Rapid COVID-19 Test: Investigating the Willingness to Take a Rapid Test Based on Multiple Factors

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Abstract

The COVID-19 Pandemic has had a significant impact on society. Due to the large loss of life, scientists have attempted to develop various rapid testing methods. Several methods have been developed among them, an inexpensive paper test. The researcher has endeavored to determine what factors will influence a person's willingness to take a daily COVID-19 test. Via a survey instrument that was disseminated we received a response of N=546 participants. We performed many standard statistical tests, t-tests, and one way ANOVA's as well as Chi Squared tests and Linear by linear associations. Via this analysis we were able to determine that there is a statistical significance between willingness to take daily rapid COVID-19 test ($p < 0.05$ and, washing your hand ($p < 0.001$), being cautious of your actions ($p < 0.001$), being concerned about COVID-19 ($p < 0.001$) and preventing things before they happen ($p < 0.001$). Risk averse people are more likely to take preventative measures to take actions to protect themselves and others around them. The lack of basic knowledge regarding the replication of SARS-CoV-2, has led people to underestimate the rapid spread of the virus. Thus, people are coming in contact with others during the most virulent state of the virus.

Key Words: rapid testing, COVID-19, coronavirus, vaccines, SARS-CoV-2, infectious rate, correlation, preventative measures, risk averse, oral hygiene

Introduction

During the pandemic we are living in, Covid-19 is what is always going to most people's minds during the day. Due to the large loss of life, many scientists are already working on various topics regarding this virus. I decided to focus on the controversy of effective and constant testing. Testing is a very important part of stopping the spread of Covid-19. Sars-CoV-2 is a virus that has a high transmissibility rate, which is why the country and places all over the world went into panic. The general public was mandated to wear masks and go into quarantine. We also had to close down many large businesses, schools, restaurants, and gathering areas. We are seeing the lasting effects of this virus constantly as we have been in lockdown for over a year. Rapid testing is a way to test for coronavirus in shorter spans, instead of having to wait 5-9 days for lab results. I found that researchers were already able to develop several methods of rapid testing, among them being the inexpensive paper test. This stuck out to me. If many health professionals were advocating the need for frequent testing, and there was a non-invasive, cheap COVID-19 test available, why was this resource not being utilized? In this project we are attempting to determine if there is correlation between which factors can influence a person's willingness to self-administer a daily rapid COVID-19 test. Our hypothesis includes seeing if correlation existed between a variety of variables. First, we wanted to see if an individual flosses daily/ has "good" hygiene practices, then their adaptability to taking a daily Covid-19 test is more likely. We also wanted to take a look at if an individual falls into the category of being female, having an education level over a High school diploma, and getting a health check-up at least once a year then they are more likely to take a daily rapid Covid-19 test. If people agree to the statements of trying to prevent things before they happen and thinking about actions and

how they affect others are more likely to take the daily Covid-19 test. And finally, if people responded to being very concerned with COVID-19 and not testing positive for COVID-19 then they are more likely to be interested in rapid testing.

Methods

We administered a survey of over 500 participants. I then disseminated the survey on many different platforms to have as many people complete it in a variety of locations including Hillsborough County and Tampa. Anyone will be able to complete the survey middle school and above and includes a variety of age ranges to choose from. There are no specific targets as vulnerable populations however minors are encouraged to complete the survey, so I am able to analyze the data at a larger scope. I included many economic ranges as well, to make sure the sample size is representative. I found participants from various platforms through the internet and spreading the word.

Data included questions regarding demographic characteristics, daily health habits, and personals. All data was collected anonymously. Not all questions will be required. No risks are associated with this survey, it is simply a questionnaire about a reflection of daily habits and thoughts on the current pandemic. This data was then compared to itself and analyzed using a myriad number of methodologies. These included t-tests, ANOVAS, correlation tests, homogeneity tests, and Chi Squared tests. The questions we asked our participants included:

1. Where do you live? (Options: USA, Europe, United Kingdom, South America, Central America, Asia, Africa, Australia/ New Zealand)- required

2. Gender you identify with (Options: Male, Female, prefer not to answer)- required
3. How old are you? (Options: 8-13, 14-18, 19-23, 24-30, 31-45, 46-60, 61+)- required
4. Education level (Options: Middle school or below, High school, High school Graduate, Bachelor's Degree, Master's Degree, PhD/ MD/ JD)- required
5. What is your income range? (Options: < \$26,000, \$26,000-\$40,999, \$41,000-\$65,999, \$66,000-\$75,999, \$76,000 and above)
6. Would you consider yourself hygienic? (Options: Mostly, Somewhat, Normal, Less than normal, Not at all)- required
7. How healthy do you consider yourself? (dietary) (Options: Mostly, Somewhat, Normal, Less than normal, Not at all)- required
8. How healthy do you consider yourself? (Physical Activity) (Options: Mostly, Somewhat, Normal, Less than normal, Not at all)- required
9. How often do you get a health checkup? (Options: Once in 3 months, once in 6 months, once a year, only when needed, never get it done, Other)- required
10. Only answer if you take medications routinely: How did you take you medication (in the past week) (Options: Without help, with a reminder (someone had to tell you), Completely unable to take it, forgot to take it once, forgot to take it more than once, other)
11. How often do you brush your teeth (Options: I don't brush my teeth, Sometimes, Often, Every day, Twice a day, After every meal, other)- required

