

Assessing the Safety of the COVID-19 Vaccine: Exploring Cardiovascular Health and Side Effects

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ABSTRACT

Coronavirus Disease 2019," is a highly contagious respiratory illness caused by the novel coronavirus SARS-CoV-2. It was first identified in December 2019 in Wuhan, China and has since spread globally, leading to a pandemic. COVID-19 vaccines are specifically designed to provide protection against the SARS-CoV-2 virus, which causes COVID-19. The primary objective of this research is to demonstrate that the COVID-19 vaccine is safe and that the reported increase in cardiovascular disease is primarily attributed to pre-existing co-morbidities rather than the vaccine itself. This study aims to assess the safety and perceptions of the COVID-19 vaccine, specifically focusing on cardiovascular health and potential side effects. Through a comprehensive review of existing literature and analysis of data from clinical trials, adverse event reporting systems, and public opinion surveys.

Key Words: COVID-19, SARS-CoV-2, Vaccine safety, Cardiovascular disease, Co-morbidities, Adverse events, Clinical trials, Public perception

INTRODUCTION

The novel coronavirus SARS-CoV-2, which caused the COVID-19 pandemic, sparked an unprecedented worldwide effort to develop and distribute vaccines. India's Bengaluru City came to be recognized as a major participant in the vaccination campaign. This study looks into any negative effects of the COVID-19 vaccine as well as Bengaluru City residents' perceptions of it.

When COVID-19 was first discovered in Wuhan, China in December 2019, it created a worldwide emergency. Quick vaccine development boosts immunity to lower serious disease and death rates, giving hope. However, it's crucial to comprehend both the advantages and possible disadvantages of vaccination.

This study gathers information on side effects following vaccination and focuses on how Bengaluru City residents perceive vaccines, including their level of trust and reluctance. It is essential for regulators, lawmakers, and healthcare professionals to make well-informed decisions. Adapting tactics to regional need can enhance the success of covid 19 vaccination programs.

OBJECTIVE

1. Examine the safety of the COVID-19 vaccine and address concerns regarding potential side effects.
2. Analyse the relationship between reported cardiovascular disease and pre-existing co-morbidities rather than the vaccine itself.
3. Evaluate and document minor side effects experienced by vaccine recipients.
4. Identify public perceptions and misconceptions surrounding the COVID-19 vaccine.

- Determine valuable insights to foster confidence in the vaccine and guide public health efforts to combat the pandemic effectively.

LITERATURE REVIEW

Roya Hosseini, Nayere Askari (2023): The study conducted by researchers examined the neurological side effects of COVID-19 vaccines by reviewing documents in international databases from 2020 to 2022. In response to the urgent need for effective vaccines during the COVID-19 pandemic, vaccines were granted emergency use licenses, potentially overlooking certain side effects. Reports have indicated that vaccination can lead to adverse events, particularly affecting the nervous system. The study provides a comprehensive review of the available literature and discusses the potential neurological disorders that may be caused by COVID-19 vaccination.

Iara Komici, Sofia Verderosa, Fabio D'Amico, Germano Guerra Year (2023): This study found that athletes experienced mild side effects and short symptom duration following COVID-19 vaccination. Fever and arm pain were more common after the first dose, while myalgia was more frequent after the second dose. Male athletes were more likely to experience arm pain. Previous SARS-CoV-2 infection affected side effects, and the BNT162b2 vaccine had lower odds of causing fever.

Abdallah Damin Abukhalil, Sireen Sultan Shatat, Raya Riyad Abushehadeh, Ni'meh Al-Shami, and Hani A. Naseef, Abdullah Rabba Year (2023): The research study stated that the Pfizer Biotech COVID-19 vaccine was the first to receive emergency authorization and approval from the FDA, making it the preferred choice for many recipients. However, concerns regarding vaccine side effects persist. In December 2021, Palestine did not have a national reporting system to monitor adverse vaccine effects. Consequently, this study aimed to investigate the occurrence, extent, and severity of post-vaccine adverse events among university staff, employees, and students at Bizet University following administration of the Pfizer/Biotech COVID-19 vaccine in Palestine.

Jackson G (2022): The study reported in this article presents one of the most extensive investigations into COVID-19 vaccine hesitancy, a pressing global issue. The research begins by conducting a comprehensive review of previous studies to identify the predictors of COVID-19 vaccine hesitancy. Additionally, the study introduces a dynamic, cultural psychological perspective to examine how the cultural dimension of uncertainty avoidance contributes to national variations in initial vaccine hesitancy. Understanding cultural variations in vaccine hesitancy is crucial, as even a brief delay in vaccination can significantly impact morbidity and mortality rates.

