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The Prevention and Recognition of Strokes in the Inland Empire

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Community Health Project

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Abstract

Our aim was to increase awareness of strokes and stroke prevention within the adult communities in the Riverside and San Bernardino counties. We wanted to educate parents and young adults attending college, as these include groups that can either be at risk for stroke or are at a young enough age to instruct good habits on preventing the development of risk factors. The educational material was presented through the use of a powerpoint on Zoom meetings where attendance was optional. Additional education material and other promotional material for the increase of stroke awareness was available through online resources, such as a website and social media. Data was gathered through the use of a pre- and post- survey which were analyzed and compared to determine the efficiency of the education material our attendees were presented. Our results found that there was a general and significant increase in knowledge of stroke awareness and prevention amongst our participants, using descriptive statistics, paired t-test and ANOVA analysis. Our conclusion was that the presentation was effective in educating the Riverside and San Bernardino community we were able to present to. However, due to the limitations set forth by social distancing, we were unable to reach out to a large portion of the community. Further research would focus on reaching out to a wider audience and performing a longitudinal study on whether participants maintained healthier lifestyles and had lower incidences of developing risk factors associated with stroke, such as hypertension, diabetes and high cholesterol.

Keywords: stroke prevention, stroke awareness, Riverside County, San Bernardino County, Future Physician Leaders

Stroke Awareness and Prevention

The goal of this study is to educate the local communities in Riverside and San Bernardino county by increasing awareness of strokes and ways to prevent them. According to the American Stroke Association (ASA), strokes occur when there is a disruption of blood flow in the brain, either due to a clot or rupture of a vessel, causing areas within the brain to die in the process (“About Stroke”, 2020). Common stroke symptoms include: facial droop, numbness, tingling or weakness to one side of the body, and difficulty speaking. As noted in “Heart Disease and Stroke Statistics-2019 Update: A Report From the American Heart Association” (Benjamin et al.), some of the risk factors associated with strokes were high blood pressure diabetes, high cholesterol, smoking, a sedentary lifestyle and an unhealthy diet. Fang et al. (2008, as cited on CDC, 2020) stated that time is of the essence when stroke occurs and it is important for an individual to seek medical attention right away as the sooner they are treated the less likely it is that they suffer from long-term disabilities due to a stroke. Treatments for stroke will vary between individuals depending on what caused their stroke and may include medications to thin your blood, prevent further clotting or breakdown existing clots (“Stroke | CVA | Cerebrovascular Accident”, 2020). From there, the patient may need to attend rehabilitation to regain any motor function they lost due to the stroke as well as work with their doctor on prevention methods so that another stroke does not occur (“Stroke | CVA | Cerebrovascular Accident”, 2020)

According to the CDC, strokes are the fifth leading cause of death in America (“Stroke Facts”, 2020). According to the National Center for Health Statistics, 7.8 million adults in the United States have suffered from a stroke during their lifetime, which is about 3.1% of the adult

population (“FastStats - Cerebrovascular Disease or Stroke”, 2016). In the state of California, 6.4% of seniors have had a stroke (United Health Foundation). While it is the fifth leading cause of death in the United States, it is the third leading cause of death in California (“California State Fact Sheet”, 2019). According to the CDC, as cited on America’s Health Rankings, California’s rate of strokes was 2.6% in 2019. In Riverside, the percent of adults who have experienced a stroke is 2.5% and in San Bernardino, it is 2.8% (“Adults who Experienced a Stroke,” 2020). Overall, Riverside and San Bernardino Counties have a higher combined average stroke rate than California, but a lower stroke rate than the national rate at 3.4% in 2019.

Although strokes are more commonly thought to affect the older generations, they can happen to anyone, regardless of age or gender. According to the American Stroke Association (2018), women have a higher risk than men of developing a stroke with approximately 55,000 more women suffering from a stroke each year than men in the United States of America. In regards to race/ethnicity, minorities tend to be affected more than the Caucasian population. African Americans have the highest death rate due to strokes and are almost double as likely to develop a stroke compared to Caucasians according to “Vital Signs: Recent trends in stroke death rates” (2017, as cited on the CDC). This study also found that although stroke death rates were on the decline for decades among all race/ethnicities, Hispanics have seen an increase in death rates due to strokes since 2013. In the Riverside/San Bernardino area, where Hispanics/Latinos, as well as women, make up 50.0% or more of the population (US Census Bureau QuickFacts, 2019), it is important to raise awareness and teach preventative measures in hopes of reducing the risk of development of strokes within these groups.

