a higher number of children, as families are required to feed more people under stricter food budgets (Gaitan-Rossi et al, 2021; Grimaccia & Naccarato, 2019).

- Education – The degree of education serves as a proxy for both social status and employment which can affect food insecurity levels. As education levels increase, food insecurity decreases due to access to better and more stable jobs and social/economic standing (Grimaccia & Naccarato, 2019).
- Marital status – Among married individuals, food insecurity was lower than those who were divorced, widowed, or separated (Grimaccia & Naccarato, 2019).
- House ownership and poverty – Households who rent, compared to those who owned, and/or face extreme poverty (income lower than $1.25 a day) face higher odds of food insecurity (Elsahoryi et al., 2020; Grimaccia & Naccarato, 2019)

One of the most common methods to measure food insecurity is with the Food and Agriculture Organization's (FAO) Food Insecurity Experience Scale (FIES) survey, used in over 140 countries and 90% of the world's population covered by the Gallup World Poll, which consists of an 8-question module that covers food-related behaviors and experiences (FAO, 2018). The FIES serves as a metric of food insecurity severity through binary yes/no responses to each of the 8 questions (FAO, 2018). When the 8 responses are combined into one score, the FIES provides a quantitative variable that measures the prevalence of food insecurity by combining the quantity and quality of food with behavioral aspects such as uncertainty and anxiety over food security (FAO, 2018). A modified version of the FIES scale, used in this study, is provided in Appendix A.

1.2.3. Guatemala Context

Prior to the COVID-19 pandemic, Guatemala was one of the most food insecure and poverty-stricken countries in the world. Although Guatemala is considered an upper middle-income country, with a GDP per capita of $4,603 USD in 2020, approximately 45.6% of the country lived in poverty prior to the pandemic (World Bank, 2021). For children under 5, 49% of the population faced levels of chronic undernourishment with disparities present in the indigenous population (58% undernourished compared to 31% in the non-indigenous populations (McGill, 2017).

On March 12, 2020, following the WHO's declaration, Guatemala began national lockdown protocols including hourly limitations on markets and supermarkets, border restrictions, and complete suspension of public transportation and schooling (CEPALSTAT, 2020). As lockdown procedures were put into place, travel and access to goods slowed as all sectors saw between 20-80% reductions in mobility (Diaz-Bonilla et al., 2021). Subsequently, households in Guatemala reported reduced food availability and higher prices in local markets which, in combination with reduced household incomes and remittances, led to reduced food diversity and increased food insecurity (Ceballos et al., 2021). Approximately 80% of all respondents to an income survey, conducted in the San Marcos, Huehuetenango, and Quiche, noted some level of decrease in income since the start of the COVID-19 pandemic (Ceballos et al., 2021). Similarly, households saw an increase in food insecurity as 91% of Guatemalan households reported at least mild food insecurity, 87% reported at least moderate food insecurity, and 20% reported severe food insecurity (Ceballos et al., 2021). Additionally, food diversity changed among Guatemalan households as consumption of animal-sourced foods decreased while vegetable/fruit consumption saw a moderate gain during the COVID-19 pandemic (Ceballos et al., 2021). However, a net total decrease in food diversity was noted across participating households (Ceballos et al., 2021).

1.2.4. HAPIN

The HAPIN study is a randomized controlled study that provides LPG stoves and fuel distribution to 3,200 households in four LMICs (Clasen et al., 2020). At the trial site in rural Jalapa, Guatemala, beginning in 2018, 800 pregnant women, their infants and another 120 older adult women (40 to <80 years old) from the same households are enrolled as part of the study (Clasen et al., 2020). Half of the enrolled women were randomly assigned to receive an LPG cookstove and a consistent supply of free LPG fuel during the study while the other half of participants served as a control group, using customary cooking practices with wood as the primary cooking fuel (Clasen et al., 2020). The primary outcomes of the trial are birth weight, severe pneumonia incidence, and stunted growth in children as well as blood

pressure in older women (Clasen et al., 2020). Researchers hypothesize that with the LPG stove and fuel intervention, children will have "increased birth weight, reduced severe pneumonia incidence and improved growth", adults in the households with LPG stoves and fuel will have lowered blood pressure, and households with the intervention will experience lower household air pollution (HAP) exposure (Clasen et al., 2020).

2. Methods

2.1. Study site and sampling frame

As part of the HAPIN study, structured interviews with enrolled women were conducted at regular intervals in the Santa Maria Xalapan and Ladinos Pardos regions of the Jalapa municipality in Guatemala. Interviews were completed between July 2018 to May 2021. The standard HAPIN procedures involved conducting household visits at eight timepoints: baseline, 24-28 weeks gestation, 32-36 weeks gestation, within 24 hours of the infant's birth, and when the infant was three, six, nine, and twelve months of age. In addition, a supplementary COVID survey was created and conducted between July to November 2020, while there were lockdowns and travel restrictions across the country, with 453 of the 800 households (CEPALSTAT, 2020). The supplementary COVID survey was added onto the normally scheduled data collection activities during the timepoints mentioned earlier. During the COVID-19 survey period, large-scale awareness campaigns via television, radio, and newspapers were launched by the Presidential Secretariat for Social Communication office to promote COVID-19 awareness and preventive actions among the population such social distancing, mask wearing, handwashing and minimizing movement outside of homes (CEPALSTAT, 2020). The HAPIN study conducted surveys among enrolled households to understand household-level impacts, during the COVID-19 pandemic-releated lockdowns, on the frequency of cooking practices, financial problems, and participant knowledge of COVID-19 and associated risks. For this analysis, exposure to the COVID-19 pandemic-related lockdowns was modeled in two ways, with two or three timepoints between Nov 11, 2018 – November 12, 2020:

- Two Timepoints:
    - Prior to COVID-19 Lockdowns (July 23, 2018 – March 12, 2020): Period from baseline data to the start of national lockdowns in Guatemala (CDC, 2022).
    - COVID-19 Lockdowns (March 13, 2020 - November 12, 2020): Period from first day of national lockdowns in Guatemala to last available COVID-19 survey response from the HAPIN study.
- Three Timepoints:
    - Baseline Data (July 23, 2018 – October 10, 2019): Baseline data collected for the HAPIN study.
    - Prior to COVID-19 Lockdowns (December 31, 2019 – March 12, 2020): Period from when the WHO recognized cases of pneumonia of unknown origin (later to be determined as COVID-19) to the start of national lockdowns in Guatemala (CDC, 2022).
    - COVID-19 Lockdowns (March 13, 2020 - November 12, 2020): Period from first day of national lockdowns in Guatemala to last available COVID-19 survey response from the HAPIN study.

For the descriptive analysis and FIES modeling, exposure to COVID-19 pandemic-related lockdowns was defined with the two timepoints. However, for a sensitivity analysis, FIES modeling was also done with three timepoints to see if the immediate timeframe prior to COVID-19 lockdowns had an unseen effect. A timeline of the COVID-19 pandemic-related lockdowns overlaid with the HAPIN study can be seen in Figure 1 and Figure 2.

2.2. Interview and survey tools

Structured survey modules, utilizing a mix of multiple choice and close-ended questions, were used by enumerators to facilitate the interviews. Baseline and demographic data, such as age, education, and occupation, was collected when participants joined the HAPIN study through a series of survey modules administered by the HAPIN team.

For the COVID-19 supplementary survey, respondents were asked a series of questions from the Innovations for Poverty Action (IPA) Research for Effective COVID-19 Responses (RECOVR) survey about potential sources of financial support they received during the lockdown period (IPA, 2021).

Support was defined as any "food, fuel, cash or other support" that the respondents usually do **not** receive, from either government sources of third-party organizations (such as religious organizations, relatives, politicians/government officials, celebrities, and NGOs). Additionally, respondents were asked about difficulties they experienced during the lockdown period in obtaining goods such as food, fuel, medications, and vaccines. Respondents were also asked about COVID-19 mitigation behaviors such as handwashing and water problems within the previous seven (7) days, difficulties in accessing transportation, visiting health care facilities, and changes in caregiving responsibilities. Respondents were also surveyed on if their cooking practices increased, decreased, or stayed the same during the lockdown. Respondents were asked about financial difficulties which include depleting savings, selling assets, borrowing money, and taking on loans. Except for questions on cooking practices, all questions came directly from and/or were adapted from the IPA RECOVR survey. The full COVID-19 supplementary survey module can be seen in Appendix A.

For the FIES score, households were asked a modified version of the FAO's FIES survey module during the various timepoints of the HAPIN study. Instead of factoring in food insecurity considerations within the last 12 months, the modified FIES survey asked participating respondents about concerns within the last 3 months. Respondents were asked to answer yes/no to each of the 8 components of the survey to create a score out of 8, with 0 being food secure and 8 being the most severe level of food insecurity. The modified FIES survey, seen in Appendix A, included the following concerns due to a lack of money or other resources:

- Worried about not having enough food to eat
- Were unable to eat healthy and nutritious foods
- Only ate a few kinds of foods
- Had to skip a meal
- Ate less than they thought they should have
- Ran out of food

- Were hungry but did not eat
- Went without eating for a full day

2.3. Data collection

Interviews were held primarily over the phone during the lockdown period, but some interviews were held in-person when participants were able to travel to a health center to conduct the survey. Enumerators were provided with step-by-step instructions on how to conduct the survey and collected data via password-protected tablets (Clasen et al., 2020). For the COVID-19 supplementary survey, one pneumonia surveillance nurse, at a 24/7-hour health center, administered the surveys as part of her regular HAPIN data collection responsibilities. She was provided a list of all participating households in the HAPIN study and would call households that were within the window of surveying for the main HAPIN study data collection timepoints. Data was then uploaded daily to a secure, Emory-hosted, REDCap™ (research electronic data capture) server which is Health Insurance Portability and Accountability Act (HIPAA) and Federal Information Security Management Act (FISMA) compliant.