12. How often do you floss (Options: I don't floss, Sometimes, Often, Every day, Twice a day, After every meal, other)- required
13. How often do you wash your hands? (Options: I don't wash my hands, Sometimes, Twice a day, Before every meal, Every couple of hours)- required
14. How much do you agree with the following statement: I tend to prevent things before they happen or get too large (Options: Strongly disagree, Disagree, Neutral, Agree, Strongly agree)- required
15. How much do you agree with the following statement: I am cautious about my actions and how they affect others (Options: Strongly disagree, Disagree, Neutral, Agree, Strongly agree)- required
16. How concerned are you with Covid-19 (Options: Not concerned at all, Not really Concerned, Somewhat concerned, Concerned, Extremely Concerned)- required
17. Have you tested positive for Covid-19? (Options: Yes, No)- required (question was modified after survey results started coming in)
18. If there was a non-invasive, cheap, daily Covid-19 test, that gave results back in about 10 min, would you take it? (Options: No, Probably not, I would try but I would probably forget, I don't know, Probably, Yes)- required
19. If you aren't interested in rapid testing, why? (Open ended Question)-required
20. Email Address (Open ended Question)

Results & Analysis

This study effectively identifies the correlation between various variables that support the hypothesis as well as finding other correlations among that data and trends that can be applied to using this theory in our daily lives. I was able to determine that there is statistical significance between a variety of the variables that I decide to test in my survey. This included variables such as washing your hands, being cautious about your actions, being concerned about COVID-19, having a tendency to prevent things before they happen, having good dietary health, brushing your teeth the recommended or a greater number of times, taking your medications on time, having a generally hygienic lifestyle, as well as age and gender.

Frequency of washing hands vs Non-invasive test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	67.139 ^a	30	<.001
Likelihood Ratio	32.325	30	.353
Linear-by-Linear Association	.270	1	.604
N of Valid Cases	546		

This Table shows the Pearson Chi-squared

values along with the significance value for the variable and question related to “Frequency of washing hands” vs the non-invasive Test variable.

Tests of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
Age	Based on Mean	1.063	5	.460
	Based on Median	1.428	5	.402
	Based on Mode	1.428	5	.402
	Based on Mean and Std. Deviation of	1.428	5	.402
	Based on trimmed mean	1.063	5	.460
Frequency	Based on Mean	1.387	5	.340
	Based on Median	.287	5	.940
	Based on Mode	.287	5	.940
	Based on Mean and Std. Deviation of	.287	5	.940
	Based on trimmed mean	.732	5	.680
Gender	Based on Mean	1.138	5	.390
	Based on Median	1.281	5	.360
	Based on Mode	1.281	5	.360
	Based on Mean and Std. Deviation of	1.281	5	.360
	Based on trimmed mean	1.076	5	.450
HealthStatus	Based on Mean	1.810	5	.170
	Based on Median	1.874	5	.160
	Based on Mode	1.874	5	.160
	Based on Mean and Std. Deviation of	1.874	5	.160
	Based on trimmed mean	1.138	5	.390
HealthStatus	Based on Mean	.857	5	.670
	Based on Median	.530	5	.570
	Based on Mode	.530	5	.570
	Based on Mean and Std. Deviation of	.530	5	.570
	Based on trimmed mean	.772	5	.610
Race	Based on Mean	.844	5	.630
	Based on Median	.490	5	.800
	Based on Mode	.490	5	.800
	Based on Mean and Std. Deviation of	.490	5	.800
	Based on trimmed mean	.652	5	.690
Ethnicity	Based on Mean	.723	5	.680
	Based on Median	.585	5	.770
	Based on Mode	.585	5	.770
	Based on Mean and Std. Deviation of	.585	5	.770
	Based on trimmed mean	.778	5	.680

Conclusion

This specific paper test is able to detect the presence of COVID-19 and 50% interval of COVID-19 cases but it's not just any 50%. This test is able to detect the middle 50% of having COVID-19. This means it can detect the virus before you are under the contagious stage. Since this paper test can give back results in about 10 to 15 minutes and is about 1 to 2 dollars, which is very cheap this can be in an affordable method for slowing the curve of coronavirus. This test is although not as sensitive as a CDC would like it to be, it's significance level is able to detect data that will actually help in the spread of the virus. Through increase knowledge about the

availability of this test and education on why this is important will be key in the next steps of this method. Based on some open-ended questions on reasons why people would or would not like to take the Covid test we were also able to determine that there is a lack of knowledge the replication and period of time SAR-CoV-2 is infectious in your body. Due to this lack of knowledge people have tended to underestimate the rapid spreading of this virus and thus people are coming into contact with others during the most virulent state of the virus. We are able to conclude that risk-averse people are more likely to take preventative measures and actions to protect themselves and the people around them, which in this case would lead to them adopting the use of a daily rapid Covid-19 test.

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