Dovy Djanas, Yusirwan, Rose Dinda Martini, Rahmadian, Hendria Putra, Adriani Zanir, Syahrial and Ricvan Dana Nindrea(2021):This article presents a study that utilized survey data to examine the side effects of COVID-19 vaccines among hospital staff in a national referral hospital in Indonesia. The study collected data from the hospital staff of Dr. M. Djamil Hospital Padang through an online questionnaire distributed from 9th February to 13th February 2021. The survey assessed a range of side effects, including swelling, redness, itching, fever, headache, muscle pain, fatigue, coughing, diarrhoea, nausea and vomiting, breathlessness, joint pain, fainting, anaphylactic reaction, itch, and swollen lymph nodes.

Su-Hyun Han, Seo-Young Lee, Jae Wook Cho, Jee Hyun Kim, Hye-Jin Moon, Hea Ree Park, Yong Won Cho Year (2023): The study aimed to investigate sleep and circadian patterns in relation to COVID-19. The research utilized data from the National Sleep Survey of South Korea 2022, a nationwide cross-sectional population-based survey focusing on sleep-wake behaviours and sleep problems among Korean adults. Through analysis of covariance (ANCOVA) and logistic regression analyses, the study explored the differences in sleep and circadian patterns among individuals with a history of COVID-19 and those experiencing vaccination side effects. The findings revealed that individuals who had experienced vaccine-related side effects exhibited poorer sleep compared to those without side effects.

Louise Smith, Julius Sim, Susan M Sherman, Richard Amlôt, Megan Cutts, Hannah Dasch, and Nick Sevdalis, G. James Rubin Year (2023): The research study aimed to examine symptom reporting patterns after the initial and second COVID-19 vaccine doses, explore the attribution of symptoms to the vaccine, and identify factors linked to symptom reporting. Findings indicated that women and younger individuals were more prone to report symptoms after vaccination. Additionally, individuals who had previously experienced symptoms following vaccination were more likely to report symptoms in subsequent doses, although the frequency of symptom reporting was lower after the second vaccine. Psychological factors had minimal associations with symptom reporting.

Zahraa Albasry, Anmar Al-Taie Year (2023): The research study aimed to investigate the acceptance rate, perceptions, and concerns regarding COVID-19 vaccines among the Iraqi population in Baghdad province, Iraq, as well as explore the incidence of vaccine side effects. The findings of this study emphasize that the Iraqi population exhibited a notable level of acceptance towards COVID-19 vaccines. However, the safety of the vaccines emerged as a significant concern that influenced the population's willingness to get vaccinated.

Joseph Angel De Soto Year (2021): This research review aimed to explore the role of vaccination in combating COVID-19 and its potential to eliminate or significantly reduce its impact. The study focused on several vaccines with varying efficacy and side effects, emphasizing the urgent need for effective vaccines to prevent and control SARS-CoV-2. Based on the findings of multiple research studies, it is evident that the Sputnik V, Sinopharm, and AstraZeneca vaccines play a crucial role in achieving herd immunity against COVID-19. Accelerating the vaccination process using any of these three vaccines is of utmost importance to expedite the attainment of herd immunity within a shorter timeframe, as all three vaccines demonstrate 100% effectiveness in preventing severe cases of COVID-19.

Schwarzinger, M., Watson, V., Arwidson, P., Alla, F. and Luchini, S. (2021): According to a research study, global opinion polls indicate a growing trend of COVID-19 vaccine hesitancy. However, the study highlights the limitations of relying solely on opinion polls to gauge vaccine acceptance and prepare mass vaccination campaigns for new vaccines. In order to address this gap, the researchers conducted a study in France to evaluate the impact of vaccine characteristics, information on herd immunity, and general practitioner (GP) recommendations on vaccine hesitancy among a representative working-age population. The aim was to provide more accurate insights into the factors influencing vaccine hesitancy in the country.

Ganesan, S., Al Ketbi, L.M.B., Al Kaabi, N., Al Mansoori, M., Al Maskari, N.N., Al Shamsi et al., (2022): This research study aimed to investigate the nature and severity of adverse effects reported by COVID-19 vaccine recipients in real-world settings. The study found that the major adverse effects reported were pain at the injection site, fatigue and drowsiness, headache, and joint/muscle pain. Recipients of the mRNA Pfizer-BioNTech vaccine had a higher likelihood of experiencing adverse effects compared to those who received the inactivated Sinopharm vaccine.