The objective of this project is to increase awareness of what a stroke is, how they present themselves and with a better understanding of the risk factors that could raise your chances of having a stroke, such that the Riverside/San Bernardino community will see a decrease in stroke occurrences and in effect increase the quality of health of all individuals within the two counties.

Methods

Participants

At first, our target population was the general public, but this was narrowed down to both parents and young adults, as these groups are either at risk for having strokes or at an early enough age to implement preventative measures that would reduce their risk of stroke in the future, respectively. Many of the young adults that were reached out to were involved in pre-med clubs and actively pursuing a career in medicine which provided the added benefit of educating a future generation of providers who could further spread awareness of our topic. Outreach was conducted by sending out emails to organizations, such as local parent centers and clubs on college campuses that could either host or promote attendance at our Zoom meetings. Flyers were made which provided potential attendees with a QR code and link to attend the meeting, as well as an Instagram handle that would take viewers to our account which would promote our meetings an hour before the event.

We presented to adults in the Inland Empire community through the San Bernardino Family Engagement Center. By presenting to COPE Health Scholars, UCR Shadow MD, UCR Friends of Dialysis, and students of CSUSB we will be educating students hoping to obtain a

career in the medical field. Thus, they can spread stroke awareness in their communities and have greater knowledge about the topic as they continue their careers as physicians.

A total of 41 people attended our Zoom presentation with a large portion of the audience within the age range of 18 to 24. However, we did a few participants between the ages of 25-31 and a single participant between the ages of 32-38. Our demographics included roughly 50% of our participants declaring Asian as their race, with Middle Eastern and Hispanic/Latino(a) as the next highest reported, then Caucasian, African-American and Filipino following.

Health Education

Due to the COVID-19 pandemic and consequential need for social distancing, education about our topic was presented through the use of Zoom meetings from July 21, 2020 up to July 24, 2020.. We created a Powerpoint that presented information on strokes including but not limited to, what a stroke is, signs/symptoms, risks factors, preventative measures, possible treatments and long-term effects. Quizzes were implemented throughout the presentation to make it more interactive for the audience and to test how well material was being presented real-time.

The audience was also provided with links for both a website and social media account on Instagram that provided further information about our group or the topic of stroke. The website was supplemented with infographics and a collection of resources that were made available to visitors who would like to gain more information on strokes, connect with support groups, or to find local health clinics or organizations that offered other health education that could be used to reduce risks for strokes, such as healthy eating or exercise classes. Phone applications were also provided that could be used as a starting point for tracking healthy habits,

such as calorie counting, meal tracking or information on exercise routines that could be done at home.

Audience members were asked to complete a voluntary Pre- and Post-Survey provided on Google Forms. The Pre-Survey was used to assess demographics, such as age and ethnicity, and how knowledgeable participants were about strokes and living a healthy lifestyle. After completion of the presentation, the Post-Survey was given where we again asked them to rate their knowledge on strokes and if they plan to maintain a healthy lifestyle in the future. Data gathered from both surveys was analyzed and compared to determine how efficiently we educated the community on stroke awareness and prevention. Participants were informed beforehand that they were eligible for entry into a raffle with a randomly drawn winner who would receive a \$5 gift card for completing both the Pre- and Post-Survey. A portion of participants were also incentivized by their club's coordinators for attending the presentation.

Results

Demographics

Our project aimed to educate the Riverside and San Bernardino communities on the topic of strokes, while also raising awareness on methods to prevent them from occurring. We had a total of 41 attendees for our presentation with survey responses from 30 participants.