2.4. Data analysis

Data analysis is categorized into two sections to understand the impact of the COVID-19 pandemic-related lockdowns on HAPIN participants: primary analysis focused on food insecurity, frequency of cooking habits and food/fuel access using descriptive analysis and regression modeling, while secondary analysis focused on economic and lifestyle changes using descriptive analysis. A combination of StataSE 17.0 (StataCorp LLC, College Station, Texas, USA) and RStudio 4.1.2 (RStudio, Boston, Massachusetts, USA) was used for all analysis of the structured survey questions, with StataSE 17.0 being used for descriptive analyses and RStudio being used for linear regression modeling.

Several steps and criteria were used during the data analysis process to match the FIES scores, taken as part of the main HAPIN surveys, with the supplementary COVID-19 survey responses. Matched FIES scores with the COVID-19 survey would serve as the FIES score during the COVID-19 pandemic-

related lockdowns. The following steps were used to match FIES scores with the corresponding COVID-19 survey data.

- Only households who responded to the COVID-19 survey were included in the analysis. All other households, even if they had FIES score data, were excluded from data analysis.
- FIES scores from the main HAPIN survey timepoints, listed in Section 2.1., were matched to their corresponding COVID-19 survey by unique household.
    - FIES scores were included for analysis if their survey data was within 90 days of the COVID-19 survey date to ensure that the FIES responses were temporally relevant to the COVID-19 pandemic-related lockdowns.
    - If there multiple FIES scores within 90 days of the COVID-19 survey, the FIES score closest to the COVID-19 survey date was included for analysis. The FIES score was excluded from analysis for redundancy purposes.
    - FIES scores that were taken after the last COVID-19 survey on Nov 11, 2020, were excluded from analysis as their COVID-19 situation was not surveyed at the time of the FIES survey.

The complete COVID-19 survey and the survey questions from the FIES can be seen as part of Appendix A.

2.4.1. Primary Analysis

A mixed-effects linear model was used to examine the association between FIES score and household exposure to the COVID pandemic-related lockdowns. Exposure to the COVID-19 pandemic-related lockdowns, via the definition provided in Section 2.1., was used as the independent predictor variable for the modeling. Bivariate regression analysis was used to assess associations between FIES scores and potential covariates. Based on previous literature, covariates analyzed for the model included demographic characteristics such as age, smoking, education, occupation, wealth (an index of tv, radio, phone, bike, and bank account ownership), and household size. Based on directed acyclic graphs (DAGs),

additional covariables related to COVID-19 such as perceived risks of contracting COVID-19 and relocation due to COVID-19; and covariables such as market trips per week and economic support and/or difficulties were also included in the model analysis. Additionally, the season of data collection for FIES scores was included as a variable in the analysis, as seasonal food insecurity has been observed in similarly agricultural countries such as Bangladesh (Ahamad et al., 2012). Seasons were defined as wet (May-October) and dry (Nov-April) for each year of the HAPIN study. Covariates that were significantly associated with FIES score at the $P<0.05$ level were included in the mixed-effects linear model. The model was examined at three levels: the whole cohort, only the intervention group, and only the control group to examine the differences due to the COVID-19 pandemic-related lockdowns between groups.

Additionally, FIES scores were used to examine the differences in food insecurity score between the intervention and control group, during the COVID-19 pandemic-related timepoints defined in Section 2.1. Data from the COVID-19 survey was also used to assess the percentage of households, in both the intervention and control group, who experienced changes in frequency of cooking practices and difficulties in food/fuel access due to the exposure of the COVID-19 pandemic-related lockdowns. Because many variables had low frequencies results (<5), Fischer's Exact Tests were used to determine statistical significance between the differences between the control and intervention groups.

2.4.2. Secondary Analysis

Data from the COVID-19 survey was used to analyze the differences in economic and lifestyle practices between the control and intervention group. For both groups, financial assistance opportunities during COVID, from government and/or third-party sources, and difficulties in transportation, health care, caregiving and financial were analyzed to examine the differences in percentage of the households who experienced changes. Because many variables had low frequencies results (<5), Fischer's Exact Tests were used to determine statistical significance between the control and intervention groups.

2.5. Ethics

Informed consent was verbally obtained from all participants before interviews began. Additionally, as the project is part of the larger HAPIN study, the COVID-19 sub-study has ethics approval from both the Emory University IRB (00089799), Universidad del Valle de Guatemala (146-08-2016/11-2016) and Guatemalan Ministry of Health National Ethics Committee (11-2016).

3. Results

3.1. Descriptive Analysis

3.1.1. Characteristics of study participants

Of the 800 enrolled HAPIN participants, 453 households participated in the COVID-19 survey. As shown in the flow diagram in Figure 3, at the start of the COVID-19 data collection period in July 2020, 296 households had either graduated or withdrawn from the main HAPIN trial, leaving 504 households available for contact. HAPIN enumerators attempted to contact all 504 of the remaining households. However, due to various logistical difficulties, the enumerators were only able to get in contact with 453 households who chose to respond to the COVID-19 survey. The surveyed participants were fairly balanced between the intervention (N=216) and control (N=237) groups. Of the 453 participants, 442 participants were interviewed over the phone while 11 were in-person (8 in the intervention group and 3 in the control). As the HAPIN study is a randomized controlled trial (RCT), the participating households were randomized at baseline providing groups with similar demographic data to reduce the risk of confounding factors in the COVID-19 responses. Characteristics of study participants can be seen further in Table 1 and Figure 3.

3.1.2. Primary Objective

3.1.2.1. FIES Score

Linear mixed-effects modeling was used to analyze the relationship between the exposure to COVID-19 pandemic-related lockdowns and FIES score. For the unadjusted model, exposure to the

COVID-19 pandemic-related lockdowns resulted in a small but not statistically significant increase in FIES score (β=0.0291, *P*=0.505). The full results of the unadjusted model can be found in Table 2.

Potential covariates were analyzed for bivariate correlations with FIES scores. Father's education level (*P*=0.027), household wealth (*P*=0.021), food difficulties (*P*=0.033) and transportation difficulties (*P*=0.035) during the lockdown, and seasonality (*P*=0.006) were all found to have statistically significant associations with FIES score. Because the questions used for food access difficulties and food insecurity were similarly worded, food access difficulties during lockdown were excluded due to redundancy. The selected covariates were analyzed against each other and were found to have no strong inter-correlation. The bivariate analysis can be seen in Tables 3 and 4. Father's education, household wealth, transportation difficulties during the lockdown, and seasonality, were included as covariates in the subsequent regression model to examine the association between FIES score and exposure to COVID-19 pandemic-related lockdowns. After adjusting the model with the selected covariates, the relationship between exposure to COVID-19 lockdowns and FIES score remained similar (β=0.03942, *P*=0.367).

The adjusted model was modeled separately for the intervention and control groups to investigate the differences by group. There were little differences in change in FIES score between the intervention and control group. Exposure to COVID-19 pandemic-related lockdowns resulted in a small but not statistically significant increase in FIES score in both the intervention group (β=0.03782, *P*=0.541) and the control group (β=0.04639, *P*=0.452). Full results of the adjusted models can be seen in Table 2.

Additionally, FIES scores remained similar during the exposure periods to the COVID-19 pandemic-related lockdowns between the intervention and control group. The intervention group's FIES score prior to COVID, right at lockdowns, and during lockdowns were 0.90, 0.91 and 0.51 compared to 0.94, 1.00, and 0.49 for the control group. At all points, there were no statistically significant differences between the two groups (*P*=0.869, 0.747, and 0.747, respectively). Full results for the FIES scores can be seen in Table 5.

3.1.2.2. Sensitivity Analysis

Unadjusted and adjusted models were also created to examine different exposure levels to COVID lockdowns. For the additional sensitivity analysis, COVID-19 pandemic-related lockdown exposure was defined with three timepoints seen in Section 3.1. and Figure 2.

For the unadjusted model, compared to baseline timepoints, there was a decrease of FIES score right before and during lockdown (β=-0.3222 and -0.0326, respectively). However, only FIES score was statistically significant for the time right before COVID-19 pandemic-related lockdowns (*P*=2.04E-06).

For the adjusted models, the entire cohort, only the intervention group, and only the control group saw statistically significant decreases in FIES score right before lockdown (β=-0.27493, -0.29784, and -0,2598; *P*=2.06E-04, 0.006, and 0.010). Additionally, all three groups saw a non-statistically significant decrease in FIES during lockdown. The entire cohort and the control group saw a statistically significant increase in FIES score from secondary school incompletion (β=0.30871 and 0.4927; *P*=0.005 and 0.002) while the intervention group did not have a significant association based on father education level. For household wealth, the entire cohort and intervention group saw a statistically significant drop in FIES (β=-0.12803 and -0.16616; *P*=0.001 and 0.002) while the control group did not. For transportation difficulties, the entire cohort and the control group saw a statistically significant increase in FIES score (β=0.31209 and 0.4042; *P*=3.89E-05 and 9.74E-05) while the intervention group saw significance at a *P*-value of 0.10. For seasonality, only the intervention group saw a statistically significant increase in FIES score during the wet season (β=0.13229, *P*=0.04078). Full results of the sensitivity analysis can be seen in Table 6.

3.1.2.3. Frequency of Cooking Practices

Among interviewed households, changes in the frequency of cooking practices during the COVID-19 pandemic-related lockdowns remained similar with no statistically significant difference between intervention and control groups (*P*=0.624). In both groups, most of the respondents noted that

their frequency of cooking practices had stayed the same during the pandemic as compared to before. Cooking practices can be seen further in Table 7.