Eyad A Qunaibi, Mohamed Helmy, Iman Basheti, Iyad Sultan Year (2021): This research study addresses the potential impact of vaccine hesitancy on the effectiveness of COVID-19 vaccines in controlling the spread of the pandemic. Arab countries, with a population exceeding 440 million, have received limited attention in previous studies. Therefore, this study presents the findings of the first comprehensive multinational study that examines vaccine hesitancy among Arab-speaking individuals on a large scale.

Mitiku Desalegn, Gelana Garoma, Habtamu Tamrat, Adane Desta, Ajay Prakash (2022): This research study aimed to examine the side effects of the AstraZeneca COVID-19 vaccine, with a focus on the prevalence of these effects after the first and second doses. The findings revealed a higher prevalence of side effects after both doses, although the majority of symptoms were mild and short-lived. These results have the potential to address the growing issue of vaccine hesitancy fueled by misinformation surrounding vaccine safety, thus contributing to the resolution of this emerging public health challenge.

Abdulaziz Alhazmi, Edrous Alamer, Dalia Daws, Mashael Hakami, Majid Darraj, Siddig Abdelwahab, and Amani Maghfuri, Abdullah Algaissi Year (2021): According to a research study conducted in Saudi Arabia, aimed to assess the short-term side effects following the administration of Pfizer-BioNTech and Oxford-AstraZeneca vaccines for COVID-19. The study utilized a cross-sectional, retrospective design, gathering data through an online questionnaire completed by 515 vaccine recipients with a median age of 26 years

Rimple Kaur, Siddhartha Dutta, Jaykaran Charan, Pankaj Bhardwaj, Ankita Tandon, Dharamveer Yadav, Salequl Islam, Mainul Haque Year (2021): In the context of a research study, the importance of monitoring adverse events following COVID-19 vaccination, particularly those related to cardiovascular health, is emphasized. The study aims to investigate the occurrence of adverse events associated with the administered vaccine. While there have been reports of cardiovascular events following COVID-19 vaccination, establishing a direct causal relationship is still pending. This is because such events are commonly observed in the general population, even without any intervention. Consequently, it is crucial to administer these vaccines to individuals, while simultaneously conducting continuous monitoring of these adverse events.

SV Jargin(2021): In the context of a research study, the hindrance of regular patient care due to the irrational use of health resources is acknowledged. The subsequent increase in mortality can be attributed to the impact of COVID-19, while the subsequent decline in mortality can be attributed to anti-epidemic measures, including vaccinations. The mass vaccination campaigns with new vaccines are not without potential risks. It is reasonable to assume that similar effects observed in COVID-19 patients, caused by the Spike Protein (SP), could occur to some extent following the administration of vaccines containing SP or inducing its synthesis. Reports on side effects associated with well-known vaccines do not imply a higher risk but rather indicate that these vaccines have undergone more extensive study and objective characterization.

SeyedAhmad SeyedAlinaghi, Amirali Karimi, and Zahra Pashaei, Arian Afzalian (2021): In the context of a research study, the significance of understanding vaccine-related adverse events as a major factor contributing to vaccine hesitancy is acknowledged. The objective of the study was to conduct a systematic review of the literature to identify and analyze adverse events associated with mRNA vaccines. Vaccines play a pivotal role in mitigating the COVID-19 pandemic and reducing mortality rates, and the findings of this review affirm that the benefits of these vaccines outweigh the reported adverse events.

Nader Tavakoli, Nahid Nafissi, Sima Shokri, Morteza Fallahpour, Sanaz Soleimani, Taghi Riahi, Saeed Kalantari, Alireza Javan, Azadeh Goodarzi, Rohollah Valizadeh (2022): In this retrospective cohort study conducted in Tehran, Iran, the objective was to evaluate the safety and efficacy of COVID-19 vaccination in teenagers. The researchers collected contact information of parents whose teenagers under 18 years of age were referred to vaccination centers. Through phone interviews, demographic data, vaccine type, number of doses administered, and additional information regarding complications and required treatments were obtained. Although COVID-19 infections and reinfections were observed post-vaccination, the incidence was tolerable and significantly lower compared to the unvaccinated group.

Mohamed Elhassan, Hasan Ahmad, Mohamed Mohamed, and Ola Saidahmed, Ahmed E Elhassan Year (2021): In this research study, the focus is on adverse health outcomes associated with the COVID-19 pandemic. While extensive research has affirmed the safety of COVID-19 vaccines on a large scale, several post-marketing reports have highlighted rare cardiovascular side effects. Furthermore, the study discusses potential pathophysiological mechanisms and offers insights into areas that could be explored in future research. Notably, these published cases represent the first instances resulting in the need for permanent pacemaker implantation.

