





Stigma, discrimination, and attitude towards the Chinese community in the USA and Canada during the outbreak of COVID-19

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Abstract

Background: The COVID-19 outbreak, declared a global pandemic by the WHO, raises some serious health, as well as discrimination concerns worldwide. This study outlines the knowledge, stigma, and discrimination of people towards the Chinese community in the USA and Canada at the onset of the pandemic.

Methods: An online community-based, opt-in descriptive survey was conducted spring of 2020. The study collected data with anonymity about demographics, travel history, COVID-19 knowledge, awareness, as well as stigmatization and discrimination against the Chinese community. Data was compiled with excel using descriptive statistics and Chi-square for the analysis.

Results: Among 172 participants, the highest number of responses came from the 21 to 40-year-old age groups. There was some reported stigma against the Chinese community in the study, particularly during the early days of the outbreak; 6.4% participants indicated that only Chinese infected COVID-19 individuals need to be quarantined with 13.4% avoiding only the Chinese community; Furthermore, 30% blamed people from China for the COVID-19 outbreak; while 13% people said they would avoid Chinese people and/or their communities. Results from the study suggest that those who live in urban settings, who are married and hold university degrees have a better understanding of the infection, knowledge of how it spreads, and also are less likely to discriminate against the Chinese community or blame the Chinese from China for COVID-19.

Conclusion: Lack of knowledge caused anxiety and fear among some people, which thus played the main role in the rising cases of Chinese community stigma and discrimination reported.

Keywords: COVID-19; Social Stigma; Social Discrimination; Social Attitude; Social Knowledge

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Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), previously known as the 2019-nCoV is a positive-stranded RNA virus (1), which belongs to beta-coronavirus (2). Coronaviruses are zoonotic infections, which spread from animals to humans (3). Few outbreaks have been associated with coronavirus in the recent past, starting from 2002. Severe acute respiratory syndrome (SARS) outbreak originated from Guangdong Province, China from 2002 to 2003 (4). Another coronavirus related outbreak occurred in 2012, the Middle East respiratory syndrome (MERS) which was seen in Saudi Arabia (5).

The current outbreak of coronavirus disease-19 (COVID-19) was first diagnosed in Wuhan, China at a seafood market (2). There have been confirmed cases of COVID-19 across 26 other countries, according to a study published on January 31, 2020, triggering a global outbreak (6). The number of infected and the countries affected has increased substantially since this reported study. The total number of people affected by COVID-19, as of March 23, 2020, was 332,930 worldwide with 14,510 deaths (7). The very first case in the United States of America (USA) was diagnosed on January 21, 2020 (8). These cases were directly linked to air travelers from Wuhan, China (9), or those who have been in contact with someone who had recently traveled.

Many incidences of discrimination against the Chinese community have been noticed, making headlines worldwide. Despite A pretested questionnaire was administered with consent online through an opt-in Google form. The pretest was carried out on 20 participants who opted in to participate. The questionnaire, starting with the study explanation and consent page, consisted of 5-sections assessing the demographic information, travel history, and knowledge of COVID-19. The knowledge section of the questionnaire dealt with the awareness of COVID-19 and preventative measures

preventive measures, there has been a constant increase in the number of COVID-19 cases, and it seems to keep increasing. This exploratory study and opt-in descriptive survey outlines the knowledge, stigma, and discrimination towards the Chinese community in the USA and Canada during the early days of the COVID-19 outbreak.

Methods

A community based descriptive study was conducted from February 20, 2020, to March 13, 2020, using an online opt-in survey that offered participants anonymity. The research study was focused on the knowledge of COVID-19 and the stigma and discrimination associated with the illness concerning the Chinese community. The research study was conducted in cities throughout the USA and Canada; the criteria for inclusion were age 18 years or older and reside in the USA and Canada. The descriptive questions were generated by the authors of this manuscript. The choice of this research topic was selected due to the state of the virus being declared a global pandemic during our research, which had infected 332,930 individuals and caused 14,510 deaths, as of March 23, 2020 (7). Unfortunately, this was just the beginning of the devastation that the pandemic would cause to the world, as the numbers of total confirmed cases and fatalities are still rising, and as of June 9, 2020, there were over 200 countries affected, 7,039,918 global cases, and 404,396 deaths associated with the outbreak (10).

that were taken if any. Participants were asked about various symptoms, and if they had any close contacts with COVID-19 infected individuals. Participants were specifically asked if they traveled to China within the last 30 days, at the onset of the outbreak, before travel restrictions being put in place by governmental institutions; as stigma towards the Chinese were significantly higher due to China being the epicenter as of early March 2020.

Additionally, participants were asked about the psychosocial impact this virus has had on their daily life.

Digital questionnaires were used to collect data.

The measures used in this study included:

- Demographic information (age range, gender, race, education level, residency location, marital status, and number of household members)
- Travel history (any travel history, whether to China or not, in the last 30 days), exposure risk, and clinical screening
- Knowledge about COVID-19, prevention, treatment, and care-seeking
- Stigma, discrimination, and psychosocial impact on individuals

All participants consented to participate in the study. This study was reviewed by our institutional review board and was considered exempt.

The data from our survey was compiled on a Microsoft Excel spreadsheet using descriptive statistics with percentage frequency distribution to construct the Figures and Tables (Figures 1-6 and Tables 1-5). A Chi-square analysis was used to compare proportions and significance was considered at a P-value <0.05.

Results

A total of 172 participants out of a targeted 250 participants completed the survey, with a response rate of 69%. The 69% who participated were those willing and able to complete the online questionnaire/survey. The survey was posted on social networks, like Reddit, Facebook, LinkedIn, and Instagram, with an emphasis and focus on targeting participants throughout the USA and Canada. Also, direct marketing strategies were used by forwarding the survey to potential participants. The majority of our participants at the time of the study were from COVID-19 hotspot cities in the US and Canada; a 50-mile radius from Chicago, Illinois accounted for 35% (60/172) of the participants, as well as

a 50-mile radius from New York City, New York which accounted for 9% (16/172). These two cities within the USA led with the most participants. In Canada, a 50-mile radius from Calgary, Alberta accounted for 15% (26/172) of the participants, as well as a 50-mile radius from Surrey, British Columbia which accounted for 9% (15/172). These two provinces within Canada led with the most participants.

The research study yielded responses that spread over a wide demographic of participants, with the highest number of responses coming from the 21 to 30-year-old age group and the 31 to 40-year-old age group, at 82/172 (47.7%) and 50/172 (29.1%) respectively. The lowest responses came from those in the under 20 years of age group and the 61 to 70-year-old age group, with both standing at 6/172 (3.5%). Also, the 71 to 80-year-old age group represented 1/172 (0.6%) of the participants and there were no participants over the age of 80 years (Table 1).