3.1.2.4. Food and fuel

The percentage of respondents from each group who experienced difficulties ranges widely from approximately 10% to 50% of respondents depending on the surveyed topic. Difficulties in accessing food were reported by 43.5% (*N*=94) of the intervention group and 56.2% (*N*=132) of the control group. Difficulties in accessing fuel were reported by 0.9% (*N*=2) of the intervention group and 51.9% (*N*=123) of the control group. These differences were statistically significant between the groups for both food (*P*=0.008) and fuel (*P*<0.001). Food and fuel access difficulties can be seen further in Table 7.

3.1.3. Secondary Objectives

3.1.3.1. COVID Assistance and Aid

Among interviewed households, there was no statistically significant difference (*P*=0.572) between the two groups on who they received additional support from during lockdown periods. Overall, the amount of support received was similar between the two groups. 52.8% of respondents in intervention group noted at least one form of support compared to 48.1% from the control group. For both groups, most of the support came from government sources. COVID assistance can be seen further in Table 7.

3.1.3.2. Transportation, health care, caregiving, and financial security

Difficulties in accessing transportation were reported by 25.6% (*N*=55) of the intervention group and 35.4% (*N*=84) of the control group. The percentage of households reporting that they experienced no difficulties was 22.6% (*N*=48) in the intervention group and 8.1% (*N*=19) in the control group. These differences were statistically significant for both transportation (*P*=0.025) and no difficulties (*P*<0.001).

Reported difficulties in accessing health care visits (P=0.490), medications/vaccines (P=1.000), caregiving responsibilities/sources (P=1.000) and finances (P=0.452) were not statistically significantly different between the two groups. The difficulties are summarized in Table 7.

3.1.3.3. No Economic Changes

Information from financial assistance and difficulties listed above was used to determine the percent of respondents who did not have any perceived economic changes during the lockdown period. Respondents who did not receive any support from external organizations **nor** experience any of the listed difficulties during the lockdown period were considered households who did not have any economic changes. Among interviewed households, 19.3% (N=41) of the intervention group experienced no economic changes compared to the 7.2% (N=17) of the control group. This difference was statistically significant (P<0.001) between the groups. COVID economic responses can be seen further in Table 7.

3.1.3.4. Water, Sanitation and Hygiene

For both handwashing (P=0.648) and water problems (P=0.714), there were not a statistically significant difference between groups in terms of hygiene practices. WASH practices can be seen further in Table 7.

4. Discussion

4.1. Summary

The primary objective of this study was to understand the effect of the HAPIN intervention on frequency of cooking practices and food/fuel access difficulties, as well as the effect of the COVID-19 pandemic-related lockdowns on food insecurity, in our study population in rural Jalapa, Guatemala. The COVID-19 pandemic-related lockdowns did not have an impact on the food insecurity or the frequency of the cooking habits of the HAPIN study participants. FIES score for both groups decreased during the pandemic and lockdown compared to prior by approximately 0.5 (from ~1.0 to ~0.5) during the

descriptive analysis. However, when modeled separately for the intervention and control groups, exposure to the COVID-19 pandemic-related lockdowns resulted in a small but not statistically significant increase on the FIES score of the HAPIN participants. Additionally, there was no significant difference in FIES score, between intervention and control groups, regarding the change of FIES score from before the COVID-19 pandemic-related lockdowns and during. For the COVID-19 survey participants, cooking habits did not change much as over 80% of participants in both groups noted similar frequencies of cooking practices during the lockdown compared to before. However, for both food and fuel, a significantly larger percentage of participants in the intervention group (who received LPG fuel) noted that they had fewer difficulties than in the control group (who did not receive free fuel). Additionally, the intervention group experienced a statistically significantly smaller percentage of participants who experienced **any** level of difficulties compared to the control group.

Secondary objectives of this research were to understand the effect that the pandemic had on the lifestyle practices and economic changes of the participants. There was not a statistically significant difference between the two groups for WASH behaviors or difficulties in accessing medications and/or vaccines, health care services, caretaking, or finances. However, the intervention group had statistically significantly fewer difficulties in accessing transportation as well as remaining economically stable compared to pre-pandemic conditions.

4.2. Difficulties and behaviors

The lack of change in frequency of cooking habits among HAPIN study participants contrasts with at least one other study that noted reduced cooking during the COVID-19 pandemic to compensate for changes in income and diet (Shupler et al., 2021). As the two groups differed in cooking fuel, the results suggest that fuel type did not have a large impact on the frequency of cooking during COVID-19. However, the intervention group reported significantly fewer difficulties in obtaining fuel than the control group like other studies with distribution of LPG fuel during the COVID-19 pandemic suggesting that the intervention was able to relieve some financial burden on participants (Shupler et al., 2021).

Although cooking habits do not appear to have been affected by the differences in fuel availability, other variables could have been impacted by the financial relief of free fuel. Savings associated with the fuel supply of LPG fuel could have been used for alternative uses such as buying food or transportation needs which have been noted in studies on LPG pay-as-you-go system showing increased savings from fuels leading to higher frequencies of purchasing food or transportation means (Shupler et al., 2021). Similar effects could have been seen among the HAPIN study as the intervention group reported significantly fewer difficulties in obtaining food than the control group. The intervention group among the HAPIN study could potentially have had more savings for food staples due to savings from not purchasing LPG fuel during the COVID-19 pandemic-related lockdowns.

Although the intervention group had fewer difficulties in accessing food compared to the control group, food insecurity scores were not significantly different between HAPIN participants. Food access differences not translating into food insecurity for both groups could potentially be resultant from the surveys' wording. For instance, for food access difficulties, participants were considered as having difficulties if they were not able to access foods that they normally purchased prior to the COVID-19 pandemic. As a result, even if participants could purchase enough food to be considered food secure, per the FAO's survey questions, they could be considered as having difficulties in access if they buy a different staple food product. Further research and analysis into the specific questions regarding food access difficulties will need to be undergone to investigate the discrepancies between the groups regarding food access and food insecurity.

Lastly, hygienic practices improved in the participant population, with no difference between groups, as about 70% of the entire cohort noted increased hand washing frequency reflecting worldwide trends in hygiene product and practices (Choi et al., 2021).

4.3. Economic assistance

Assistance from outside parties for the HAPIN participants came primarily through the government. During the COVID-19 pandemic, the National Guatemalan Government was able to

implement several safety net initiatives to provide aid towards the population including emergency cash transfers, food/medicine vouchers, school lunches, and electrical subsidies that prioritized low-income and vulnerable populations (Diaz-Bonilla et al., 2021). The World Bank estimated that 85% of the adult population of Guatemala was able to receive some form of a safety net through the government which differs from the results of the study by approximately 35% (Diaz-Bonilla et al., 2021). Differences between the World Bank's data and the HAPIN study results could have been a result of lack of knowledge by the participants about government support, lower support than anticipated by participants, or the HAPIN participants not being able to meet government thresholds for aid. However, the COVID-19 surveys were not equipped to gauge participant understandings of how government aid worked or what they expected leaving a potential limiting factor in survey design.

4.4. Food insecurity factors

After adjusting for covariates, exposure to the COVID-19 pandemic-related lockdowns had no statistically significant effect on the FIES score for the whole HAPIN cohort which differs from other studies that showed an increase in food insecurity in Bangladesh and India (Hamandani et al., 2020; Jaacks et al., 2021). A potential factor that could have impacted the differences between the HAPIN participants and studies in Bangladesh and India are the amount of government and third-party support available to participants in each country. For both intervention and control groups of the HAPIN participants, approximately 50% of the surveyed noted support from the government and/or third-party organizations. However, in Bangladesh, only 11.5% of participants received governmental support while 19.5% received support from other parties (Hamandani et al., 2020). In India, approximately one-third of participants received a lockdown-specific form of aid from the government (Jaacks et al., 2021). Higher levels of external support for HAPIN participants in Guatemala could potentially result in increased income and food staples which would provide a larger buffer from negative impacts associated with the COVID-19 pandemic-related lockdowns.

No significant difference in FIES score, between the two groups, to the different exposures of the COVID-19 pandemic-related lockdowns suggest that the primary intervention of supplying free LPG fuel did not have a direct impact on food insecurity levels during the pandemic. However, models in the study note some covariates which might have a greater impact on their susceptibility to food insecurity.

Father's education levels had varying effects on the FIES score for the entire cohort as well as both groups. There is no observable trend for the HAPIN participants showing an increase in education level with a decrease in FIES score, shown in other literature, suggesting that other factors might also have an influence on education and FIES scores (Grimaccia & Naccarato, 2019). Wealth showed a statistically significant linear relationship with FIES where an increase in wealth resulted in a decrease in FIES. As a proxy for household income, the relationship between wealth and FIES demonstrate that higher income households can be more resilient during times of need by absorbing negative economic shocks and having a buffer from potential negative consequences such as food insecurity (Tarasuk et al., 2019). Difficulties in accessing means and methods of transportations showed a statistically significant increase in FIES score for HAPIN participants in both groups as well as the entire cohort. The increase in FIES score suggests that transportation plays a large role in the community to physically access foods and/or feel confident in their ability to get food. Additionally, in rural areas, access to food is one of the largest drivers towards hunger as the distance to markets is large and forces families to rely on less reliable sources of food like home gardens (Shim et al., 2018). For both groups of the study, as well as the entire cohort, FIES scores increased during the wet season compared to the dry season, with statistically significant data. However, the data contrasts with other studies that noticed increased food security during the dry season (M'Kaibi et al., 2015; Small & Raizada, 2017). Further research will be necessary to investigate the differences between the HAPIN study and other studies around the world, but factors could include large rainstorms affecting crop growth or access to markets (Bonuedi et al., 2021). If the HAPIN participants rely on market access more than rain-fed agriculture, then food insecurity could be more common during the wet season than dry (Bonuedi et al., 2021).

