

# ***ANALYZING COVID-19 LOCKDOWN IMPACTS ON VULNERABLE HOUSEHOLDS – CASE OF COLLEGE STUDENTS IN JAPAN***

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## **Overview**

COVID19 targeted every aspect of life globally in 2020. In light of the rapid increase in COVID19 cases, the Japanese government requested its citizens for self-imposed lockdowns, in order to curb infections. This reduced job opportunities for many, while forcing others to work from home. Furthermore, the lockdowns forced many to conduct their work remotely, hence significantly increasing the hours spent inside the household. Due to this massive shift of hours spent outside to conducting works from inside household, many households faced a surge in energy expenditure. While these changes can be handled easily by some households, others may face difficulties in coping with such changes. Particularly, households which are living on lower incomes and/or high living costs, such as elderly couple households, single parent households with a child or children, and households living on public funds such as the national pension [1]. These households are often regarded to as the “vulnerable households”. Based on this description, college students living independently well fit inside the category of vulnerable households, as they face living expenses like any other household, often pay medium to high levels of tuition fees, but live on very low amount of income, mostly from hourly-paid jobs.

In order to explore the effects of the lockdowns on energy expenditure, we investigated a small sample of 218 independent college student households in a survey on their attitudes and practices towards energy use during the lockdowns, as well as its other effects on their daily lives. Furthermore, based on the students’ net income and their expenditure on energy services, we assess the energy poverty rate among this sample of student households. Lastly, we investigate whether Japanese students experience higher energy poverty rates compared to non- Japanese students, using Student’s t-test.

## **Methods**

In order to assess the COVID-19 lockdown impacts on college students, we conducted original surveys in January 2021, when students were following the work-from-home regime and taking classes remotely. The survey included several questions regarding financial status, expenditure on energy services, awareness and attitude of the respondents towards energy consumption, the effects of COVID-19 lockdown on students’ daily life, and demographics. In order to further assess students’ energy performance inside the households, we adopted the ‘Ten-percent Rule’ of energy poverty, and applied it to the collected data. The equation used for this measurement is based on the ‘Ten- percent Rule’ introduced by Boardman in 1991 [2], called the Energy Poverty Ratio by which the households are considered as energy poor when the ratio of energy expenditure to income surpasses 10%. Energy expenditure was calculated as the sum of the reported energy bills for electricity and gas consumption inside the household, and the income was calculated based on the reported monthly earnings from full-term or part-time jobs, added by the allowance received from parent(s) or scholarship(s) received by governmental or private institutions. In cases where students were sharing the living space with other individuals, the reported energy expenditure was divided by the number of the occupants inside the household. In order to statistically compare the difference between the two groups of Japanese and non-Japanese respondents, Student’s t-test for independent samples was employed. The level of significance was set to 0.05 to maximize the accuracy in results. IBM SPSS Statistics Version 27 was used to conduct the analysis for the collected data.

## **Results**

A total of 218 student households responded to the survey questionnaires. Nearly 45% of the respondents were Japanese, while the rest were non-Japanese students, The composition of Japanese and non-Japanese students in the

collected samples enabled us to further investigate the differences between these two categories of households. Near 40% of the respondents were male and 60% were female college students of up to 30 years of age.

With regards to the direct effects on lifestyle, the respondents were asked five questions regarding the effects of the COVID19 lockdowns on their energy consumption costs, practices and attitudes towards using energy, as well as direct effects on their daily lives. When asked about the impacts of the lockdowns on daily lives, 93% of the respondents reported that they were impacted by the pandemic one way or the other. Over half of the respondents reported an income reduction, while near half reported reduced working hours and difficulty in studies. About 70% of the respondents reported an increase of energy consumption inside the household compared to pre-lockdowns.

In order to curb energy consumption inside household or be able to cope with the higher utility bills, actions such as adjusting clothes (57.3%), opening or closing windows (50.5%), and cutting back on spending for non-essentials (41.3%) were among the commonly practiced measures. However, other actions which may seem concerning, such as enduring or coping with difficulties rather than using required levels of energy (36.7%) were also reported. Although 52.5% of the respondents claimed that they never delayed or missed a bill or payment, the rest reported otherwise for energy bills (28.1%), accommodation rent (24%), university tuition payment (16.6%) and other payments such as phone, internet or credit card bills (15.7%).

Based on the collected data on average income and energy expenditure, energy poverty was estimated using the Energy Poverty Ratio. The results showed that the mean energy poverty rate among student households was 0.1, which is equal to the energy poverty threshold. Furthermore, in order to examine the difference between Japanese and non-Japanese households' income, consumption and energy poverty rates, Student's t-test for independent samples was applied to the collected data. The results show that the difference between the two groups is statistically significant in energy expenditure ( $t=3.2, p<0.01$ ) and energy poverty ratio ( $t=2.0, p=0.04$ ). No significance was found in the income results.

## Conclusions

We studied the effect of the COVID19 pandemic and consequently, self-imposed lockdowns, on college students' energy consumption-related actions and daily life practices. Several literatures worldwide, including Japan, report a rise in household energy consumption as a result of the pandemic and work-from-home regime. While the studies conducted so far target ordinary households, we focused on college students to assess the impacts on a category already deemed to be vulnerable. In this study, we collected responses from a small sample of 218 college student households. The results reported that about 70% of the respondents faced increases in their energy consumption based on the monthly utility bills due to the increase in occupancy hours caused by the self-imposed lockdowns and work-from-home regime. Furthermore, we found out that 93% of the respondents' daily lives were impacted by the pandemic one way or the other. Results showed that several actions were taken by households to fight the surge in energy expenditure, such as adjusting clothes (57.3%), opening or closing windows (50.5%), and cutting back on spending for non-essentials (41.3%). The average energy poverty rate for the studied sample was at 0.1, which is equal to the energy poverty threshold. The results also show a statistical difference in energy consumption and energy poverty ratio between Japanese and non-Japanese respondents.

## References

- [1] Tabata, T., Tsai, P., 2020. Fuel poverty in Summer: An empirical analysis using microdata for Japan, *Science of the Total Environment*, Vol. 703, 135038. DOI: <https://doi.org/10.1016/j.scitotenv.2019.135038>
- [2] Boardman, B., 1991. Fuel Poverty: from cold homes to affordable warmth. Belhaven Press, London, UK.