The study also indicates that out of the 172 participants, more females responded than males with 110/172 (64%) of the study respondents being females.

During the time of this study, from February 20, 2020, to March 13, 2020, study responses indicated that 171/172 (99%) of people had not traveled to China within the last 30 days, while only 10/172 (5.8%) indicated having any contact with an individual who has visited China within the last 30 days. At the time, only 26/172 (15.1%) of the respondents indicated any acute respiratory symptoms such as fever, sudden onset of cough or sore throat, and shortness of breath; however, the study pointed out that the majority did not receive any information regarding COVID-19 (Table 2).

Table 3 showed the knowledge of contact, prevention, treatment, and care-seeking of COVID-19 while Table 4 showed stigma, discrimination, and psychosocial impact of COVID-19. Table 5 showed the statistical analysis of selected questions in Tables 3 and 4.

Table 1. Demographic information of all the participants

Variables	N (%)
Gender	
Male	60 (34.9)
Female	110 (64)
Non-binary	2 (1.1)
Age (years)	
<20	6 (3.5)
21-30	82 (47.7)
31-40	50 (29.1)
41-50	17 (9.9)
51-60	10 (5.8)
61-70	6 (3.5)
71-80	1 (0.6)
Race	
Non-Chinese	170 (98.8)
Chinese	2 (1.2)
Education	
University/College	151 (87.8)
High School	20 (11.6)
No Formal Education	1 (0.6)
Residence	
Larger Metropolitan Area	111 (64.5)
Smaller City	41 (23.8)
Smaller Town	19 (11)
Rural Area (less than 1,000 residents)	1 (0.6)
Marital Status	
Single	87 (50.6)
Married	70 (40.7)
Divorced / Separated / Widower	10 (5.8)
Prefer Not to Answer	5 (2.9)

In this study, 148/172 (86%) respondents ($\chi^2=0.0002$; $P=0.99$) knew how COVID-19 can spread from one person to another and 123/172 (71.5%) knew how to avoid getting the infection ($\chi^2=0.6109$; $P=0.43$). However, during this period there was some reported stigma against the Chinese community, particularly during the early days of the outbreak when it was still contained within the Chinese borders; 11/172 (6.4%) indicated that only Chinese infected COVID-19 individuals need to be quarantined ($\chi^2=1.1137$; $P=0.30$) with 23/172 (13.4%) avoiding only the Chinese community ($\chi^2=1.2496$; $P=0.26$). This could demonstrate the lack of information and protocol available to the public at the time, as well as a general lack of understanding of COVID-19 by the general public. Furthermore, in this study, 52/172 (30%) respondents ($\chi^2=6.1969$; $P=0.013$) blamed people from China for the COVID-

19 outbreak; while 23/172 (13%) people ($\chi^2=1.2496$; $P=0.26$) said they would avoid Chinese people and/or their communities; privately held opinions did not appear to dictate individuals' actions.

The level of knowledge, stigma, and discrimination with the respondent's socio-demographic characteristics was compared in Figures 1 to 6 to identify the association between the two factors.

In Figure 1, regarding the knowledge of the virus and how it spreads from one person to another, 32/34 (94%) respondents aged 41-years and over had a better understanding of this concept. Comparing respondents' knowledge on how to avoid being exposed to the infection, 42/50 (84%) of the respondents aged 31-40 years, had a good understanding of this concept. The study also addressed stigma in respondents with the question whether they felt that Chinese people from China should be blamed for the

Table 2. COVID-19 information on travel history, exposure risk, and clinical screening by individuals

Criteria (N=172)	Answer		
	Yes N (%)	No N (%)	Does Not Apply N (%)
Traveled to China within the last 30-days	1 (0.6%)	171 (99.4%)	-
Traveled to surrounding countries of China within the last 30-days	-	172 (100%)	-
COVID-19 information received during any travel	-	28 (16.3%)	144 (83.7%)
Any acute respiratory infection symptoms* within the last 30-days	26 (15.1%)	146 (84.9%)	-
Any close contact with a person that has acute respiratory symptoms* within the last 30-days	35 (20.3%)	137 (79.7%)	-
Wearing any protective equipment** during contact with ill-presenting individual	13 (7.6%)	50 (29.1%)	109 (63.4%)
Any contact with bodily fluids*** during contact with ill-presenting individual	12 (7%)	62 (36%)	98 (57%)
Any contact with an individual who has visited China within the last 30-days	10 (5.8%)	162 (94.2%)	-
Any contact with an individual who has a confirmed or probable case of COVID-19	-	172 (100%)	-

*Symptoms such as fever, sudden onset of either a cough, sore throat, and/or shortness of breath

**Personal protective equipment (e.g. gown, gloves, eye protection, face mask, etc.)

***Bodily fluids (e.g. blood, saliva, sweat, nasal secretions, urine, tears, stool, etc.)

Table 3. Knowledge of contact, prevention, treatment, and care-seeking of COVID-19

Criteria (N=172)	Answer		
	Yes N (%)	No N (%)	Does Not Apply N (%)
Know how it can spread from one person to another	148 (86%)	24 (14%)	-
Know how to avoid getting the infection	123 (71.5)	49 (28.5)	-
Any action that was taken to prevent the spread of COVID-19	91 (52.9%)	81 (47.1%)	-
Avoidance of all markets where live or dead animals are handled	95 (55.2%)	77 (44.8%)	-
Avoidance of only Chinese markets where live or dead animals are handled	73 (42.4%)	99 (57.6%)	-
Consider wearing protective equipment in upcoming trips	108 (62.8%)	26 (15.1%)	38 (22.1%)
Taken extra caution to wash hands with soap and water OR use an alcohol-based disinfectant solution before eating, after using the toilet, and after any contact with animals and/or humans	138 (80.2%)	34 (19.8%)	-
Any attempts to seek treatment if presented with symptoms and suspecting illness	14 (8.1%)	41 (23.8%)	117 (68%)
Any hospitalizations if presented with symptoms and suspecting illness	1 (0.6%)	81 (47.1%)	90 (52.3%)
Willing to notify public health authorities if participant or close contact might have a probable case of COVID-19	166 (96.5%)	6 (3.5%)	-
Rejection of treatment if infected with COVID-19 due to fear of being discriminated against or stigmatized because of the virus	5 (2.9%)	167 (97.1%)	-