4.5. Limitations

One of limitations of the study is from the availability of the study's participants. Out of the 800 participants of the larger HAPIN study, only 453, or 56.6%, of the participants were able to fill out the supplementary COVID-19 survey. By the start of the COVID-19 data collection period, 296 of the participants were no longer enrolled in the study. Out of the remaining 504 households, approximately 90% of the participants answered the COVID-19 survey. Many factors may have driven the lack of response from the remaining participants including difficulty in reaching participants, lack of cellular phones, or poor cellular signal when the enumerators were conducting surveys. However, as the surveys were conducted between July to November 2020, there was an extended timeline to reach households to participate in the additional COVID-19 survey. Because most COVID-19 surveys were answered over the phone, the results are biased towards respondents who have cellular devices, which can serve as a proxy for income and can skew the study towards answers favorable towards wealthier study participants. As a result, the COVID-19 participants might not be representative of the larger HAPIN study participants.

Another limitation of the study comes from the method in which difficulties in accessing resources were quantified for the study. For each resource surveyed, the COVID-19 survey provided multiple options for the reason of difficulty in access including the type, amount, and cost related to the resource. For this study, all "Yes" options were combined to create a binary variable for each variable. As a result, the study is not able to differentiate specific reasons as to why participants had difficulties with each resource which could mask significant differences in difficulty access between the two groups.

5. Conclusion

This paper adds insight into the impact of RCTs under the context of crises such as the COVID-19 pandemic. Although the COVID-19 pandemic-related lockdowns did not impact the frequency of cooking practices or food insecurity of the HAPIN participants differently, the intervention group did experience some benefits during the pandemic-related lockdowns. compared to the control group. Namely, households in the intervention group had fewer difficulties in obtaining food, means of

transportation, and general difficulties during the pandemic, suggesting that receiving free fuel was able to relieve some financial and social burdens. The results show that the HAPIN intervention had a protective effect beyond simply ensuring access to cooking fuel. The results also suggest that any form of aid, during times of crises, can have additional indirect benefits for recipients but further research will need to explore reasonings and potential effects on policymaking.

Additionally, this paper adds further insight into the determinants of food insecurity worldwide, especially with crises like the COVID-19 pandemic taken into consideration. Using the FIES scores, the study was able to examine household food insecurity during the COVID-19 pandemic-related lockdowns. Like existing literature, the study shows that wealth, transportation difficulties, and seasonality have strong impacts on FIES (Tarasuk et al., 2019; M'Kaibi et al., 2015; Small & Raizada, 2017; Shim et al., 2018). However, unlike previous studies, the results of this study show that father's education has an impact on FIES but not in a linear manner where each level of higher education reflects less food insecurity (Grimaccia & Naccarato, 2019). Discrepancies among father's education requires additional research and context prior to being used for policymaking. For instance, combined household education levels might have a larger impact than just the father's education. Further research of the determinants of food insecurity, under the context of a pandemic, should be undergone with emphasize placed on the poor and those who do not have adequate sources of transportation for potential policy implications in the future.

6. Figures and Tables

Figure 1: Timeline of COVID-19 pandemic and HAPIN study in Guatemala: Before Lockdown vs During Lockdown

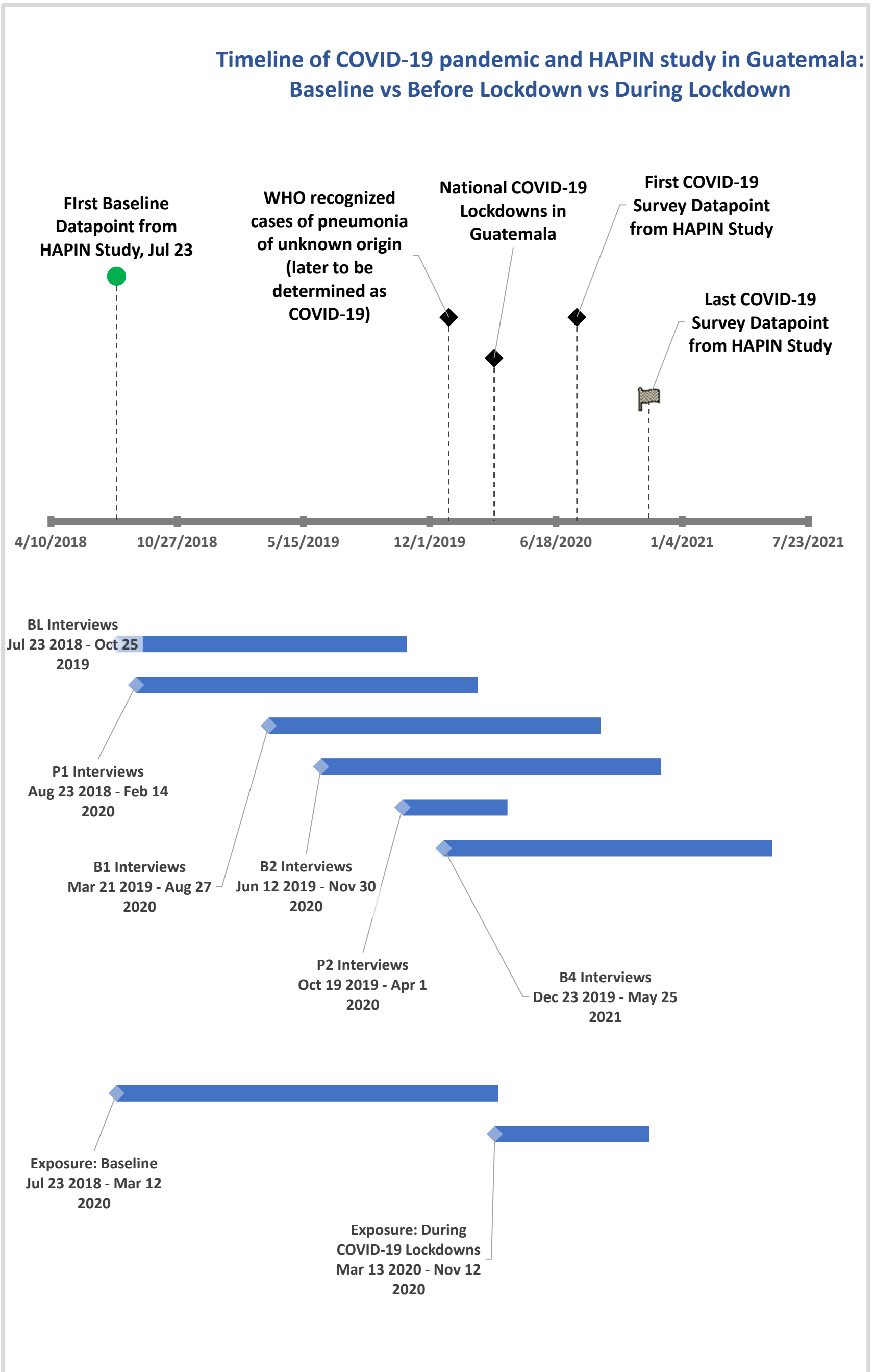

Figure 2: Timeline of COVID-19 pandemic and HAPIN study in Guatemala: Baseline vs Before Lockdown vs During Lockdown

