**IS4250**

**Community Psychological and Behavioral Responses through the First Wave of the 2009 Influenza A(H1N1) Pandemic in Hong Kong**

**Report**

By

Low Jia Wei

Liu Yue

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**Introduction**

***Research Motivation***

In the event of an influenza pandemic, there are often close to no available vaccine. The only way to prevent or slow down the spread of such a pandemic is through “non-pharmaceutical” community intervention. This intervention usually includes promotion of health and hygiene preventative measure, symptom of the pandemic disease and what to do when met with issue regarding the pandemic. Prior to this paper, there are very little data on about community psychological and behavioral responses to influenza.

In response to prior paper on Severe Acute Respiratory Syndrome (SARS), this research experiment takes into account perception of risk and anxiety which were not measured in prior SARS related paper. There have been others studies done to examine the initial response of the people in pandemic affected country. However, this paper focuses on the response of the general community in Hong Kong throughout the wave of the pandemic in 2009. It also seek to find out what factors will result in greater use of preventive measure which are the “non-pharmaceutical” community interventions.

**Methodology**

This experiment uses telephone surveys for collection of data. The surveys are designed to be cross-sectional in nature and it records information on the subjects without manipulating the study environment which in the case of this survey is the daily lives of the community in Hong Kong. The surveyors hence should not influence the subjects when conducting the survey in a way that it would change their behavior towards the pandemic of H1N1.

Cross-sectional studies are suitable for the research purpose as the research require comparison of multiple variables at the same time. This will allow them to reduce cost as addition of variables will result in very little costs hence given the amount of factors being measured, this would definitely lower the cost of the research study. Cross-sectional studies are useful to serve as a guide or springboard for future research which are similar or can a further research to test for causation.

***Methods***

This research uses phone calls to collect the results. The phone numbers are randomly selected by a random-digit dialing of all the valid land-based phone numbers which are generated by computer system using a randomization algorithm. Phone survey is used as more than 98% of the populations in Hong Kong have a valid land-based phone numbers.

Interviewers of the survey are trained to increase chance of gathering reliable and valid survey results. These phone calls were made outside of working hours to prevent the exclusion of the working groups and overrepresentations of the non-working group. The criteria of a valid survey respondent are as below:

* They must be aged 18 and above
* They must lived in the house for at least 5 days per week
* They must speak Cantonese which is to identify them as Hong Kong citizens and not foreign expats as most Hong Kong citizen speaks Cantonese. (Citation)
* They must give their consent to participate in the survey before the questions are asked.
* They must be available by the 5th Follow-up call if they are busy during the first 4 or else they will be deemed as an invalid survey target.

There are a total of 13 surveys being conducted throughout the research period. Participants are separated by demographics characteristics of gender and age for each survey in terms of means and proportion. Each survey took approximately 15 minutes to complete and response to the survey were ordinal Likert-type. Below shows an example of an ordinal Likert-type response:

**Do you feel those masks are important during a pandemic outbreak?**

Strongly Agree Agree Neutral Disagree Strongly Disagree

The answer to the above sample survey is ‘Agree’. Participants were asked to answer around 100 of such question in a survey. 12 out of the 13 surveys have at least 1000 respondents and with that sample size, the sampling error is at most 3%. Sampling error is usually due to differences between the sample from the population and the population itself. Randomization is used in the selection process of the research in the form of randomly generated landline number by the computer and this helps to reduce sampling error in the research. Sampling error is impossible to eliminate as it require sampling of the entire population which is expensive and definitely not feasible. The sampling error of this research is within the confidence interval which is good.

The only survey to be deemed as invalid is the one with only 504 respondents which is well below the average of about 1000. Responses from people exhibiting flu like symptoms were also excluded as they behave differently from those who do not exhibit these symptoms. Multivariable logistic regression is used for each of the survey data which give dichotomous outcome and uses more than one variable on the right side of the regression equation as opposed to linear regression which outcome is continuous and consist of one variable.

Survey number one and two psychological responses are somewhat different from the other eleven remaining surveys and the first local case did not happen until survey three. This means that the first two surveys are measuring psychological responses against a potential threat while the remaining surveys are measuring psychological responses against a confirmed or a real threat. The responses to the survey from survey 3 to 13 excluding survey 6 which have only 504 respondents were very consistent which shows that the sampling error is within a good range.

We will hence look at the results of the survey conducted and how they are being analyzed to show the impact of the study on the general population.

**Results**

Results obtained from this research do indicate correlation among the different factors that were being measured. However, it should be noted that these results do not infer causation as they are cross-sectional in nature.

The overall response rate for the survey was 69.9% which is defined as out of the number of suitable subjects who took part in the survey over the total number of suitable subjects identified.

We will first look at the overall trend before going into the multivariable logistic regression analysis part of the result. **Appendix 3A** shows that the State Trait Anxiety Inventory Score (STAI) of the general public remains fairly constant even at the peak number of case from September to October. There are 2 subscales within this measure of STAI. First, the State Anxiety Scale (S-Anxiety) evaluates the current state of anxiety, asking how respondents feel at that point in time and using items that measure subjective feelings of apprehension, tension, nervousness, worry, and arousal of the autonomic nervous system. The Trait Anxiety Scale (T-Anxiety) evaluates relatively stable aspects of “anxiety proneness,” including general states of calmness, confidence, and security.

