

# Effect of Social Isolation on Covid-19 Risk Taking Behavior

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## **Abstract**

**Background:** The Covid-19 pandemic in 2020 has changed the daily lives for everyone. Many governments around the world instituted social distancing measures in order to slow the spread of the Covid-19 virus in the general population. Although social distancing has proven to be effective in slowing down the spread of the Covid-19 virus, it has brought an unintended effect of social isolation and decreases in mental health for many people. Loneliness and the lack of social support for individuals likely played a large part in individuals risk assessment when partaking in social interactions at the expense of Covid-19 exposure. However, social isolation does not affect every individual equally. The effect varies depending on living situation, employment, age, and cultural background. This study examined the relationship between age and ethnicity of individuals and their willingness to participate in social interactions at the expense of exposure to Covid-19.

**Methods:** An online survey with situational questions was distributed through the online platform Survey Monkey for those who are currently residing in Canada. Chi-square statistical tests were performed to identify any association with the age and ethnicity of the individual and their willingness to participate in social activities with risk of Covid-19 exposure.

**Results:** The survey resulted in 136 responses. Each individual of the 136 respondents answered eight situational questions which resulted 688 data points for those who are aged under 29, 332 data points for those who are aged over 30, 143 data points for those identified as belonging to a collectivistic community, and 869 data points for those who identified as belonging to an individualistic community. The present study found a statistically significant association between age of individuals and their willingness to participate in social activities with risk of Covid-19 ( $p=0.0004$ ), with younger persons more likely to participate than older individuals but no statistically significant association between ethnicity of individuals and their willingness to participate in social activities with risk of Covid-19 ( $p=0.1462$ ).

**Conclusion:** This study showed that younger persons were more willing to risk exposure to COVID 19 than to be socially isolated. In British Columbia this was seen during the second and third waves of the pandemic where younger persons were more likely to develop COVID 19, and this increased incidence of disease was associated with large social gatherings and workplaces where the workforce is predominantly younger. This suggests that public health messaging for those 30 and under needs to be improved and made more relevant to their lifestyles. With respect to ethnicity and willingness to risk exposure to COVID 19 in order to avoid social isolation, the results did not show any statistically significant associations. It should be noted, however, that our study had a small sample size for those who identified being from a "Collectivistic" Community, and further research is needed to confirm or refute these findings.

**Keywords:** Canada, Covid-19, social isolation, risk, age, individualism, collectivism

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## **Introduction**

As of April 25th, 2021 there have been 147.6 million cases of Covid-19 and

3.11 million Covid-19 related deaths globally (Worldometer, 2021). Although there are high numbers of deaths and more

stringent protocols are recommended by the health authorities, the new case numbers continue to grow every day. Vaccine rollout has been slow and unpredictable in many countries. As such, health authorities around the world continue to stress the importance of preventative measures against Covid-19 such as social distancing. At the same time social isolation caused by social distancing seems to have negative effects on the mental health of the general population and most likely played a role in individual's risk assessment on partaking in social interactions at the expense of Covid-19 exposure.

### **Literature/Evidence Review**

#### **COVID 19 and Mental Health**

Social interactions provide many benefits to the individual psychology and social isolation can lead to deterioration of mental health (Myers, D. G., 2010). A large scale online public survey on how the residents of British Columbia are faring during the first few months of the Covid-19 pandemic was performed by the British Columbia Centre for Disease Control (BCCDC) followed by another survey in

spring of 2021 (BC COVID-19 SPEAK Round 2 Survey). The first survey was open from April 24th to May 12th of 2020 and resulted in 394,982 responses. On July 20th of 2020, the Provincial Health Officer of British Columbia Dr. Bonnie Henry held a daily briefing on Covid-19 pandemic update where preliminary results of the first survey was disclosed to show that 47% of the respondents reported that their mental health worsened during the Covid-19 pandemic (Zussman, 2020). Results of the second BC CDC survey, will be published in the summer of 2021.

Decreases in mental health was not associated with a particular age group or isolated to the residents of British Columbia. However, a survey study performed by Nwachukwu et al. (2020) on 8,267 residents of Alberta assessing associations between age and prevalence of perceived stress due to the Covid-19 pandemic found that younger age groups reported more high levels of stress than older groups. 96.3% of respondents in the age group  $\leq 25$  years reported high stress, 91.1% of respondents in the age group 26- 40 years reported high stress, 81.9% of respondents in the age 41- 60 years reported high stress, and 68.2% of

respondents in the age group > 60 years reported high stress.