Table 4. Stigma, discrimination, and psychosocial impact of COVID-19

Criteria (N=172)	Answer		
	Yes N (%)	No N (%)	Does Not Apply N (%)
Should only Chinese infected COVID-19 individuals be quarantined since the outbreak?	11 (6.4%)	161 (93.6%)	-
Should all infected COVID-19 individuals be quarantined since the outbreak?	161 (93.6%)	11 (6.4%)	-
Should the Chinese people from China be blamed for the COVID-19 outbreak?	52 (30.2%)	120 (69.8%)	-
Should all infected COVID-19 persons be blamed for their illness?	9 (5.2%)	163 (94.8%)	-
Only uneducated persons get infected with COVID-19	2 (1.2%)	170 (98.8%)	-
Will you be ashamed if you contract COVID-19?	20 (11.6%)	152 (88.4%)	-
A person who contracts COVID-19 will be discriminated against or stigmatized because of it	99 (57.6%)	73 (42.4%)	-
Do you find yourself avoiding Chinese people and/or Chinese communities?	23 (13.4%)	149 (86.6%)	-
Do you have anxiety when working with or being around Chinese people and/or Chinese communities?	21 (12.2%)	151 (87.8%)	-
Do you find yourself avoiding any open spaces, such as restaurants, shows/theatres, airports, travel-plans, etc.?	41 (23.8%)	131 (76.2%)	-
Do you feel afraid to go home after being in open spaces because of the fear of infecting your family?	17 (9.9%)	155 (90.1%)	-
Do you feel more inclined to wear masks and protective equipment, especially in open spaces?	44 (25.6%)	128 (74.4%)	-
Do you feel more inclined to wear masks and protective equipment, particularly around the Chinese?	22 (12.8%)	150 (87.2%)	-
Do you experience fear of being infected with COVID-19 if you work closely with Chinese individuals?	13 (7.6%)	65 (37.8%)	94 (54.7%)
Do you feel stigmatized and discriminated against by your friends and/or acquaintances because of COVID-19 if you work closely with Chinese individuals?	5 (2.9%)	66 (38.4%)	101 (58.7%)
Do you feel reluctant to work or have considered resignation if you work closely with Chinese individuals?	1 (0.6%)	63 (36.6%)	108 (62.8%)
Do you feel that the misinformation and/or fear-induced behavior by individuals, organizations, and/or countries is having a direct impact on business continuity, such as disruptions in operations, restricted travel, etc.?	138 (80.2%)	34 (19.8%)	-

COVID-19 outbreak. Those aged 51 to 60 years had the majority with 6/10 (60%). Lastly, discrimination, if present, addressed whether respondents felt themselves avoiding Chinese people and/or Chinese communities. The majority of respondents, 149/172 (87%), did not feel this way.

In Figure 2, results show that the majority of individuals have a good understanding of how the virus spreads with non-binary gender recording the highest that 2/2 (100%). The study also shows that 2/2

(100%) of the non-binary gender, know how to avoid getting the virus. Furthermore, 2/2 (100%) of the non-binary gender did not feel that Chinese people from China should be blamed for the COVID-19 outbreak, whereas only 34/60 (57%) of the males felt the same. All or 2/2 (100%) of the non-binary gender, did not avoid the Chinese people and the Chinese community.

In figure 3, 5/5 (100%) of those who prefer not to answer on their marital status had a good understanding of how the virus

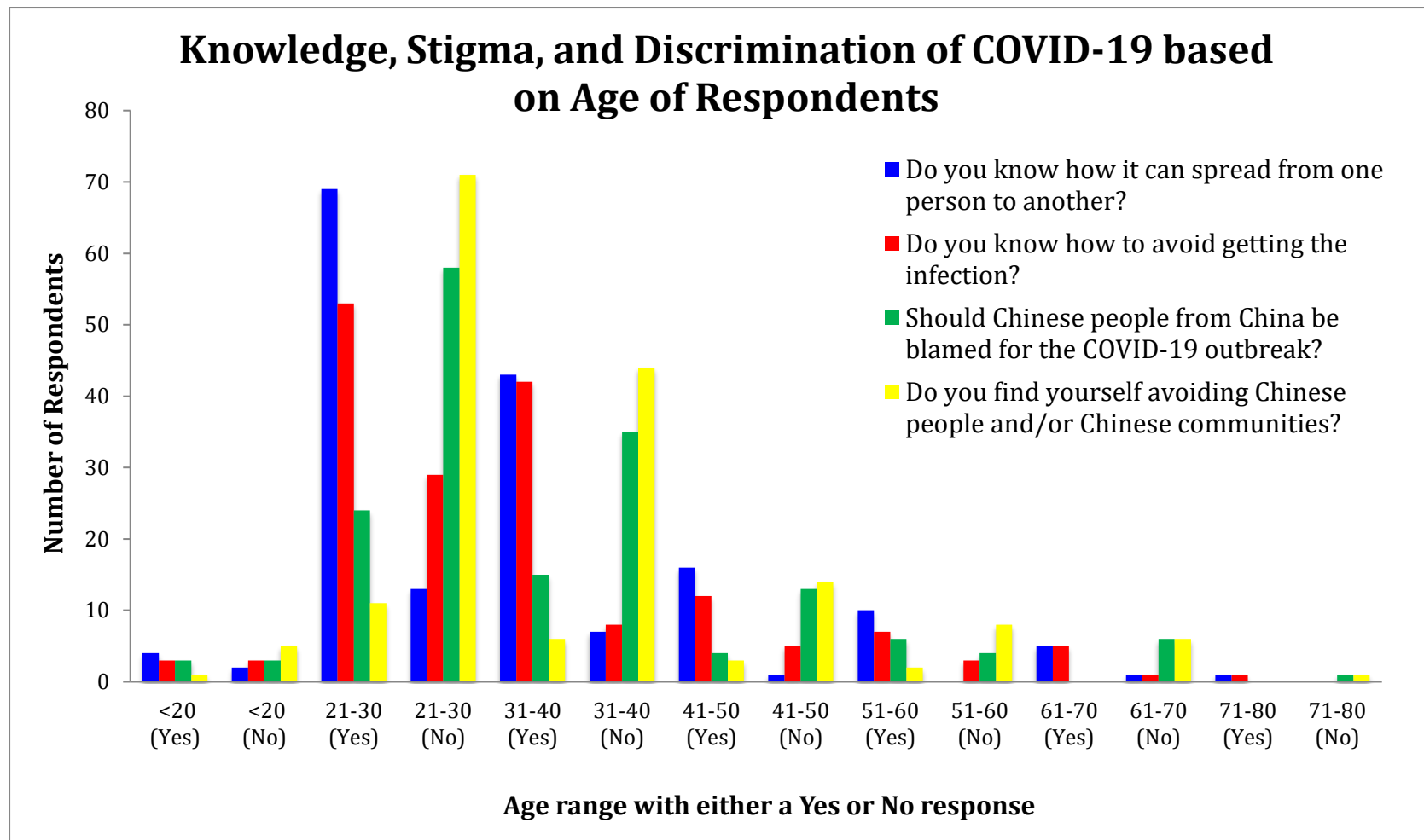


Figure 1. Statistical analysis between the knowledge, stigma, and discrimination of COVID-19 on individuals based on the age of respondents