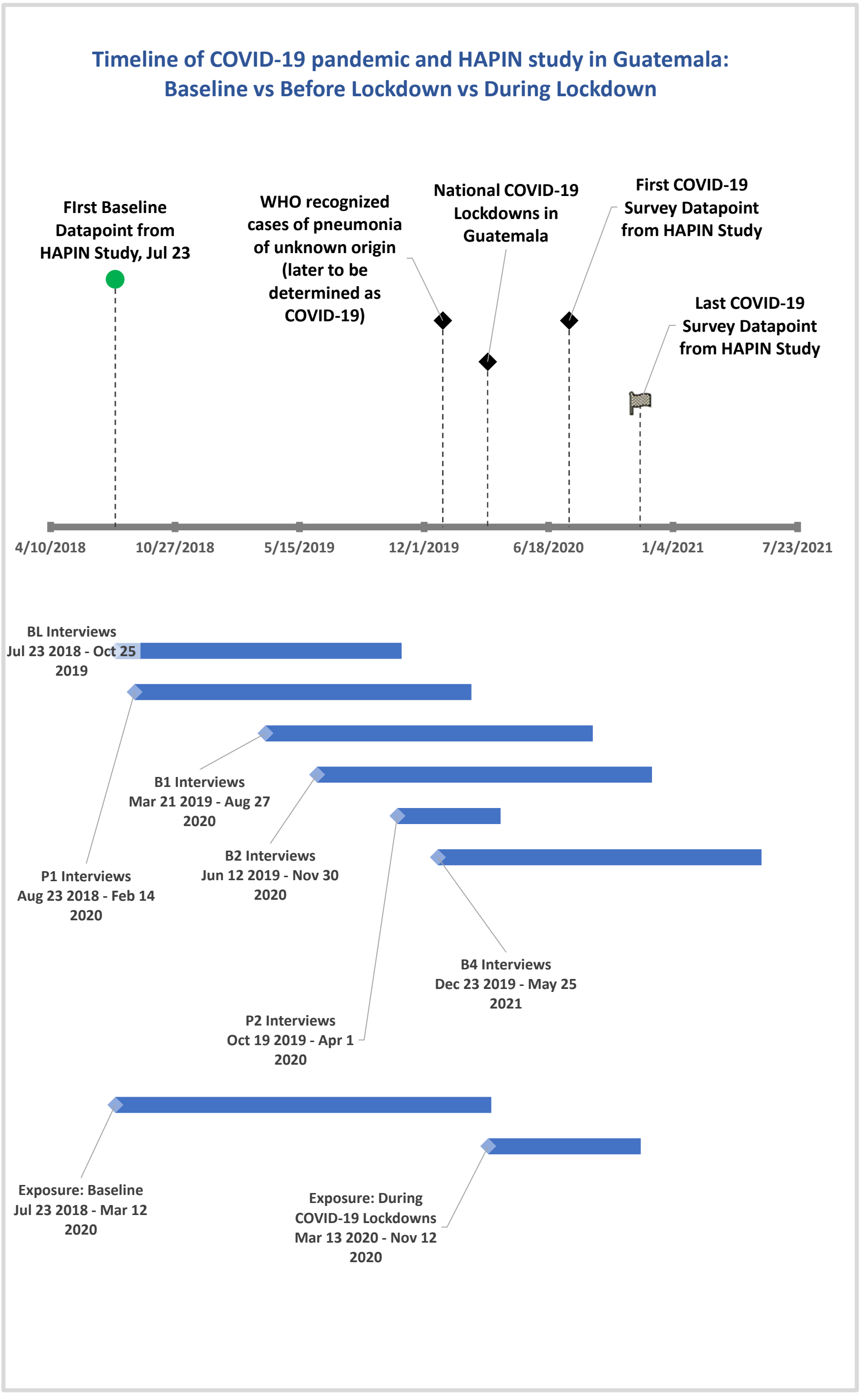

Figure 3: Flow Diagram of Guatemala HAPIN Participants

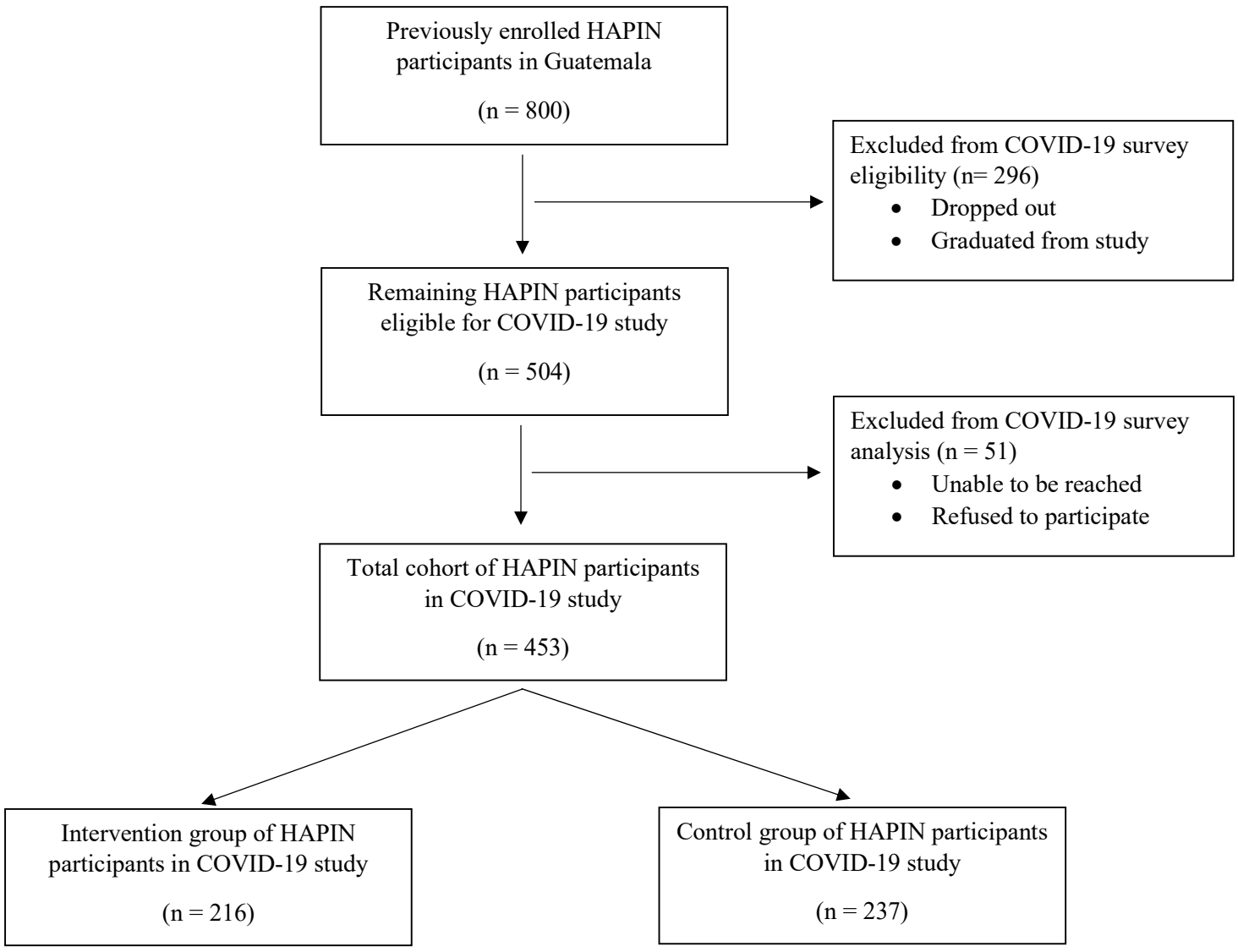

Table 1: Study Participant Characteristics at Baseline

	Guatemala HAPIN Study - Baseline N = 453			
	Intervention N = 216		Control N = 237	
	N (%)	Mean (SD)	N (%)	Mean (SD)
Age at screening (years)		24.67 (4.3)		25.12 (4.6)
Gestational age at screening (weeks)		13.98 (2.8)		13.40 (2.9)
Gestational age at intervention (weeks)		17.97 (2.91)		-
Height (cm)		148.38 (5.22)		148.46 (4.8)
Someone in the household smokes	8 (3.7)		8 (3.4)	
BMI (kg/m^2)		23.98 (3.6)		23.58 (3.0)
Hemoglobin (gm/dl)		12.75 (1.0)		12.98 (1.1)
Gravidity				
1	61 (28.2)		64 (27.0)	
2	55 (25.5)		50 (21.1)	
3+	100 (46.30)		123 (51.9)	
Number of previous live births		2.14 (1.4)		2.17 (1.4)
Mother's highest level of education completed				
No Formal/Primary School Incomplete	96 (44.4)		106 (44.7)	
Primarary School/ Secondary School Incomplete	91 (42.1)		96 (40.5)	
Secondary School/Vocational/Some College or University	29 (13.4)		35 (14.8)	
Father's highest level of education completed				
No Formal/Primary School Incomplete	70 (32.41)		78 (32.9)	
Primary School Complete	48 (22.2)		77 (32.5)	
Secondary School Incomplete	34 (15.7)		31 (13.1)	
Secondary School/Vocational	57 (26.4)		46 (19.4)	
Some College or University	1 (0.5)		0 (0.0)	
Don't Know	6 (2.8)		5 (2.1)	
Mother's Occupation				
Household	202 (94.0)		224 (94.9)	
Agriculture/Farming	4 (1.9)		0 (0.0)	
Commercial	4 (1.9)		3 (1.3)	
Other	5 (2.3)		9 (3.8)	
Father's Occupation				
Household	3 (1.5)		5 (2.3)	
Agriculture/Farming	156 (78.79)		176 (80.4)	
Commercial	18 (9.1)		27 (12.3)	
Other	21 (10.6)		11 (5.0)	
Mother lives with husband / partner	164 (76.0)		193 (81.4)	
Number of people living in household		5.41 (2.4)		5.29 (2.1)
Primary fuel type before COVID				
Wood	216 (100.0)		234 (100.0)	
Charcoal	0 (0.0)		0 (0.0)	
Animal dung	0 (0.0)		0 (0.0)	
Other	0 (0.0)		0 (0.0)	
Infant sex, female	106 (49.3)		120 (50.6)	
Wealth Index				
1	12 (5.6)		9 (3.8)	
2	97 (44.9)		108 (45.6)	
3	66 (30.6)		85 (35.9)	
4	31 (14.4)		31 (13.1)	
5	10 (4.6)		4 (1.7)	
Floor Material				
Mud/Clay/Dirt/Dung	151 (69.9)		159 (67.4)	
Concrete/Cement	52 (24.1)		63 (26.7)	
Other	13 (6.0)		14 (5.9)	
Water/Sanitation Improvements				
None	199 (93.9)		216 (93.1)	
Either	11 (5.2)		15 (6.5)	
Both	2 (0.9)		1 (0.4)	

Table 2: Mixed-Effects Model (Before Lockdown vs During)