Poor mental health can be caused by multiple factors of the Covid-19 pandemic such as social isolation brought by social distancing measures. Moreno et al. (2020) reported that the sudden lockdowns and physical distancing implemented by the Covid-19 pandemic can cause high levels of stress in the population through a number of different factors. Social isolation exerts a negative effect on the mental health for people with pre-existing health problems, Covid-19 patients, family members of Covid-19 patients, and single-family households. Although Monreno et al. also discuss other factors of the Covid-19 pandemic that may contribute to the decrease of mental health in the population; the lack of social distancing shown by the rising new daily Covid-19 case numbers support the possibility that the general public's need for social interaction is outweighing the fear of Covid-19.

### **Social Distancing and Social Isolation in Relation to Age**

The BCCDC Covid-19 Situation Report for the month of November of 2020

shows that out of the 18,799 cases reported by week 45 (November 7th, 2020) 12% were in the age group 0 – 19 years, 44% are in the age group 20 – 39 years, 28% are in the group 40 – 59 years, 13% are in the age group 60 – 79 years, and 4% are in the age group 80+ years. Almost half the Covid-19 cases occur within the age group 20-39 with the highest concentration of Covid-19 cases in the 20 – 29 age group which accounts for 24% of the total 18,799 cases. An opposite trend is seen in mortality rates, out of the 279 deaths caused by Covid-19 0% are in the age group 0-39 years, 4% are in the age group 40-59, 28% are in the age group 60-79, and 67% are in the age group 80 + (BCCDC, 2020). The high incidence of Covid-19 cases in the age group 20-29 have been blamed on reckless behavior of young people by authorities (Oltermann, 2020), however a global survey performed by International Security and Development Center (ISDC) across 12,000 participants in 130 countries showed that people in the age group 18-25 actively perform preventative measures against Covid-19 as much as people in age group > 45 (Richardson, 2020).

Preventative measures against

Covid-19 such as social distancing may be a contributing factor to the high frequency of Covid-19 cases in the younger age group. A study by Zhaoyang et al. in 2018 examined the association between the frequency of social interaction and age group. 173 participants between the ages of 20 to 79 reported their social interaction at five random times in a day for a week. The data gathered during this study showed no statistically significant difference in the frequency of social interaction across different age groups. However, another paper presented by the same authors in 2019 showed that there is an association between age group and the different attributes of social interaction. There was a higher value towards the quality over quantity of the social interaction for the older population, while the younger population valued the quantity of social interaction over quality (Zhaoyang et al. 2019). Quantity of social interaction being valued over quality of social interaction and the zero mortality rates amongst younger population may be one of the key factors behind the high incidence rate of Covid-19 cases in the 20-29 age group in BC.

### **Social Distancing and Social Isolation in Relation to Ethnicity**

The global Covid-19 Dashboard designed by Gardner (2020) at Johns Hopkins University showed that the success rate for early response against Covid-19 varied greatly for every country. Different countries can be categorized with six different cultural dimensions set forth by Hofstede (2011). One of the categories is individualism / collectivism where Hofstede measures how much the individual prioritize self over the collective. Fincher et al. (2008) compared 98 regions with individualism / collectivism data with the historical pathogen prevalence and found behaviorism in collectivism society were more effective in inhibiting transmission of pathogens.

The fundamental basis of collectivist society may encourage individuals to value the safety of the collective over the individual need for social interaction created by social distancing. Individuals of collectivist society feel less social isolation compared to individuals in individualistic society due to the cultural-psychological effect. Study by Heu et al. (2019) shows that higher collectivism characteristics were

related to lower loneliness compared to individualism. Heu et al. coined the findings as those who are in a collectivistic society are lonely-together while those in individualistic societies are lonely-alone. Furthermore, an eight multilevel analysis of 42,769 resident's data in European society by Lykes and Kemmelmeier (2013) found that absence of interactions with family was linked with loneliness collectivistic society and absence of interactions with friends was linked with loneliness individualistic society. Ethnic groups with individualistic society roots may experience higher levels of stress from social isolation and value meeting friends over family. This may result in individuals with individualistic qualities to value social interaction with friends over the safety from Covid-19.

### **Purpose of Study**

The purpose of this study was to identify the willingness of the general public to risk exposure to Covid-19 in order to fulfill their social interaction needs based upon different age groups and ethnicity. The outcomes of this study can be utilized by various health authorities as a guideline to set specific target populations and

educate the importance of social distancing to avoid further spread of Covid-19. Different categories of social activity can be compared to safer situations with Covid-19 preventative measures to determine if the public health awareness and messaging is adequate in dealing with situations where Covid-19 exposure could happen.