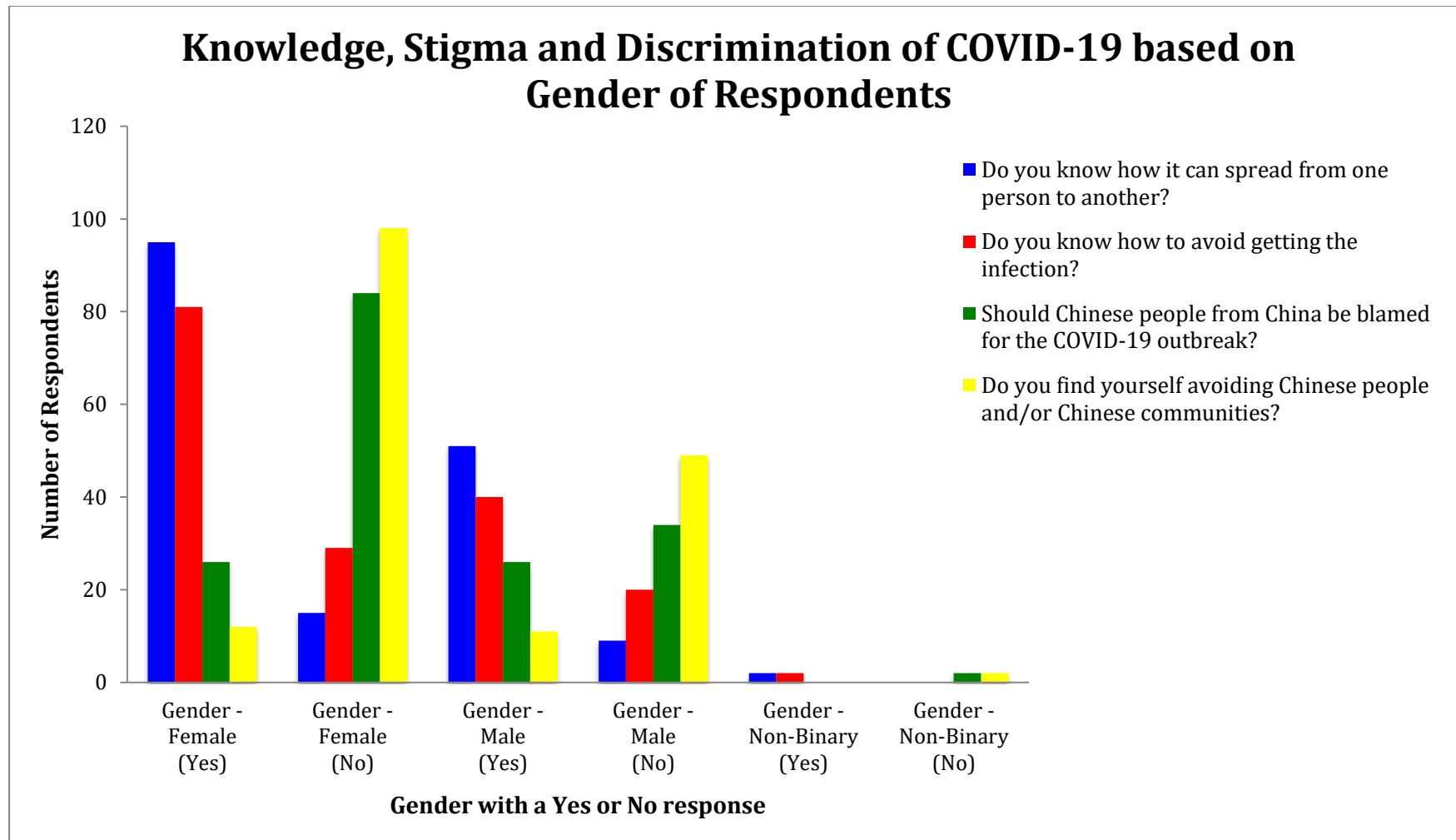


Figure 2. Statistical analysis between the knowledge, stigma, and discrimination of COVID-19 on individuals based on the gender of respondents