Unadjusted - Whole Group					
Parameter	**Estimate**	**Std. Error**	**P value**	**95% CI Lower**	**Upper**
Intercept	0.4288	0.0388	**<2E-16**	0.3528	0.50482220
COVID Timepoint (Ref. Baseline)					
During Lockdown	0.0291	0.0436	0.505	-0.05636759	0.11464960
Adjusted - Whole Group					
Parameter	**Estimate**	**Std. Error**	**P value**	**95% CI Lower**	**Upper**
Intercept	0.52629	0.11989	**1.39E-05**	0.29273723	0.75961120
COVID Timepoint (Ref. Baseline)					
During	0.03942	0.04371	0.367	-0.04585340	0.12554400
Father Education (Ref. No Formal/Primary School Incomplete)					
Primary School Complete	0.11827	0.08896	0.184	-0.05494249	0.29137510
Secondary School Incomplete	0.31289	0.10959	**0.005**	0.09951701	0.52615960
Secondary School/Vocational	-0.01754	0.09467	0.853	-0.20183607	0.16670800
Some College or University	0.27098	0.72663	0.709	-1.14342371	1.68524190
Don't Know	0.01636	0.22821	0.943	-0.42785053	0.46061760
Wealth Index	-0.12757	0.03941	**0.001**	-0.20428185	-0.05084130
Transportation Difficulties (Ref. No)					
Yes	0.32156	0.07499	**2.21E-05**	0.17559309	0.46752390
Season (Ref. Dry: Nov-April)					
Wet (May-October)	0.11832	0.04135	**0.004**	0.03738079	0.19945150
Adjusted - Intervention					
Parameter	**Estimate**	**Std. Error**	**P value**	**95% CI Lower**	**Upper**
Intercept	0.66522	0.15875	**3.93E-05**	0.35816175	0.97180860
COVID Timepoint (Ref. Baseline)					
During	0.03782	0.06193	0.541	-0.08294565	0.15974160
Father Education (Ref. No Formal/Primary School Incomplete)					
Primary School Complete	-0.01505	0.13540	0.912	-0.27664110	0.24641820
Secondary School Incomplete	0.12646	0.15413	0.413	-0.17134475	0.42407780
Secondary School/Vocational	-0.03891	0.13181	0.768	-0.29349108	0.21570640
Some College or University	0.19711	0.71863	0.784	-1.19094380	1.58492730
Don't Know	0.21747	0.30400	0.475	-0.36968064	0.80459130
Wealth Index	-0.16325	0.05372	**0.003**	-0.26699544	-0.05945690
Transportation Difficulties (Ref. No)					
Yes	0.20509	0.11423	*0.074*	-0.01563152	0.42566950
Season (Ref. Dry: Nov-April)					
Wet (May-October)	0.20443	0.05921	**0.001**	0.08874506	0.32077970
Adjusted - Control					
Parameter	**Estimate**	**Std. Error**	**P value**	**95% CI Lower**	**Upper**
Intercept	0.32780	0.18244	*0.074*	-0.02616544	0.68136037
COVID Timepoint (Ref. Baseline)					
During	0.04639	0.06168	0.452	-0.07361466	0.16837697
Father Education (Ref. No Formal/Primary School Incomplete)					
Primary School Complete	0.21377	0.11889	*0.073*	-0.01679896	0.44414074
Secondary School Incomplete	0.49554	0.15652	**0.002**	0.19205636	0.79885464
Secondary School/Vocational	-0.01952	0.13819	0.888	-0.28749896	0.24825544
Some College or University					
Don't Know	-0.21956	0.34429	0.524	-0.88708363	0.44787934
Wealth Index	-0.06900	0.05899	0.243	-0.18333069	0.04537292
Transportation Difficulties (Ref. No)					
Yes	0.41552	0.10172	**6.08E-05**	0.21838252	0.61275547
Season (Ref. Dry: Nov-April)					
Wet (May-October)	0.04008	0.05777	0.488	-0.07304814	0.15334333

Bold indicates statistically significant at p<0.05 level
Italicized indicates statistically significant at p<0.10 level

Table 3: Bivariate Analysis

Variable	N	Coefficient	SE	p-value
Food Insecurity Score (FIES)				
Age at Screening (years)	447	-0.001	0.017	0.966
Household #	447	0.047	0.033	0.158
Living with Partner (Ref. No)	447			
Yes		-0.206	0.180	0.253
Stay during COVID (Ref. No)	447			
Yes		0.137	0.327	0.675
Covid Risk (Ref. No)	447			
Yes		0.186	0.164	0.256
Mother Education (Ref. No Formal/Primary School Incomplete)	447			
Primarary School/ Secondary School Incomplete		-0.024	0.160	0.882
Secondary School/Vocational/Some College or University		0.007	0.224	0.975
Mother Occupation (Ref. Household Only)	445			
Agriculture/Farming		-0.664	0.786	0.398
Commercial		0.229	0.596	0.702
Other		0.300	0.425	0.481
Trips to Market (Ref. No)	447			
Yes		-0.331	0.784	0.673
Trips to Market (#/week)	447	0.056	0.044	0.200
Father Education (Ref. No Formal/Primary School Incomplete)	447			
Primary School Complete		0.422	0.191	**0.027**
Secondary School Incomplete		0.214	0.232	0.356
Secondary School/Vocational		0.227	0.201	0.259
Some College or University		2.276	1.560	0.145
Don't Know		-0.270	0.486	0.579
Father Occupation (Ref. Household Only)	410			
Agriculture/Farming		0.406	0.481	0.399
Commercial		0.364	0.515	0.481
Other		0.262	0.533	0.623
Wealth index (Ref. 1)	888			
2		-0.137	0.255	0.592
3		-0.312	0.256	0.223
4		-0.621	0.269	**0.021**
5		-0.107	0.339	0.753
Floor Material (Ref. Mud/Clay/Dirt/Dung)	446			
Concrete/Cement		-0.017	0.172	0.923
Other		-0.002	0.314	0.994
Water/Sanitation Improvements (Ref. None)	443			
Water or Sanitation		-0.009	0.263	0.971
Both		-0.138	0.753	0.855
Econ Support (Ref. None)	447			
Gov Only		0.147	0.154	0.340
Third Party Only		0.181	0.364	0.619
Both		-0.638	0.445	0.152
Food Difficulties (Ref. No)	445			
Yes		0.315	0.147	**0.033**
Fuel Difficulties (Ref. No)	447			
Yes		0.209	0.165	0.205
Transportation Difficulties (Ref. No)	446			
Yes		0.338	0.160	**0.035**
Season (Ref. Dry: Nov-April)	2633			
Wet (May-October)		0.130	0.047	**0.006**
Someone in the Household Smokes (Ref. No)	447			
Yes		0.012	0.410	0.977

Bold indicates statistically significant at $p<0.05$ level

Table 4: Covariate Correlation

	Father Education	Wealth	Transportation Difficulties	Season
Father Education	1.0000			
Wealth	0.1786	1.0000		
Transportation Difficulties	0.0276	0.0084	1.0000	
Season	0.0021	-0.0127	-0.3294	1.0000

Table 5: FIES Scores

	Guatemala HAPIN Study - FIES Scores N = 453					
	Intervention N = 216		Control N = 237		p-value	
	N (%)	Mean (SD)	N (%)	Mean (SD)	Fisher's Exact p-value	Two Sample T-Test
Food insecurity score before COVID		0.90 (1.6)		0.94 (1.5)	-	0.869
Categorical					0.561	-
None	132 (62.0)		142 (60.7)			
Mild	65 (30.5)		67 (28.6)			
Moderate/Severe	16 (7.5)		25 (10.68)			
Food insecurity score at Lockdown		0.91 (1.6)		1.00 (1.6)	-	0.747
Categorical					**0.049**	-
None	85 (61.2)		98 (59.4)			
Mild	44 (31.7)		46 (27.9)			
Moderate/Severe	10 (7.2)		21 (12.7)			
Food insecurity score during COVID		0.51 (1.4)		0.49 (1.3)	-	0.747
Categorical					0.636	-
None	155 (79.1)		176 (82.6)			
Mild	31 (15.8)		25 (11.7)			
Moderate/Severe	10 (5.1)		12 (5.6)			
Food insecurity difference (Before - During)		0.40 (1.8)		0.48 (1.9)	-	0.662
Categorical Change		0.21 (0.8)		0.29 (09)	-	0.354
-2	6 (3.1)		6 (2.8)			
-1	15 (7.8)		18 (8.5)			
0 (No Change)	113 (58.6)		115 (54.3)			
1	50 (25.9)		55 (25.9)			
2	9 (4.7)		18 (8.5)			
Food insecurity difference (At - During)		0.38 (1.8)		0.60 (1.9)	-	0.339
Categorical Change		0.20 (0.8)		0.33 (0.9)	-	0.166
-2	4 (3.1)		5 (3.3)			
-1	9 (7.0)		9 (6.0)			
0 (No Change)	78 (60.9)		83 (55.0)			
1	32 (25.0)		39 (25.8)			
2	5 (3.9)		15 (9.9)			

Bold indicates statistically significant at $p<0.05$ level

able 6: Mixed-Effects Model (Baseline vs Before Lockdown vs During Lockdown)