### **Materials and Methods**

#### **Materials**

The material used in this project was a computer to manage the survey and analyze data. The survey was performed via the online platform Survey Monkey ([www.surveymonkey.com](http://www.surveymonkey.com)) and statistical analysis was carried out on Microsoft Excel and NCSS 2021 (NCSS, 2021). A \$100 gift card was prepared as a prize for participants wishing to enter the prize draw.

#### **Methods**

Data for this project were collected via the online survey platform Survey Monkey (<http://www.surveymonkey.com>). The survey was open for two weeks from January 18th to Feb 1st, 2021. The participants were recruited through social media platforms such as Reddit and

Instagram and by email invitations.

### **Inclusion and Exclusion criteria**

Participants were restricted to current residents of Canada. To increase the randomness of responses, friends, family members, or classmates of the primary investigator were excluded from the survey.

### **Ethical Consideration**

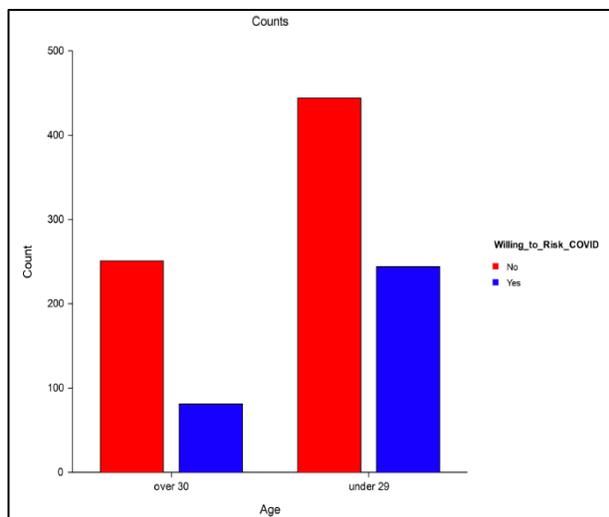
Survey questions were submitted to the BCIT Research Ethics Board for ethical review before being distributed publicly. The current study survey questions received approval from the BCIT Research and Ethics Board on January 6th of 2021. No personal information was collected unless the responder chooses to provide their email for the prize draw. The prize draw was conducted under the supervision of faculty advisor Helen Heacock.

### **Results**

NCSS 2021 (NCSS, 2021) was used for inferential statistical analysis through the Chi-square test method. Chi-square test was chosen since the present study attempts to find any association between three variables: age, ethnicity, and

willingness to partake in social activities during Covid-19 pandemic. Age and Ethnicity of the respondents were tested individually for a possible association with the choice of whether an individual would chose to partake in different levels of Covid-19 risky behaviors to fulfill their social interaction needs.

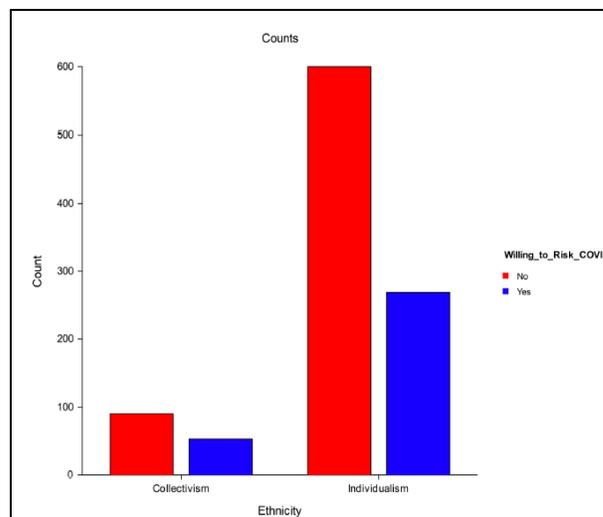
Age groups have been simplified to a younger generation under the age of 29 and older generation over the age of 30. Each individual of the 134 respondents answered eight situational questions which resulted in a total of 688 data points for those who are aged under 29 and 332 data points for those who are aged over 30. Figure 1 shows that 24.4% of the respondents in the age group of over 30 responded “Yes” while 75.6% responded “No” to situations that would be considered unsafe and would contravene the BC Public Health Orders in place at the time of the survey. The responses in the age group of under 29 were 35.5% “Yes” while 64.5% responded “No”. Chi-square test with these grouping of data points resulted in a p-value of 0.0004 suggesting that younger respondents were more likely to risk contracting Covid-19 in order to fulfill their



**Figure 1 NCSS Cross Tabulation Report for Age vs Willingness to Risk Covid-19 for Social Interaction** social needs than the older participants.