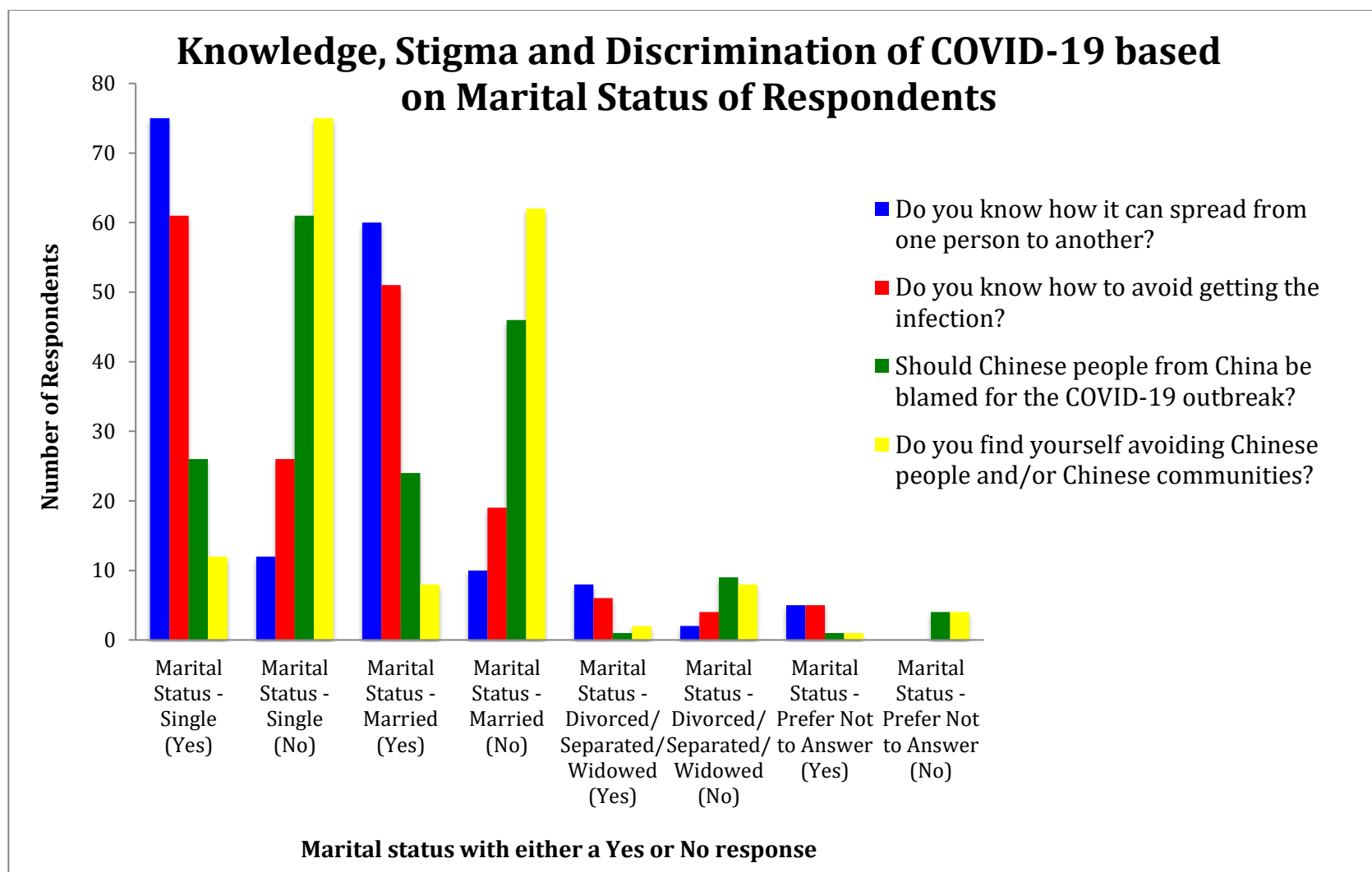


Figure 3. Statistical analysis between the knowledge, stigma, and discrimination of COVID-19 on individuals based on the marital status of respondents

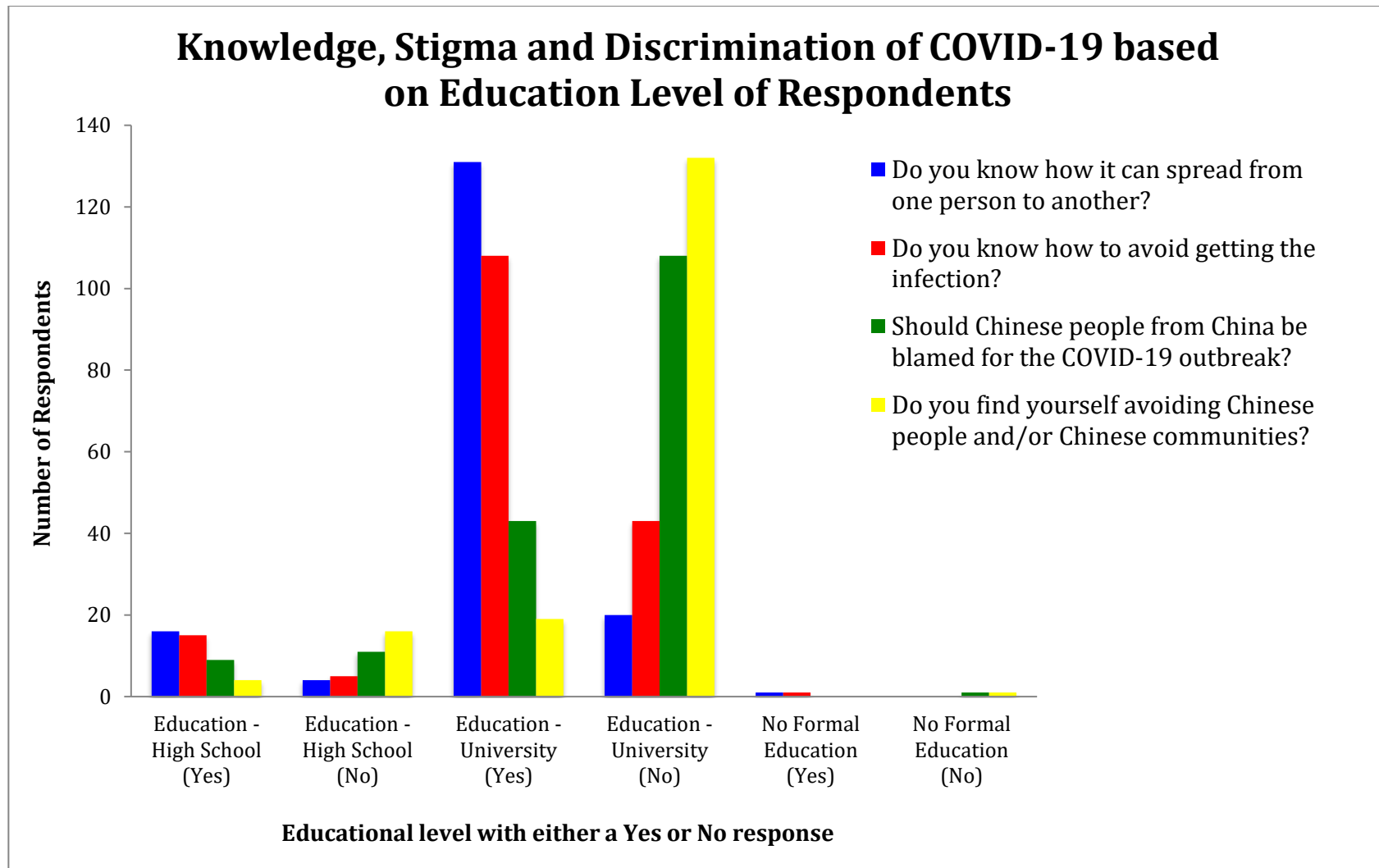


Figure 4. Statistical analysis between the knowledge, stigma, and discrimination of COVID-19 on individuals based on the level of education of respondents