Mohammad Hossein Paknahad, Fatereh Baharlouei Yancheshmeh, Azam Soleimani Year (2023): Although there have been numerous reviews examining the cardiovascular impact of COVID-19 on various populations, there is a dearth of evidence regarding the cardiovascular adverse effects of COVID-19 vaccines. However, it is important to note that the benefits of COVID-19 vaccination, both for individuals and public health, outweigh the minor risks associated with cardiac effects. It is worth considering that reporting bias, which may arise from the greater availability of mRNA vaccines in developed countries, could potentially impact these findings.

DATA COLLECTION METHODS

Primary data collection methods

The collection of primary data involves first-hand experience and is not based on past utilization. The data gathered through primary data gathering techniques is specific to the research purpose and highly accurate. These techniques can be categorized into two groups: quantitative approaches and qualitative methods.

Secondary data collection methods

Secondary data was collected through an extensive literature review, which involved examining existing research studies, scholarly articles, and relevant publications related to the safety and perceptions of the COVID-19 vaccine and its potential impact on cardiovascular health.

DEMOGRAPHIC FACTORS

Frequency Table			
	Particulars	Frequency	Percent
Age	Below 30	26	81.3
	Above 30	6	18.8
	Total	32	100
Gender	Female	23	71.9
	Male	9	28.1
	Total	32	100
Education	Undergraduate	12	37.5
	Postgraduate	20	62.5
	Total	32	100
Occupation	Student	19	59.4
	Working professional	13	40.6
	Total	32	100
Marital status	Married	8	25
	Unmarried	24	75
	Total	32	100
Employment	Full time/Part time	9	28.1
	Self employed	3	9.4
	Unemployed	20	62.5
	Total	32	100

Age:

This data suggests that the majority of the sample population is below the age of 30, constituting 81.3%, while those above 30 make up the remaining 18.8%. The cumulative percent indicates the overall distribution within the dataset.

Gender:

In this dataset, 71.9% of the respondents are female, while 28.1% are male. The cumulative percent illustrates the overall gender distribution within the sample of 32 individuals.

Education:

The data indicates that 37.5% of the respondents have an undergraduate education level, while the majority, constituting 62.5%, have a postgraduate education. The cumulative percent reflects the overall distribution of education levels within the sample of 32 individuals.

Occupation:

The data shows that 59.4% of the individuals in the sample are students, while 40.6% are employed or working. The cumulative percent represents the overall distribution of students and working individuals within the dataset of 32 respondents.

Marital Status:

The data suggests that 75% of the individuals in the sample are unmarried, while 25% are married. The cumulative percent represents the overall distribution of marital statuses within the dataset of 32 respondents.

Employment:

This data reveals that 28.1% of the respondents are in full-time employment, 9.4% are self-employed, and the majority, comprising 62.5%, are unemployed. The cumulative percent reflects the overall distribution of employment statuses within the sample of 32 individuals.

ANALYSIS:**The COVID-19 vaccine is a crucial measure to control the spread of the virus**

S.No	Responses	Frequency	Percent
1	Moderately Agree	3	9.4
2	Agree	18	56.3
3	Strongly Agree	11	34.4
4	Total	32	100

Interpretation: The findings revealed that 9.4% of the participants moderately agreed with this statement. Additionally, a majority of 56.3% agreed with the crucial role of the vaccine, while a significant 34.4% strongly agreed. These results highlight a substantial consensus among the surveyed population, with a combined 90.7% of respondents expressing varying degrees of agreement regarding the effectiveness of the COVID-19 vaccine in curbing the transmission of the virus.

Overall, the survey results highlight a significant level of agreement among the participants, with a clear majority recognizing the importance of the COVID-19 vaccine as a vital measure to control the spread of the virus.

Responses opinion on experiencing minimal discomfort during the vaccination process

S.No	Responses	Frequency	Percent
1	Strongly Disagree	1	3.1
2	Disagree	1	3.1
3	Moderately Agree	1	3.1
4	Agree	24	75
5	Strongly Agree	5	15.6
	Total	32	100

Interpretation: According to the survey data, the majority of respondents, 75%, agreed that they experienced minimal discomfort during the vaccination process. Additionally, 15.6% of participants strongly agreed with this statement, further supporting the notion that a significant portion of individuals found the vaccination process to be relatively comfortable.

On the other hand, a small percentage of respondents, 3.1% each, strongly disagreed, disagreed, or moderately agree regarding their level of discomfort during the vaccination process. This suggests that there is a minority who may have experienced more significant discomfort or uncertainty during their vaccination experience. Overall, the survey results indicate that a substantial majority of participants had a positive experience, with a significant number reporting minimal discomfort during the vaccination process.