The eight ethnicity groups were categorized into either individualistic communities or collectivist communities according to the Hofstede cultural dimension individualism scores (Hofstede, 2011). Europe, North America, and Oceania were grouped together as individualistic communities. Eastern Asia and Western Asia were grouped together as collectivistic communities. The “None of the above” response was discarded for this analysis since it was impossible to determine which type of community they belong to without more information.

134 respondents answered eight situational questions which resulted in a total of 143 data points for those identified



**Figure 2 NCSS Cross Tabulation Report for Ethnicity vs Willingness to Risk Covid-19 for Social Interaction**

as belonging to a collectivistic community and 869 data points for those who identified as belonging to an individualistic community. Figure 2 shows that 37.1% of the respondents who identified as belonging to collectivistic community responded “Yes” while 62.9% responded “No” to the eight situational questions. 31.0% of the respondents who identified as belonging to an individualistic community responded “Yes” while 69.0% responded “No” to the eight situational questions. Chi-square test with these ethnic groups resulted in a p-value of 0.1462 and the ethnicity null hypothesis cannot be rejected.

Question Number	Questions
1	What is your age?
2	Which of the following places did you spend the majority of your childhood (0-18 years)?
3	Are you currently residing in Canada?
4	It is your nephew's birthday and about 10 extended family members will be there for the birthday party at his house. Would you go to the party?
5	You arrived at a restaurant with your friend that you guys been looking forward to all week. 10 people are lined up outside, but they are not keeping 2 meter distance between them. Would you line up?
6	It is Friday night, your friend calls you and says 5 of them are going to the bar/nightclub and invites you. Would you go with your friends?
7	Your sister just graduated and invited you to the convocation held in a hotel conference room (approx. 50 people will be there). Would you go to the convocation?
8	You and 4 friends just had dinner and were about to head home. One of your friends suggests carpooling to the movies nearby. Would you carpool to the theater?
9	Your friend calls and says he needs one more person to play 5 vs 5 basketball. Your friend says he booked a small indoor elementary school gym. Would you join for the basketball game?
10	Your parents call to say they miss you and ask you over for dinner along with your sister. Would you pick up your sister and go to your parent's house?
11	2 of your friends are planning to go hiking/fishing and asked you to join them. Would you go with them?
12	Would your answers change for questions 4 ~ 11 if you were asked them in the summer of 2020 before the second wave of Covid-19 cases?
13	Would your answers change for questions 4 ~ 11 if there were NO restrictions in social gatherings (lockdowns) in place by the government?
14	Please leave an email if you wish to participate in the prize draw for a \$100 Prepaid Visa Card. You can skip this question if you do not wish to enter into a prize draw.

## Discussion

### **Association Between Age of Individual and Willingness to Participate in Social Interactions**

Results of the present study showed a statistically significant association between the age of the individual and their willingness for social interaction over safety from Covid-19. For the purpose of this study, Younger Age Group (YAG) was categorized

as those who are under 30 and Older Age Group (OAG) was categorized as those who are 31 or older.

Similar responses can be found where more than 70% of the participants in both groups would not risk high Covid-19 risk scenarios with situations such as >10 people in the scenario and high-risk activities such as gym or nightclub (See figure 3, questions 4, 6, 7, and 9). These

common responses denote that high Covid-19 risk nature of the situation deters social interaction regardless of age of the individual.

For medium to low Covid-19 risk activities, YAG participants report higher rates of willingness to participate in social interactions compared to that of OAG participants in most scenarios (Figure 3, Questions 5, 8, 10, and 11). This may be related to stress relief associated with being social. This aligns with the study performed by Nwachukwu et al. (2020) where respondents in the age group 25 or younger reported the highest stress levels during the initial months of Covid-19 pandemic. Younger people tend to be more social by nature and have various characteristics that allow them to be more socially active. Furthermore, younger people experienced less morbidity and mortality from Covid-19 compared to older people in BC, particularly during the first and second waves of the pandemic (BCCDC, 2020). This fact was common public knowledge at the time of the survey and it most likely influenced the responses of the YAG participants towards more participation for social interaction. The present study did find that older aged

individuals were more willing to participate in some social interactions provided in the scenario questions compared to younger individuals (figure 3, questions 4, 9, and 11). However, the results of these scenario questions were most likely due to the small pool of survey respondents.