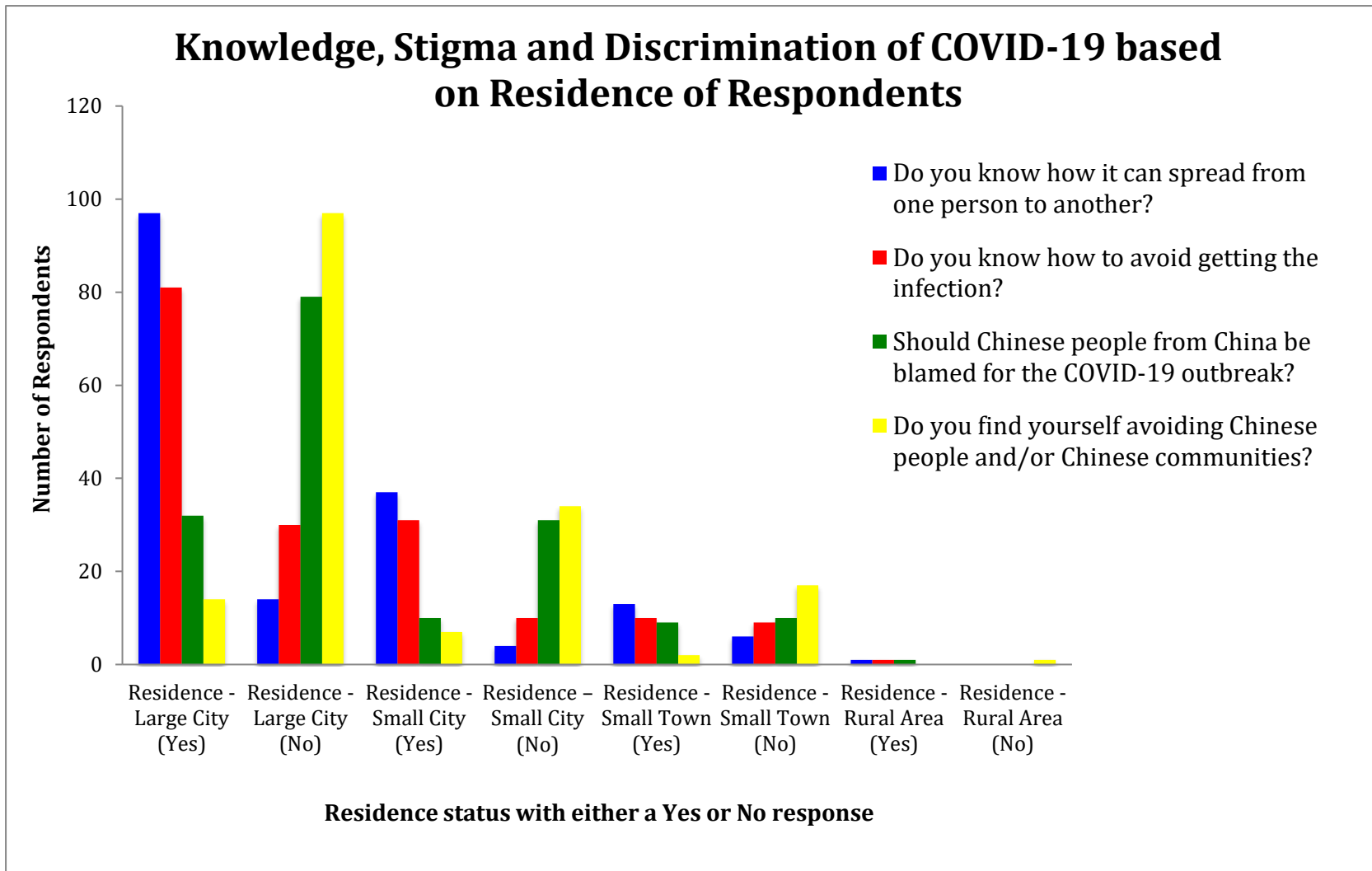


Figure 5. Statistical analysis between the knowledge, stigma, and

discrimination of COVID-19 on individuals based on the residence of respondents

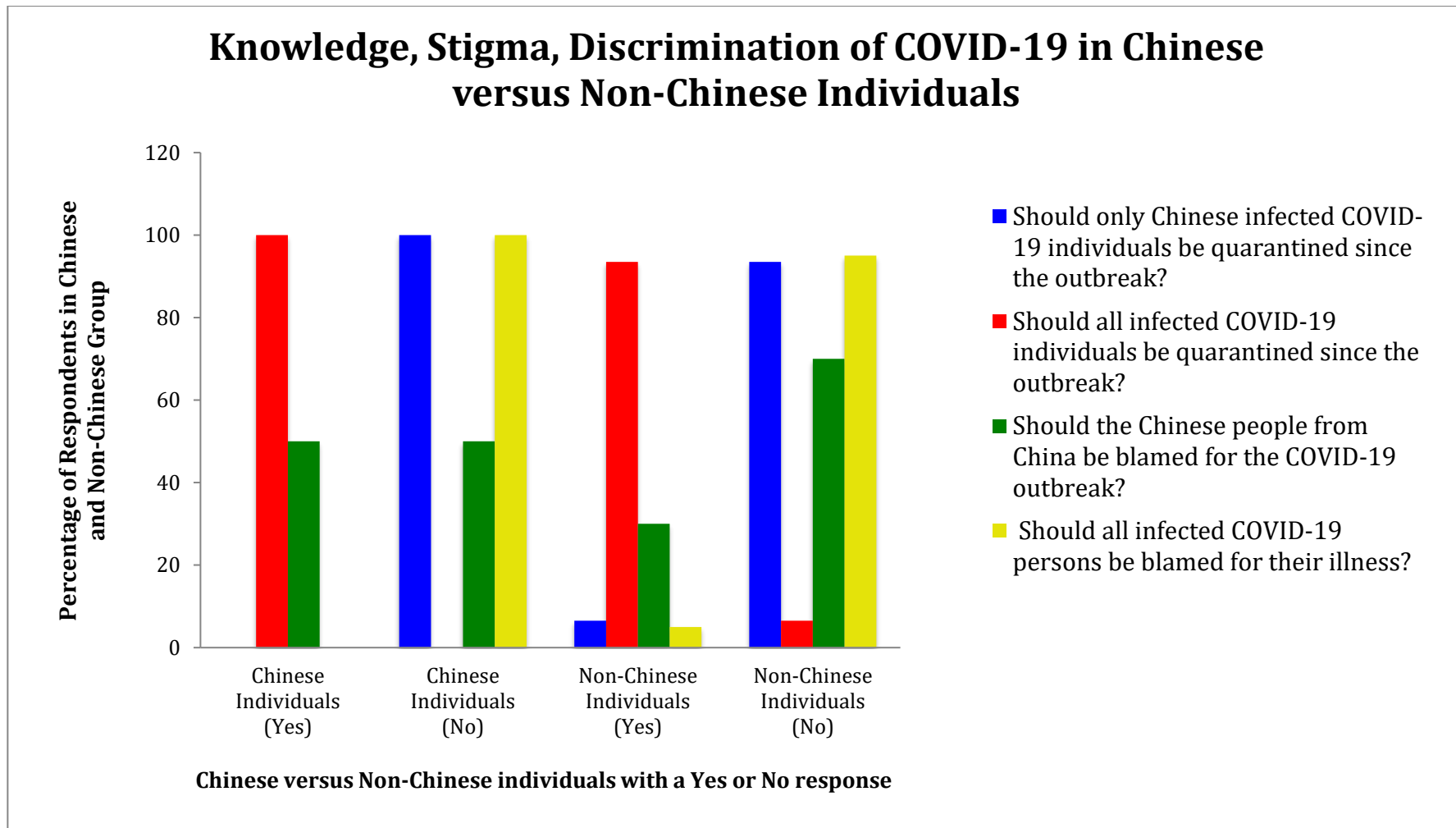


Figure 6. Statistical analysis comparing the knowledge, stigma, and discrimination of COVID-19 on individuals among Chinese versus Non-Chinese respondents