Figure 1

Distribution of Age for Participants

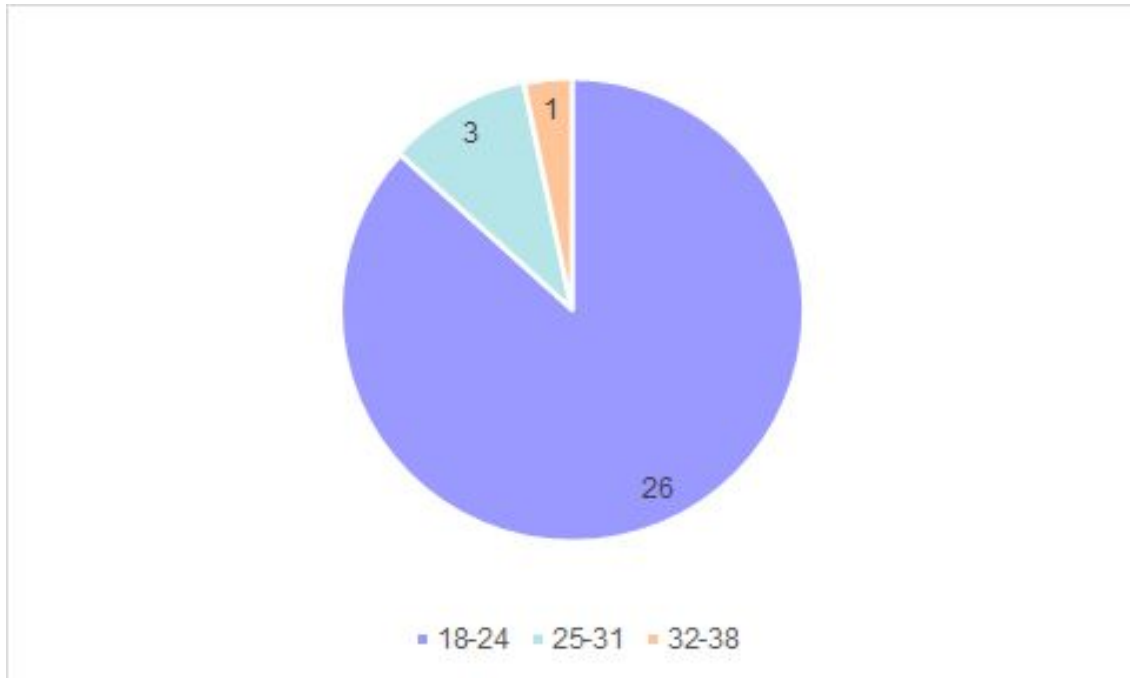
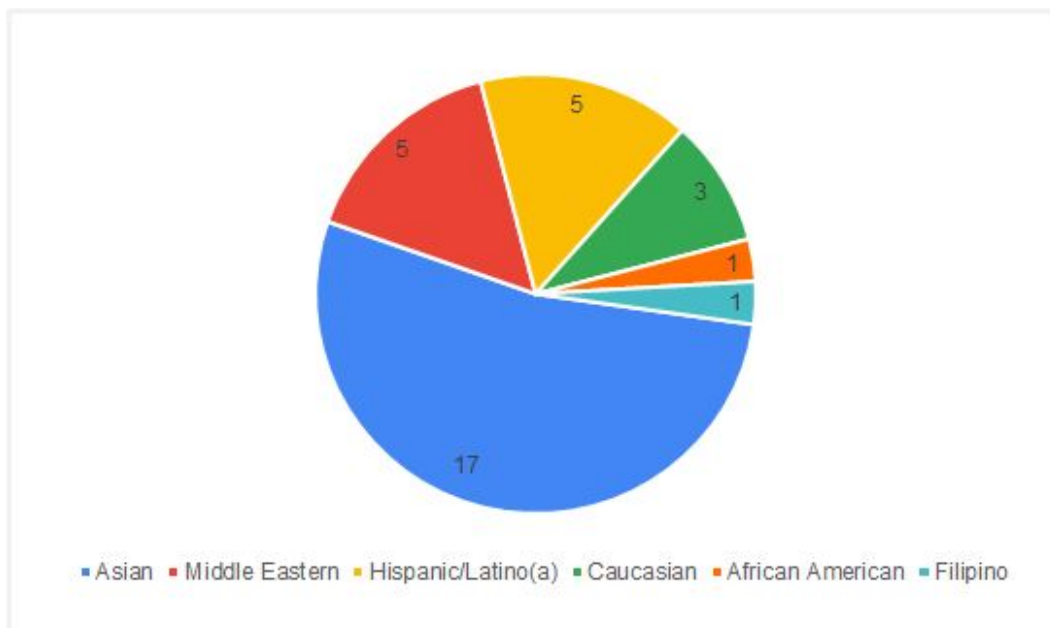