Furthermore, questions 4, 9, and 11 (Figure 3) have no common theme in terms of the nature of the social event, the identity of the participants (friends or family members), or the total number of the participants in the scenario. Considering the above facts, it is most likely that the small number of total participants of this survey contributed to the result where some questions had higher OAG participants willing to participate in social interactions than YAG participants.

### **Association Between Ethnicity of Individual and Willingness to Participate in Social Interactions**

Results of the present study did not show an association between ethnicity of the individual and their willingness for social interaction over safety from Covid-19. This can be due to two possible reasons: The cultural character of collectivism and

individualism does not play a great role in determining the choice of participating social interaction over safety from Covid-19, or the results of this study may be invalid due to the small number of responses.

Collectivistic societies have many values which would aid in inhibition of pathogen transmission during a pandemic (Fincher et al., 2008). As Hofstede (2011) points out, collectivist societies place the values of the society above the individual and steer away from actions that would benefit the individual at the expense of the community. Therefore, individuals will adhere to precautionary and preventative measures against a disease during a pandemic with less resistance. However, the line between collectivism and individualism is not always clear. Individuals who are from collectivist societies and live in an individualism society would have a mix of both cultural characters. The true cultural identity in terms of individualism and collectivism of an individual would depend on where they received their education during their youth when their social identity was forming by observing and learning from their surroundings.

Individuals who identified them-

selves to be from a collectivist heritage may have been influenced by Canadian society and the characteristic of collectivism could have faded away or have been replaced by individualism values. In such cases, although the individual identified themselves as a collectivistic individual, they are more similar to an individualistic individual. This would cause problems with the validity of this study since the researcher attempted to use ethnicity of the participants as a measure to determine the individual's identity in either collectivism or individualism category.

A more likely problem that contributed to the determination of no association between the ethnicity of individual and their willingness to participate in social interaction is that the response rate was too low for this survey to provide valid results. Out of the total responses (N = 134) only 13.4% (N=18) of the participants identified themselves belonging to a collectivistic heritage. Furthermore, the current study was open for a relatively short period of time to account for the external conditions that might affect the survey responses such as a government-mandated lockdown or change

in social distancing / gathering policies. Due to the low number of responses from these constraints, it is the opinion of the researcher that the validity cannot be assured for the chi-square test testing for association between the ethnicity of the individual and their willingness to participate in social interaction.

### **Knowledge Translation**

The present study found that the Canadian participants were aware of the high-risk Covid-19 activities and were not openly willing to participate in those activities. Therefore, health authorities and respective governmental authorities should place more emphasis on educating the public on the medium and low Covid-19 risk activities to further prevent Covid-19 spread. Especially in the current situation where variants of Covid-19 are starting to emerge in Canadian population and vaccination rollout is happening at a slow rate.

### **Limitations**

The greatest limitation for this study was the government mandated social distancing orders which resulted in this

survey only being feasible in conducted on-line. Due to the nature of the independent variables of this study, it was vital that a broad spectrum of age and ethnicity be included to provide valid results. However, only online platforms were available for survey methods and age/ethnicity pool of respondents are greatly biased depending on which platform/website the survey was accessed at. Furthermore, there were new orders and policy changes every week during the course of this survey. As the survey responses were likely to change depending on the current government policies, it was difficult to collect large number of responses since the survey could only be open for a short period.

Furthermore, this study was only conducted in English. This most likely resulted in a bias in sampling as only those who are fluent in English would be able to participate in this study. This was a significant limitation since one of the independent variables was ethnicity of the respondents and only persons fluent in speaking English were likely to participate. If the survey was translated into multiple languages and placed in locations where there was high traffic of individuals who

spoke the respective languages, there would have been a much more balanced and accurate pool of results.

### **Future Research**

- Repeat this study after the Covid-19 pandemic ends and compared the results
- Research changes in behavior of individuals between early pandemic days when OAG were at higher risk and current situation when non-vaccinated YAG are more at risk.
- Repeat this study by translating it into multiple languages and by distributing via multiple methods.

### **Conclusions**

A online survey (N=136) of those residing in Canada resulted in a statistically significant association between age of individuals and their willingness to participate in social interactions at the expense of Covid-19 exposure during the first year of the 2020 Covid-19 pandemic, but no statistically significant associations between the ethnicity of the individual and their willingness to participate in social interactions were observed. However, the small sample size, particularly among those identifying as being from a collectivist society, may have diminished the validity of the study. As such, the findings of this study

can be used as a guide to design further studies and parameters for any future Covid-19 related research on behavioral choices during times of great stress.

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### **Competing Interest**

The author of this paper declares that they have no competing interests.

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