Table 5. Statistical analysis of selected questions on knowledge, stigma, and discrimination in Tables 3 and 4 by sex of participants

Criteria (N=172)	Sex	Yes	No	χ^2 value with Yate correction	P
Know how it can spread from one person to another	Male	51	9	0.0002	0.989184
	Female	95	15		
	Non-Binary	2	0		
Know how to avoid getting the infection	Male	40	20	0.6109	0.434441
	Female	81	29		
	Non-Binary	2	0		
Since learning about COVID-19, have you taken extra caution to wash your hands with soap and water OR use an alcohol-based disinfectant solution before eating, after using the toilet, and after any contact with animals and/or humans?	Male	45	15	1.0062	0.315826
	Female	91	19		
	Non-Binary	2	0		
Since the outbreak, should only Chinese infected people be quarantined?	Male	6	54	1.1137	0.291272
	Female	5	105		
	Non-Binary	0	2		
Should the Chinese people from China be blamed for the COVID-19 outbreak?	Male	26	34	6.1969	0.012798*
	Female	26	84		
	Non-Binary	0	2		
Since the outbreak, should all infected people be quarantined?	Male	56	4	0.0622	0.803018
	Female	103	7		
	Non-Binary	2	0		
Do you find yourself avoiding Chinese people and/or Chinese communities?	Male	11	49	1.2496	0.26363
	Female	12	98		
	Non-Binary	0	2		
In the last 30-days and related to this outbreak, do you find yourself avoiding any open spaces, such as restaurants, shows/theatres, airports, travel-plans, etc.?	Male	12	48	1.3992 (Actual χ^2 value without Yates correction)	0.496796
	Female	28	82		
	Non-Binary	1	1		
Do you have anxiety when working with or being around Chinese people and/or Chinese communities?	Male	7	53	0.0019	0.965672
	Female	14	96		
	Non-Binary	0	2		

*Significant ($P < 0.05$); χ^2 Chi-square

spreads from person-to-person as well as having a good understanding of how to avoid getting this virus. 9/10 (90%) of divorced/separated/widowed, did not feel that Chinese people from China should be blamed for the COVID-19 outbreak. A greater number of participants also did not feel as if they should avoid the Chinese people or their respective communities. In Figure 4, majority of participants with

college education think they have a good understanding of how the virus spreads and have a good understanding of how to avoid the virus across the educational status. Half or 9/20 (45%) of individuals with a high school education felt that the Chinese people from China should be blamed for this outbreak. Also, the majority of participants did not see themselves avoiding Chinese people or the Chinese

community across the educational status. In Figure 5, the majority of participants across residential status also have a good understanding of how this virus spreads from person-to-person as well as. having a good understanding of how to avoid the virus. Only 10/19 (53%) from small towns do not feel that the Chinese people from China should be blamed. However, 1/1 (100%) of the rural area residents did feel that the Chinese people from China are to blame for the COVID-19 outbreak. A large proportion of participants in the study did not avoid Chinese people and/or the Chinese community.

In Figure 6, both or 2/2 (100%) of Chinese and 159/170 (94%) of non-Chinese individuals agree that all people infected with COVID-19 should be quarantined. Approximately, 1/2 (50%) of the Chinese individuals think that the Chinese people from China should be blamed for the COVID-19 outbreak, whereas only 51/70 (73%) of non-Chinese individuals blame the Chinese people from China.

Discussion

Results obtained from this study showed that the majority of the participant had a good knowledge of COVID-19 and a good understanding of how the virus spreads from person-to-person. In addition, the participants knew how to avoid getting the infection. However, there was some observed stigma against the Chinese community in the study, particularly during the early days of the outbreak when it was still contained within the Chinese borders during which this study was carried out. Infection with SARS-CoV-2, a member of the coronavirus has caused stigmatization and discrimination of the Chinese community outside of China (2, 7). On December 31, 2019, Chinese authorities alerted the World Health Organization (WHO) of an outbreak of a novel strain of coronavirus, which has killed 6,600 people worldwide, as of February 20, 2020 (11). COVID-19 started in Wuhan, China where it was not contained totally and spread

globally, thus raising fear amongst the public towards the Chinese ethnicity (2). Given that this is a new disease, it is understandable that its emergence and spread have caused confusion, anxiety, and fear among the general public, giving rise to harmful stereotypes (7). Although the majority of our respondents demonstrated good knowledge of the disease which was similar to the result obtained in China during the lockdown, Tanzania, and Pakistan (12-14); a general lack of knowledge and understanding of COVID-19 among some individuals has increased stigma towards the Chinese community outside of China (15). Among the Asian and Chinese communities, mutual discrimination has been reported (16). Raising awareness without increasing fear and sharing accurate information about how the virus spreads will help to decrease this stigma (15). Media reporting should be balanced and contextualized, using evidence-based information to combat rumors and misinformation that could lead to stigmatization (7).

The summary, of the comparison between the level of knowledge, stigma, and discrimination with the respondent's socio-demographic characteristics in the study suggests that those who live in urban settings, who are married and hold university degrees have a better understanding of the infection, knowledge of how it spreads, and also were less likely to discriminate against the Chinese community or blame the Chinese from China for COVID-19. Whereas, participants who live in rural settings, who are unmarried and have minimal education had lesser knowledge and were more stigmatic and discriminative against the infection. In general, and during the outbreak, social stigma may mean a person or group of people are labeled, stereotyped, discriminated against, treated separately, and/or experience loss of status because of a perceived link with COVID-19 (17). Overall, an important role in preventing and stopping the stigma surrounding people

from China and Asia is played by governments, citizens, media, key influencers, and community leaders (17). Many reputable sources online are available for the public to use to educate themselves about COVID-19 and how to flatten the curve during this pandemic. WHO has information available online for the public, detailing things such as when and how to use face masks, following good respiratory hygiene, social distancing, and how to wash your hands (7). The Public Health Agency of Canada (PHAC) has asked that Canadians avoid non-essential travel outside Canada and that all travelers arriving in Canada undertake 14 days of self-isolation to stop the spread of the virus (18). Canada has implemented and strengthened screening measures at airports with stronger and more visible messaging, health screening questions at kiosks and by the airline personnel, information made available to the public about COVID-19 at the terminals and customs area, Canada Border Services Agency (CBSA) officers checking on all arriving passengers, and passengers upon departure from the customs hall to ensure delivery and reinforcement of public health messaging (18). The USA is also implementing a similar strategy as Canada to slow the spread of the virus (19). The Centers for Disease Control and Prevention (CDC) and PHAC are also asking all to stay home from work if they are feeling sick, to work from home if possible, close all food courts/bars/restaurants/nightclubs, avoid social gatherings of larger than 10 people, stay away from nursing homes, asking children to stay home because all schools were forced to close, practice good hygiene and proper disinfecting of one's homes (18, 19). The CDC also has an abundance of information for the public on the spread of COVID-19 in the workplace, such as that there is no evidence of COVID-19 being spread via cash or credit cards, encourage the population to limit the number of people in a grocery store, and space out people standing in lines for banking (20).