Figure 2

Distribution of Race/Ethnicity for Participants



Our survey data revealed that a majority of our participants were between the ages of 18 and 24, with at least half declaring Asian as their race. As we had set out to educate young adults

and parents, our data confirms that we were able to successfully reach out to this subset of the population. However, according to our data, we do not feel there was an adequate representation of parents/older adults amongst our participants. Limitations for this are discussed further underneath our Discussion section.

Awareness

One aspect of stroke education we wanted to strongly address was awareness of stroke and related symptoms. Data gathered from pre- and post-surveys measured the accuracy that participants were able to identify symptoms that may occur during onset of a stroke. This data was then used to compare and analyze if there was a significant difference between before and after the presentation.

Table 1

Comparison of Symptom Recognition Before & After Presentation

	Post	Pre
Mean	4.933333333	4.133333333
Variance	0.064367816	0.87816092
Observations	30	30
Hypothesized Mean Difference	0	
df	29	
t Stat	4.396968653	
P(T<=t) one-tail	6.74664E-05	
t Critical one-tail	1.699127027	

Table 1 shows data participants from before and after the presentation which was analyzed using a paired t-test to determine if there was a significant difference in being able to recognize stroke symptoms. For testing purposes, we hypothesized that the mean difference was 0 to support that there was a growth in knowledge before and after attending our presentation.

With a P-value significantly less than the 0.05 significance level, we can reject the null hypothesis and conclude that there was a positive change in symptom recognition, due to a higher mean in the ‘Post’ group compared to the ‘Pre’ group, after participants attended our presentation.

Table 2

Mean Difference in Stroke Symptom Recognition Between Groups

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>	<i>P-Value</i>
Stroke	16	11	0.6875	0.7625	
No Stroke	14	13	0.928571429	1.302197802	
Between Groups					0.518150452

After analysing the difference in all attendees as a whole, we set out to see if there was a difference in educational attainment of stroke symptom recognition after attending our presentation between participants who stated they had either experienced or knew someone who had experienced a stroke previously and those who did not. On average, those participants who reported they did not know someone who has had a stroke showed a higher improvement in choosing symptoms related to a stroke. However, after performing an ANOVA Single Factor analysis on data between the two groups, we are unable to reject the null hypothesis, due to a P-value significantly higher than 0.05, and conclude the difference between the groups is likely due to chance. In conjunction with data from the previous, we can assume that both groups as a whole gained from the presentation equally.

Table 3

Comparison of Resource Knowledge Before and After Presentation

<i>Pre</i>		<i>Post</i>	
Mean	2.866666667	Mean	4.566666667
Standard Error	0.247903083	Standard Error	0.092018655
Median	3	Median	5
Mode	4	Mode	5
Standard Deviation	1.357821108	Standard Deviation	0.504006933
Sample Variance	1.843678161	Sample Variance	0.254022989
Range	4	Range	1
Minimum	1	Minimum	4
Maximum	5	Maximum	5
Sum	86	Sum	137
Count	30	Count	30

Participants were asked to rate their knowledge of resources available to them to gain more information about strokes both before and after the presentation. According to statistics, we found that with even a basic analysis of the data, the mean, median, and mode of the participants' responses increased thereby supporting evidence we were able to educate the community on where to gain resources for information on strokes.

Prevention

Another aspect we focused on was the topic stroke prevention. To improve our participants' knowledge on stroke prevention, we aimed to inform them of the risk factors that lead to the development of strokes. Participants were surveyed before and after the presentation on whether how accurately they felt they knew the risk factors related to strokes.