Unadjusted - Whole Group					
				95% CI	
Parameter	**Estimate**	**Std. Error**	**P value**	**Lower**	**Upper**
Intercept	0.48860	0.04070	**<2E-16**	0.40884340	0.56841937
COVID Timepoint (Ref. Baseline)					
Right Before	-0.32219	0.06766	**2.04E-06**	-0.45479620	-0.18958244
During Lockdown	-0.03256	0.04530	0.472	-0.12131200	0.05626315
Adjusted - Whole Group					
				95% CI	
Parameter	**Estimate**	**Std. Error**	**P value**	**Lower**	**Upper**
Intercept	0.61641	0.12241	**6.54E-07**	0.37786009	0.85461983
COVID Timepoint (Ref. Baseline)					
Right Before	-0.27493	0.07396	**2.06E-04**	-0.41956470	-0.12976456
During Lockdown	-0.00935	0.04549	0.837	-0.09807162	0.08031271
Father Education (Ref. No Formal/Primary School Incomplete)					
Primary School Complete	0.11784	0.08905	0.186	-0.05554789	0.29113120
Secondary School Incomplete	0.30871	0.10971	**0.005**	0.09510342	0.52221736
Secondary School/Vocational	-0.01645	0.09477	0.862	-0.20094550	0.16798866
Some College or University	0.29431	0.72748	0.686	-1.12171677	1.71016725
Don't Know	0.01762	0.22846	0.939	-0.42705010	0.46233196
Wealth Index	-0.12803	0.03946	**0.001**	-0.20481545	-0.05121306
Transportation Difficulties (Ref. No)					
Yes	0.31209	0.07511	**3.89E-05**	0.16589342	0.45829328
Season (Ref. Dry: Nov-April)					
Wet (May-October)	0.05083	0.04504	0.259	-0.03724250	0.13925178
Adjusted - Intervention					
				95% CI	
Parameter	**Estimate**	**Std. Error**	**P value**	**Lower**	**Upper**
Intercept	0.76937	0.16331	**4.00E-06**	0.45325453	1.08479190
COVID Timepoint (Ref. Baseline)					
Right Before	-0.29784	0.10851	**0.006**	-0.50975598	-0.08491308
During Lockdown	-0.01465	0.06461	0.821	-0.14052712	0.11256505
Father Education (Ref. No Formal/Primary School Incomplete)					
Primary School Complete	-0.02038	0.13554	0.881	-0.28220910	0.24134832
Secondary School Incomplete	0.12139	0.15429	0.432	-0.17668677	0.41928851
Secondary School/Vocational	-0.04377	0.13195	0.740	-0.29859685	0.21108557
Some College or University	0.22236	0.71941	0.758	-1.16706256	1.61153307
Don't Know	0.21565	0.30430	0.479	-0.37202777	0.80330068
Wealth Index	-0.16616	0.05379	**0.002**	-0.27001044	-0.06225206
Transportation Difficulties (Ref. No)					
Yes	0.19752	0.11437	*0.086*	-0.02343520	0.41835875
Season (Ref. Dry: Nov-April)					
Wet (May-October)	0.13229	0.06459	**0.041**	0.00628461	0.25928670
Adjusted - Control					
				95% CI	
Parameter	**Estimate**	**Std. Error**	**P value**	**Lower**	**Upper**
Intercept	0.40520	0.18510	**0.029**	0.04605715	0.76383511
COVID Timepoint (Ref. Baseline)					
Right Before	-0.25980	0.10120	**0.010**	-0.45751085	-0.06126931
During Lockdown	-0.00003	0.06410	1.000	-0.12466561	0.12673612
Father Education (Ref. No Formal/Primary School Incomplete)					
Primary School Complete	0.21720	0.11900	*0.069*	-0.01362321	0.44779932
Secondary School Incomplete	0.49270	0.15670	**0.002**	0.18894172	0.79635805
Secondary School/Vocational	-0.01103	0.13840	0.937	-0.27935011	0.25709050
Some College or University					
Don't Know	-0.21310	0.34460	0.537	-0.88124866	0.45494534
Wealth Index	-0.06664	0.05906	0.260	-0.18110451	0.04785277
Transportation Difficulties (Ref. No)					
Yes	0.40420	0.10190	**9.74E-05**	0.20671635	0.60184510
Season (Ref. Dry: Nov-April)					
Wet (May-October)	-0.02449	0.06286	0.697	-0.14741119	0.09882330

Bold indicates statistically significant at p<0.05 level
Italicized indicates statistically significant at p<0.10 level

Table 7: COVID Responses

	Guatemala HAPIN Study - COVID Responses					
	N = 453					
	Intervention N = 216		Control N = 237		p-value	
	N (%)	Mean (SD)	N (%)	Mean (SD)	Fisher's Exact p-value	1-sided Fisher's Exact p-value
Cooking Practices during COVID compared to before					0.624	-
More Cooking	41 (18.9)		41 (17.4)			
Less Cooking	1 (0.5)		0 (0.0)			
Same Amount	174 (80.6)		195 (82.6)			
Stove Type during COVID						
Biomass	3 (1.4)		236 (99.6)			
LPG	215 (99.5)		3 (1.3)			
Other	1 (0.5)		0 (0.0)			
Dietary diversity score before COVID		3.16 (1.3)		3.13 (1.3)		
Left Household during COVID	10 (4.6)		14 (5.9)			
# of people slept in house vs. before					**0.019**	-
More	56 (25.9)		89 (37.6)			
Same	153 (70.8)		138 (58.2)			
Fewer	7 (3.2)		10 (4.2)			
Economic Changes due to COVID						
Financial Assistance					0.572	-
Government Only	100 (46.3)		95 (40.1)			
Third Party Only	8 (3.7)		12 (5.1)			
Both	6 (2.8)		7 (3.0)			
None	102 (47.2)		123 (51.9)			
Difficulties in:						
Obtaining Food	94 (43.5)		132 (56.2)		**0.008**	**0.005**
Obtaining Fuel	2 (0.9)		123 (51.9)		**0.000**	**0.000**
Transportation	55 (25.6)		84 (35.4)		**0.025**	**0.015**
Attending Health Care Visits	15 (7.0)		21 (8.9)		0.490	0.282
Obtaining Medications/Vaccines	43 (20.1)		48 (20.5)		1.000	0.503
Caretaking	85 (41.7)		95 (41.7)		1.000	0.539
Finances	107 (49.8)		109 (46.2)		0.452	0.253
None	48 (22.6)		19 (8.1)		**0.000**	**0.000**
No Changes	41 (19.3)		17 (7.2)		**0.000**	**0.000**
Past 7 days: # of times gone to market					0.727	-
0 (None)	2 (0.9)		2 (0.8)			
1	4 (1.9)		4 (1.7)			
2	16 (7.4)		17 (7.2)			
3	36 (16.7)		44 (18.6)			
4	67 (31.0)		60 (25.3)			
5	28 (13.0)		42 (17.7)			
6	20 (9.3)		16 (6.8)			
7 (All)	43 (19.9)		52 (21.9)			
Past 7 days: # Times gone to market					1.000	0.653
None	2 (0.9)		2 (0.8)			
Yes - at least once	214 (99.1)		235 (99.2)			
Past 7 days: # Times gone to market					0.839	-
0 (None)	2 (0.9)		2 (0.8)			
1-2	20 (9.3)		21 (8.9)			
3-4	103 (47.7)		104 (43.9)			
5+	91 (42.1)		110 (46.4)			
Within the past 7 days:					0.648	-
Washed Hands More Often						
More	159 (73.6)		162 (68.9)			
Less	1 (0.5)		1 (0.4)			
Same	56 (25.9)		72 (30.6)			
Water Problems	4 (1.9)		3 (1.3)		0.714	0.451
Risk of Contracting Covid						
No	154 (71.3)		170 (71.7)			
Yes	62 (28.7)		67 (28.3)			

Bold indicates statistically significant at $p<0.05$ level

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Appendix A: Interview and Survey Tools

V1- COVID19 Ancillary Questions for HAPIN study

Today's date: ___ / ___ / ___ dd /mm /yyyy **As of today, is the lockdown still in effect?** ___Yes ___No	**Who Completed the Form?** **How was the form completed?** ___Phone ___In-person

SECTION A: Respondent Information	
A1. Where [are/were] you and your family staying during the [lockdown period*]? * Change bracketed language to a term that people will understand locally	☐ 1. Original house (have not moved) → SKIP TO A2 ☐ 2. Family or friend's home outside the study area ☐ 3. Family or friend's home inside the study area ☐ 4. Seasonal residence outside the study area ☐ 5. Seasonal residence inside the study area
A1a. Did you leave because of the coronavirus pandemic?	☐ 0. No ☐ 1. Yes
A2. Including yourself, how many people slept in the house/compound where you slept last night? *Translation note: translate "house/compound" as appropriate to include members who may choose to sleep outside in warm weather.	_____
A3. How many of those people are over 60 years old?	_____
A4. How many of those people are currently pregnant?	_____
A5. How many of those people have a chronic conditions or disease such as asthma, chronic respiratory disease, diabetes, cardiovascular disease, high blood pressure, or cancer?	_____
A6. You said that ## [number from A2] people slept in the same house as you last night. Is that more, the same, or fewer than typically slept in your house before [the lockdown period]?	☐ 1. More ☐ 2. The same ☐ 3. Fewer

SECTION B: COVID-19 Impact on Daily Life and Practices **Enumerator read:** Thank you for your responses so far. Now I'm going to ask you some questions about how coronavirus has impacted your daily life.	
B1. In the past 7 days, how many days have you stayed at home all day, without going out at all and without receiving any visits? Note: Staying within your home unless you are using shared water / cooking / toilet / laundry facilities common to a compound or apartment building or working on your farm or kitchen garden. Receiving visits would include others in the compound who do not live in your home.	____ (Number of days)
B2. In the past 7 days, have you attended church, temple, or mosque, or gathered with people from outside your household to pray?	☐ 0. No ☐ 1. Yes
B3. In the past 7 days, how many days did members of your household go to a market or food store?	____ (Number of days)
B4. In the last 7 days have you worn a face mask? Enumerator note: If YES, prompt for type of mask.	☐ 0. No ☐ 1. Yes, manufactured face mask ☐ 2. Yes, homemade (cloth) mask or other nose / mouth covering
B5. In the past 7 days, have you washed your hands with soap and water more often, less often, or about the same as you did before [the lockdown period]?	☐ 1. More ☐ 2. Less ☐ 3. Same
B6. In the past 7 days, have you or anyone in your household had to go without washing hands because of problems with water?	☐ 0. No ☐ 1. Yes
B7. Do you feel that you or anyone in your household is at risk of contracting coronavirus?	☐ 0. No → B7a ☐ 1. Yes → SKIP TO B8
B7a. If NO: Why do you feel that your household is NOT at risk of contracting coronavirus? (Allow to answer spontaneously. Do NOT read answer choices.)	☐ 1. Belief in God ☐ 2. Follow preventive/protective measures ☐ 3. Does not exist where I live ☐ 4. Does not exist at all ☐ 5. We are strong and healthy ☐ 6. Hot weather ☐ 7. Because my racial or ethnic group is not affected ☐ 555. Other