Because the study was an opt-in online Internet survey, sampling was based on those who self-selected to participate rather than a random probability sample. Also, we could not estimate the mean values because our data was nominal. Also, the number of Chinese individuals sampled in the study was low which could have skewed the results. Larger population size studies are thus required to further understand the level of stigmatization and discrimination towards the Chinese community based on knowledge of the COVID-19 disease in the communities.

COVID-19 is a new and widespread pandemic disease that has impacted thousands of people around the world in a short time and is testing the resilience of robust health systems globally. COVID-19 has been categorized as highly infectious, with its emergence coming out of Wuhan, China, and spreading rapidly to other developed nations; thus, global discrimination against the country of origin and its constituents have been observed. Despite some participants instigating blame on the Chinese communities, our research indicates that most participants are educated enough to realize that the virus knows no race, religion, or nationality at the onset of the outbreak.

Conflict of interest

Authors declare no conflict of interests.

References

1. Paules CI, Marston HD, Fauci AS. Coronavirus infections - more than just the common cold. *JAMA*. January 23, 2020. doi:10.1001/jama.2020.0757. Accessed on February 09, 2020, Available from: <https://jamanetwork.com/journals/jama/fullarticle/2759815>
2. McIntosh K. Coronaviruses. *UpToDate*. February 06, 2020. Accessed on February 09, 2020 Available from: https://www.uptodate.com/contents/coronaviruses/print?search=corona...search_result&selectedTitle=1~53&usage_type=default&display_rank=1
3. WHO. Novel coronavirus (2019-nCov) outbreak. *World Health Organization*. 2020. Accessed on February 09, 2020, Available from: <https://www.who.int>
4. Rodriguez-Morales AJ, Bonilla-Aldana DK,

- Balbin-Ramon GJ, Rabaan AA, Sah R, et al. History is repeating itself: Probable zoonotic spillover as the cause of the 2019 novel Coronavirus epidemic. *Le Infezioni in Medicina*. 2020;28(1):3-5. Accessed on February 09, 2020, Available from: https://www.researchgate.net/publication/338934614_History_is_repeating_itself_a_probable_zoonotic_spillover_as_a_cause_of_an_epidemic_the_case_of_2019_novel_Coronavirus
5. Momattin H, Al-Ali AY, Al-Tawfiq JA. A systematic review of therapeutic agents for the treatment of the Middle East Respiratory Syndrome Coronavirus (MERS-CoV). *Travel Medicine and Infectious Disease*. 2019;30:9-18. Accessed on February 09, 2020, Available from: <https://www.sciencedirect.com/science/article/pii/S1477893919301097>
 6. Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: A modelling study. *The Lancet*. 2020. doi.org/10.1016/S0140-6736(20)30260-9. Accessed on February 09, 2020, Available from: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30260-9/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30260-9/fulltext)
 7. WHO. Coronavirus disease 2019 (COVID-19) Situation Report - 63. *World Health Organization*. 2020. Accessed on March 23, 2020, Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200323-sitrep-63-covid-19.pdf?sfvrsn=d97cb6dd_2
 8. Patel A, Jernigan DB, et al. Initial public health response and interim clinical guidance for the 2019 novel Coronavirus outbreak - United States, December 31, 2019 - February 4, 2020. *CDC Morbidity and Mortality Weekly Report*. February 07,2020;69(5):140-146. Accessed on February 09, 2020, Available from: <https://www.cdc.gov/mmwr/volumes/69/wr/mm6905e1.html>
 9. Crawford C. AAFP president: Prepare your office for novel Coronavirus. *AAFP*. January 24, 2020. Accessed on February 09, 2020, Available from: <https://www.aafp.org/news/health-of-the-public/20200124novelcoronavirus.html>
 10. WHO. Coronavirus disease 2019 (COVID-19) Situation Report - 141. *World Health Organization*. 2020. Accessed June 10, 2020, Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200609-covid-19-sitrep-141.pdf?sfvrsn=72fa1b16_2
 11. Scripps Research Institute. COVID-19 coronavirus epidemic has a natural origin. *ScienceDaily*. 17 March 2020. Accessed on March 21, 2020, Available from: <https://www.sciencedaily.com/releases/2020/03/200317175442.html>
 12. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, Li Y. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International journal of biological sciences*. 2020;16(10):1745.
 13. Byanaku A, Ibrahim M. Knowledge, attitudes, and practices (KAP) towards COVID-19: A quick online cross-sectional survey among Tanzanian residents. medRxiv. 2020 Jan 1.
 14. Hussain I, Majeed A, Imran I, Ullah M, Hashmi FK, Saeed H, Chaudhry MO, Rasool MF. Knowledge, Attitude, and Practices Toward COVID-19 in Primary Healthcare Providers: A Cross-Sectional Study from Three Tertiary Care Hospitals of Peshawar, Pakistan. *Journal of Community Health*. 2020 Jul 6:1-9.
 15. CDC. Coronavirus disease 2019 (COVID-19) reducing stigma. *Centers for Disease Control and Prevention*. 2019. Accessed on March 21, 2020, Available from: <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/reducing-stigma.html>
 16. Lin CY. Social reaction toward the 2019 novel coronavirus (COVID-19). *Social Health and Behavior*. 2020 Jan 1;3(1):1.
 17. WHO. A guide to preventing and addressing social stigma associated with COVID-19. *World Health Organization*. 24 February 2020. Accessed on August 23, 2020, Available from: https://www.who.int/publications/m/item/a-guide-to-preventing-and-addressing-social-stigma-associated-with-covid-19?gclid=Cj0KCQjwp4j6BRCRARIsAGq4yMFQOvIXM1xPV7GUPgY4T0YrE5Duz0HYJT8g6BBqdJNvYqr7TZtT73MaAsZkEALw_wcB
 18. Canada. New measures for COVID-19 response. *Government of Canada*. 2020. Accessed on March 21, 2020, Available from: <https://www.canada.ca/en/transport-canada/news/2020/03/new-measures-for-covid-19-response.html>
 19. CDC. Coronavirus disease 2019 (COVID-19) how to protect yourself. *Centers for Disease Control and Prevention*. 2020. Accessed on March 18, 2020, Available from: <https://www.cdc.gov/coronavirus/2019-ncov/prepare/prevention.html>
 20. BCCDC. COVID-19. *BC Centre for Disease Control*. 2020. Accessed on March 22, 2020, Available from: <http://www.bccdc.ca/health-info/diseases-conditions/covid-19>