Table 4

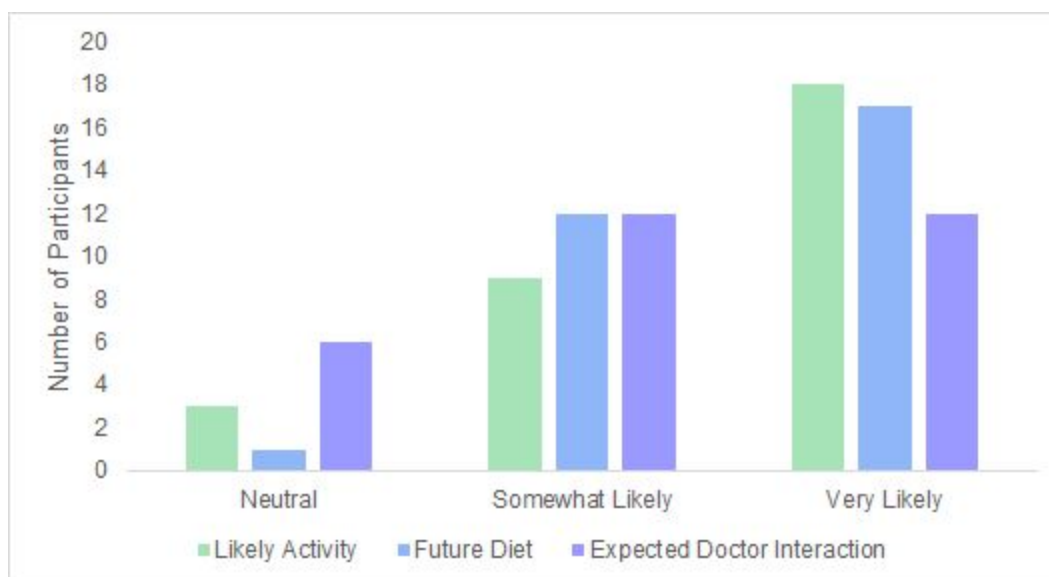
Comparison of Risk Factor Knowledge Before and After Presentation

	<i>Post</i>	<i>Pre</i>
Mean	4.566666667	3.133333333
Variance	0.254022989	1.222988506
Observations	30	30
Hypothesized Mean Difference	0	
df	29	
t Stat	6.738178408	
P(T<=t) one-tail	1.07491E-07	
t Critical one-tail	1.699127027	

Data from before and after the presentation was compared using a paired t-test and we found that there was a significant growth in knowledge of risk factors likely related to the presentation as our P-value was below the 0.05 significance level. Examining the data, we found that both the mean increased and variance decreased after attending the presentation. This can be interpreted as a growth in knowledge with almost all individuals feeling very knowledgeable in being able to identify ways to reduce their risk of stroke in the future.

Figure 3

Distribution of Likelihood for Future Healthy Lifestyle Changes



Our data shows that after the presentation, participants are more likely to practice healthy lifestyle changes, such as exercising, eating a healthy diet or working with their doctor on maintaining their health; all ways to reduce their risk of developing health conditions, like hypertension, diabetes or high cholesterol, which lead to an increased risk of having a stroke.

Discussion

Conclusion

The prevalence of cerebrovascular accidents (CVAs) and their long-term debilitating consequences or potential to cause fatal outcomes is more than enough reason to institute methods that increase the awareness of this acute condition. Strokes act often without warning, and by the time the symptoms of a stroke are recognized in a patient, there is only so much the medical staff can do to prevent the damage from being done. Therefore, it is imperative to realize that this medical emergency is handled best through prevention by eliminating or minimizing the risk factors likely to increase the chances of having a CVA. Additionally, many of the risk factors are developed over long periods of time due to lifestyle habits such as alcohol consumption, diet, and tobacco use. The purpose of our health education event was to increase the community's awareness of the risk factors of stroke, how to prevent them, and how to manage them if already present. As mentioned before, the most effective way to treat a stroke is to prevent one from occurring at all. Diabetes, hypertension, hyperlipidemia, and obesity are some of the chronic conditions that were addressed as risk factors for a CVA. By emphasizing the prevalence of these diseases in our community and how they develop over long periods of time, we were able to both acknowledge the broad spectrum of precursors for a stroke and discuss methods in which an individual can manage or prevent the risk factors. We also realize