B8. Which sources of information do you trust when it comes to advice about prevention of coronavirus? (Allow to answer spontaneously. Do NOT read answer choices.)	☐ 1. Newspapers ☐ 2. Radio ☐ 3. TV ☐ 4. Informational calls/SMS (not sent by family or acquaintances) ☐ 5. Employer, work colleague, or others at work (incl. employees) ☐ 6. Family/relatives ☐ 7. Friends/neighbors/acquaintances ☐ 8. NGOs ☐ 9. Social media (Facebook, Twitter, etc.) ☐ 10. Informational campaigns ☐ 11. Health center/provider ☐ 12. Local or community leaders (e.g., village leader) ☐ 13. None ☐ 555. Other (specify):
SECTION C: COVID-19 Impact on Cooking Practices **Enumerator read:** Thank you for your responses so far. Now I'm going to ask you some questions about your cooking practices.	
C1. During [the lockdown period], has your household spent more, less, or about the same amount of time cooking as before?	☐ 1. More ☐ 2. Less ☐ 3. About the same
C2. Which stoves have you used to cook during [the lockdown period]? (select all that apply)	☐ 1. Biomass stove (any type) → **C3** ☐ 2. LPG stove → **C4** ☐ 555. Other (specify)
C3. [During the lockdown period], has your household used the biomass stove more, less, or about the same amount as before?	☐ 1. More → **C3a** ☐ 2. Less → **C3b** ☐ 3. Same → **SKIP TO C3c**
C3a. For what reasons has your household used your biomass stove more? (Select all that apply. Do not read options)	☐ 1. Ran out of LPG ☐ 2. Problem with LPG stove ☐ 3. More time at home ☐ 4. More people in the house ☐ 5. Holiday celebrations ☐ 6. Easier to get biomass fuel than LPG ☐ 7. Cooking different types of food ☐ 555. Other (specify)
C3b. For what reasons has your household used your biomass stove less? (Select all that apply. Do not read options.)	☐ 1. Less food available to cook ☐ 2. Less access to biomass fuel ☐ 3. Fewer people at home ☐ 4. Cooking different types of food ☐ 5. Easier to get LPG fuel ☐ 6. LPG fuel is cheaper/provided by the government ☐ 555. Other (specify)
C3c. [During the lockdown period], has your household done all, most, or some cooking on the biomass stove?	☐ 1. All cooking ☐ 2. Most cooking ☐ 3. Some cooking

C4. [During the lockdown period], has your household used your LPG stove more, less, or about the same as before?	☐ 1. More → **C4a** ☐ 2. Less → **C4b** ☐ 3. Same → **C4c**
C4a. For what reasons has your household used your LPG stove more? (Select all that apply. Do not read options) → SKIP TO C10	☐ 1. LPG fuel is cheaper/provided by the government ☐ 2. More time at home ☐ 3. More people in the house ☐ 4. Holiday celebrations ☐ 5. Easier to get LPG than biomass fuel ☐ 6. Cooking different types of food ☐ 555. Other (specify)
C4b. For what reasons has your household used your LPG stove less? (Select all that apply. Do not read options)	☐ 1. Less access to food ☐ 2. Less access to LPG fuel ☐ 3. Easier to get biomass fuel than LPG ☐ 4. Fewer people at home ☐ 5. Cooking different types of food ☐ 555. Other (specify)
C4c. [During the lockdown period], has your household done all, most, or some cooking on the LPG stove?	☐ 1. All cooking ☐ 2. Most cooking ☐ 3. Some cooking
(Intervention arm only)	
C5. [During the lockdown period] did your household have any delays in LPG cylinder delivery?	☐ 0. No → **SKIP TO SECTION D** ☐ 1. Yes → **C5a**
C5a. If yes, what was the maximum period you went without LPG fuel?	☐ Number of days
C5b. If yes, did you buy your own LPG refill?	☐ 0. No → **SKIP TO SECTION D** ☐ 1. Yes → **C5c**
C5c. If yes, how many LPG cylinders did you buy?	☐ Number of cylinders

SECTION D: COVID-19 Impact on Food, Fuel, and Health Services

Enumerator read: Thank you for your responses so far. Now I'm going to ask you some questions about your ability to obtain needed supplies and services.

D1. In the past 7 days, have you or any household member experienced any of the following...? Enumerator note: Select all that apply, read out	☐ 0. None ☐ 1. Difficulties in going to food markets due to mobility restrictions imposed by government ☐ 2. Difficulties in buying food due to most food markets being closed ☐ 3. Unable to buy the amount of food we usually buy because of shortages in the markets ☐ 4. Unable to buy the amount of food we usually buy because the price of food was too high ☐ 5. Unable to buy the amount of food we usually buy because the household income has dropped

D2. In the past 7 days, have you or any household member experienced any of the following...? Enumerator note: Select all that apply, read out	☐ 0. None ☐ 1. Difficulties in going to obtain cooking fuel due to mobility restrictions imposed by government ☐ 2. Difficulties in buying cooking fuel due to suppliers being closed ☐ 3. Unable to obtain the same amount of cooking fuel as usual because of shortages ☐ 4. Unable to buy the amount of cooking fuel we usually buy because the price of cooking fuel was too high ☐ 5. Unable to buy the amount of cooking fuel we usually buy because the household income has dropped
D3. In the past 7 days, have you or any household member experienced any of the following...? Enumerator note: Select all that apply, read out	☐ 0. None ☐ 1. Difficulties in accessing *your preferred mode* of transportation to visit locations outside of your home/compound ☐ 2. Difficulties in accessing *any* mode of transportation to visit locations outside of your home/compound ☐ 3. Unable to visit a location that you wanted to visit because of transportation shortages ☐ 4. Unable to visit a location that you wanted to visit because the price of transportation was too high ☐ 5. Unable to visit a location that you wanted to visit because the household income has dropped 0.
D4. Have you or any other member of your household delayed or skipped needed health care visits [since the lockdown period began]?	☐ 0. No → **SKIP TO D5** ☐ 1. Yes → **D4a**
D4a. IF YES: For what reasons have you or any other members of your household delayed or skipped needed health care [since the lockdown period began]? Enumerator note: Code to fit - do **not** read out since it might discourage health-seeking behaviors	☐ 1. Cost - Could not afford care ☐ 2. Cost - Could not afford transportation ☐ 3. Clinic was closed ☐ 4. Clinic had a long wait time / was understaffed ☐ 5. Concerns about covid-19/coronavirus infection ☐ 6. Could not find transportation ☐ 555. Other (specify)
D5. Have you or any other member of your household been unable to obtain any needed medications or vitamins [since the lockdown period began]?	☐ 0. No ☐ 1. Yes
D6. Have you or any other member of your household been unable to obtain any needed vaccinations [since the lockdown period began]?	☐ 0. No ☐ 1. Yes

SECTION E: COVID-19, Economic Impacts, and Sources of Assistance

Enumerator read**:** Thank you for your responses so far. Now I'm going to ask you some questions about how COVID-19 has affected your household and family economically.

E1. Have your caregiving responsibilities changed [since the lockdown period began]? Enumerator note: Select all that apply, read out.	☐ 1. I am not caring for anyone ☐ 2. No more than usual ☐ 3. More care for parents or elders ☐ 4. More care for children whose schools have closed ☐ 5. Less care for young children since older children are home to help
E2. [Since the lockdown period began] have you or someone in your household been forced to do any of the following to pay for food, healthcare, or other expenses? Enumerator note: Select all that apply, read out.	☐ 0. None of the above ☐ 1. Sell off assets (including livestock) ☐ 2. Deplete your savings ☐ 3. Borrow money you were not certain you could pay back on time ☐ 4. Skip making a required payment on a loan (NOT taking advantage of govt programs to delay)
E3. [Since the lockdown period began], have you received any food, fuel, cash, or other support from the government that you do NOT usually receive? If so, what type of support? Enumerator note: Select all that apply, read out	☐ 0. No, none ☐ 1. Food ☐ 2. Fuel ☐ 3. Cash ☐ 4. PPE (Personal protection equipment) ☐ 555. Other (specify)
E4. [Since the lockdown period began], have you received any food, fuel, cash, or other support from anyone else that you do NOT usually receive? If so, from what source? Enumerator note: Select all that apply, read out	☐ 0. No, none ☐ 1. Church/mosque/temple ☐ 2. Relatives in country ☐ 3. Relatives outside the country ☐ 4. Politician or local government official ☐ 5. Celebrity ☐ 6. NGO/CSO ☐ 555. Other (specify)

M11-Lifestyle Behaviors Questionnaire

SECTION C. HOUSEHOLD FOOD INSECURITY		
ASK:	**RESPONSE:**	**CODE:**
During the **last 30 DAYS**, was there a time when **you or others in your household** worried about not having enough food to eat because of a lack of money or other resources?	1 = Yes 0 = No 888 = Don't know	
During the **last 30 DAYS**, was there a time when **you or others in your household** were unable to eat healthy and nutritious food because of a lack of money or other resources?	1 = Yes 0 = No 888 = Don't know	
During the **last 30 DAYS**, was there a time when **you or others in your household** ate only a few kinds of foods because of a lack of money or other resources?	1 = Yes 0 = No 888 = Don't know	
During the **last 30 DAYS**, was there a time when **you or others in your household** had to skip a meal because there was not enough money or other resources to get food?	1 = Yes 0 = No 888 = Don't know	
During the **last 30 DAYS**, was there a time when **you or others in your household** ate less than you thought you should because of a lack of money or other resources?	1 = Yes 0 = No 888 = Don't know	
During the **last 30 DAYS**, was there a time when **you or others in your household** ran out of food because of a lack of money or other resources?	1 = Yes 0 = No 888 = Don't know	
During the **last 30 DAYS**, was there a time when **you or others in your household** were hungry but did not eat because there was not enough money or other resources for food?	1 = Yes 0 = No 888 = Don't know	

During the **last 30 DAYS**, was there a time when **you or others in your household** went without eating for a whole day because of a lack of money or other resources?	1 = Yes 0 = No 888 = Don't know	