**Appendix 3B** shows the results of perceived risk and worry. Perceived risk of infection in the following month ("absolute susceptibility") was initially high, declined in May, and temporarily rose in June as the local epidemic began, before fluctuating between 10% and 15% for the remainder of the study period. Perceived risk of infection compared to others outside your family ("relative susceptibility") remained lower throughout. Perceived severity of H INI compared with SARS ("severity") was high in the initial survey in April and decline.

**Appendix 3C** shows the respondents knowledge on mode of transmission. Results show that the respondents have a misconception that H1N1 is spread via cold weather and oral-feacal. It could be due to previous cases. **Appendix 3D** shows it is a norm for them to wash their hands using liquid soap after coming back home. The level of hygiene behavior is also very consistent throughout the pandemic period with no sudden peak or drop in proportion with the exception of disinfecting of homes which is significantly higher during earlier periods of the outbreak.

In **Appendix 3E,** social distancing declined as the pandemic proceed on and the only known peak is the participant avoiding crowded places during the period of end June around when the first local case was first identified.

**Contribution of Paper**

This paper has been the basis for research regarding psychological and community behavior for pandemic. It identifies the correlation between hygiene behaviors and attributes like age, gender and education level. It could be a baseline for future researcher to do a more focus to infer causation. For example, an increase of anxiety is correlated to an increase in house disinfection which is one of the preventive behaviors that was measured in the study. Hence future researcher could do a longitudinal studies on these to infer causation whether indeed anxiety leads to them disinfection there house more than usual during a pandemic outbreak.

Government in Hong Kong could use the results from this study to adjust their containment and preventive campaign to prevent the spread of this epidemic which is the only measure which could be taken during the spread of a new virus since current medication and vaccination does not work on new strains of virus.

**Challenges & Limitation**

***Limitations***

As with many researches, there will be challenges faced while performing the experiment and also limitation of the methodology and resulted gathered.

The first limitation is that due to the cross-sectional nature of the survey conducted, we cannot infer any causation from any of the analysis done. This means that the correlation mentioned in the result does not means causation. For example, males having poor hygiene and protective behavior does not means that being male caused them to have such a behavior.

Factors associated with the results could suffer from reverse causation. Reverse causation means that the outcome caused the initial exposure instead of the other way else. In the case of greater hand hygiene leading to lower anxiety could very well mean that lower anxiety lead to greater hand hygiene.

Biasness will always be present in any surveys. In the case of this experiment, selection bias could be potentially found in the case of exclusion of the working class. Additionally, there is no data from non-respondent hence we cannot be truly sure of extend of the selection bias.

Although, telephone interview have been accepted as methodology for this type of study on preventive behavior during pandemic; limitation still exists. It suffers from recall and social conformity bias which may affect the result as the response they gave might not be what they really did in the real situation. This may affect the accuracy of the survey results when what they recall is different from what they actually did or when they choose to reply the standard answer which they think other will most likely answer. There is also difficulty in checking validity of the information supplied by the respondent to match to the requirement as it is over the phone and the person might not provide the true information. This is shown in the huge of number of invalid responses which is nearly about 90% of the total number of landline dialed.

This study is conducted in Hong Kong and hence might not be applicable to pandemic in other region for instant the spread of Ebola in Saudi Arabia. These two countries could have very little similarities between community behavior and psychological response to a pandemic since their standards and way of living is very much different from each other. Hence, this study might not be able to be a basis for studies of pandemic in very different region. However, it could be used for similar area in the same region such as Taiwan or South East Asian countries. Additionally, there should be some similarities between them which could prove useful to support and become the basis of research in countries like Saudi Arabia.

***Challenges***

The main challenge for this research experiment is that it is hard to infer causation from the results collected by this methodology of a cross-sectional survey. They will need to conduct longitudinal studies instead of the cross-sectional studies which will require long period of time. This will require more resources to conduct longitudinal studies hence resulting in a much more expensive study. There will also be a chance that research subject might drop out half way due to the long duration of such studies hence reducing the sample size and data point which can be obtained. If this experiment is conducted as a longitudinal study, they will need to monitor over 10,000 study subjects over a period of time and constantly gather input from them instead of the current one time off survey. Hence, it is not that feasible given the large amount of sample and limited resources of the research. It would be best to set up the foundation in this paper and let it be a reference for future research since some correlation can be spotted which can be further developed into a more focus longitudinal studies to infer causation.

Another challenge would be to gather sufficient amount of samples for the research which is shown when survey 6 only have 504 participants which is half of the desired sample size. As shown in Appendix XX, there were 38,817 cases of interviewer unable to determine if the participant was eligible to participate in the survey despite having given pre-requisite requirement. This shows that the pre-requisite requirement should be more specific and less general. Additionally, 10,302 of the number dialed did not pass the initial requirement of it being a home number. These are potentially close to 50,000 cases of potential sample being wasted as there is not clear answer whether they are valid or not with time wasted in attempting to conduct the survey on them.

***Possible Recommendation to Overcome Challenges***

**Conclusion**

**References**

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