that not every stroke is preventable and being able to recognize the signs and symptoms of one is crucial. During our presentations, we were able to list some of the common symptoms of a CVA while mentioning some of the potential outcomes and post-stroke treatment methods. Overall, our data from the surveys and attendance shows that we had an impact on our participants' awareness surrounding strokes, and their motivation to be proactive in their overall health. By increasing our community's awareness of the risk factors of strokes, the signs and symptoms of one, the potential consequences of suffering from one, and the fast-acting nature of one, we successfully influenced the likelihood of individuals in the Riverside/San Bernardino community to pay closer attention to their health and make the necessary lifestyle changes to decrease their risk of suffering from a CVA.

Limitations

While the overall goal and purpose of our health education event and presentation was achieved, there were limitations present. The complications surrounding the COVID-19 pandemic made it difficult to land outreach locations that could promise any attendees. This is why the presentations where we had the most participants attend were the ones where the attendees were incentivized by the clubs or organizations they were affiliated with. For instance, COPE Health Scholars provided its members with project hours if they participated in our health education events, while CSUSB simply advertised our Zoom link. This led to a fairly skewed demographic, with most of the participants coming from pre-health organizations and backgrounds, which may have influenced the growth of knowledge when comparing the pre- and post-survey statistics. Additionally, because most of our outreach locations were college clubs and organizations, over 86% of those who answered the surveys were within the age range of

18-24 years old. Without the representation of older age groups, and potentially more at-risk demographics, our data is missing important information and statistics that would help us further understand the community's knowledge regarding strokes. However, one factor to consider is that we had 41 participants overall but only 30 survey respondents. Therefore, it is a possibility that there might have been a more diverse ethnicity and age demographic that was not represented.

Future Research

Attaining a more diverse demographic to assess is an aspect of our project that would likely be addressed if given the opportunity. Because of how skewed and specific our sample size was, there is a need for differing responses from populations in the Riverside/San Bernardino area that were not adequately represented. Therefore, if we were able to continue this research, reaching out to organizations with an older demographic would be our first goal. Additionally, tracking and compartmentalizing the statistics surrounding our social media and internet interactions would provide a unique perspective on how much further we actually touched our community. With a website and instagram page, there are endless possibilities of increasing our social media presence in a highly digitalized world. Finally, being able to track health habits throughout participants over a large period of time would help determine the efficacy of our presentation in promoting positive lifestyle choices, such as diet, exercise and preventative care.

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Vital Signs: Recent trends in stroke death rates – United States, 2000-2015. MMWR 2017;66.

Appendix*Links of Resources Used*

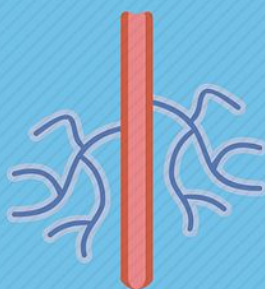
Pre-Survey English	https://tinyurl.com/yb2abt89
Pre-Survey Spanish	https://tinyurl.com/y3upxmc
Post-Survey	https://tinyurl.com/y3s7jftb
Post-Survey Spanish	https://tinyurl.com/y5o42m7g
Website	https://ucrfplg2strokes.wixsite.com/stompouts-strokes
Instagram	https://www.instagram.com/ucrsomfpl_strokeawareness

Brochure



STROKE AWARENESS

What is a stroke?



A stroke, sometimes called a brain attack, occurs when something blocks blood supply to part of the brain or when a blood vessel in the brain bursts.

HEALTH RISKS



High Blood Pressure



Smoking



Overweight/Obesity

Stroke is a leading cause of death in the United States, killing more than 130,000 Americans each year—that's 1 of every 20 deaths.

https://www.cdc.gov/stroke/statistics_maps.htm



SIGNS & SYMPTOMS

- Weakness on one side of the body
- Numbness of the face
- Unusual and severe headache
- Vision loss
- Numbness and tingling
- Unsteady walk



<https://www.health.harvard.edu/womens-health/8-things-you-can-do-to-prevent-a-stroke>

If you see someone experiencing any of these symptoms, call 911 immediately.

FOR MORE INFORMATION, SCAN THE QR CODE