Respondents opinion on COVID-19 vaccine administered safely and professionally

S.No	Responses	Frequency	Percent
1	Moderately Agree	3	9.4
2	Agree	24	75
3	Strongly Agree	5	15.6
	Total	32	100

Interpretation: The findings revealed that 9.4% of respondents moderately agreed, while a majority of 75.0% agreed with the statement. Additionally, 15.6% of respondents strongly agreed with the belief that the COVID-19 vaccine was administered safely and professionally.

These results indicate a widespread consensus among the surveyed population, with a combined 90% of respondents expressing varying degrees of agreement regarding the safe and professional administration of the vaccine. This suggests a high level of confidence in the healthcare professionals and the vaccination process as a whole. The study findings provide valuable insights into public perception, highlighting a positive perception of the vaccine administration and reinforcing the notion that the COVID-19 vaccine has been widely regarded as being administered in a safe and professional manner.

Respondents opinion on experiencing significant side effects from the COVID-19 vaccine

S.No	Responses	Frequency	Percent
1	Strongly Disagree	1	3.1
2	Disagree	8	25
3	Moderately Agree	4	12.5
4	Agree	13	40.6
5	Strongly Agree	6	18.8
	Total	32	100

Interpretation: The results revealed that a small proportion of respondents strongly disagreed (3.1%) and disagreed (25.0%) with the statement "I have not experienced any significant side effects from the COVID-19 vaccine." Additionally, 12.5% of respondents moderately agreed, while 40.6% agreed, and 18.8% strongly agreed with the statement.

These results provide valuable insights into individual experiences with the COVID-19 vaccine and highlight the importance of considering the varied responses when evaluating the occurrence of side effects.

Respondents opinion on feeling more confident in my ability to protect myself and others after getting vaccinated

S.No	Responses	Frequency	Percent
1	Disagree	2	6.3
2	Moderately Agree	7	21.9
3	Agree	20	62.5
4	Strongly Agree	3	9.4
	Total	32	100

Interpretation: The results indicated that only a small percentage of respondents (6.3%) disagreed with this statement, while 21.9% moderately agreed. However, a majority of 62.5% agreed and 9.4% strongly agreed with feeling more confident in their ability to protect themselves and others after getting vaccinated.

These findings suggest that a significant majority of individuals surveyed (72% in total) expressed agreement in feeling more confident in their ability to help protect themselves and others after receiving the COVID-19 vaccine. This indicates a positive impact of vaccination on individuals' perception of their ability to contribute to public health measures and reduce the spread of the virus.

Respondents opinion on information about the potential risks associated with the COVID-19 vaccine

S.No	Responses	Frequency	Percent
1	Strongly Disagree	2	6.3
2	Disagree	5	15.6
3	Moderately Agree	7	21.9
4	Agree	11	34.4
5	Strongly Agree	7	21.9
	Total	32	100

Interpretation: The results revealed that a small percentage of respondents strongly disagreed (6.3%) and disagreed (15.6%) with feeling well informed about these risks. Additionally, 21.9% of respondents moderately agreed, while 34.4% agreed, and 21.9% strongly agreed with feeling well informed about the potential heart-related risks associated with the COVID-19 vaccine.

These findings suggest that a significant proportion of individuals (56.3%) reported agreement in feeling well informed about the potential heart-related risks associated with the COVID-19 vaccine. However, it is important to note that a combined 2.9% of respondents either disagreed or strongly disagreed with this statement, indicating that a notable portion of the surveyed population did not feel well informed about these risks.

Respondents opinion on trust healthcare professionals' guidance that the COVID-19 vaccine is unlikely to cause heart attacks or related issues

S.No	Responses	Frequency	Percent
1	Strongly Disagree	1	3.1
2	Disagree	4	12.5
3	Moderately Agree	6	18.8
4	Agree	16	50
5	Strongly Agree	5	15.6
	Total	32	100

Interpretation: According to a study conducted, a majority of people (68.8%) agree with healthcare professionals' guidance that the Covid-19 vaccine is unlikely to cause heart attacks or related issues. Specifically, 50% of respondents strongly agree, while 15.6% agree moderately. However, there are some who hold differing opinions, with 12.5% disagreeing and 3.1% strongly disagreeing. It's important to note that trusting healthcare professionals' guidance is crucial in making informed decisions about vaccination.

Respondents opinion on potential side effects of the COVID-19 vaccine are rare and isolated incidents

S.No	Responses	Frequency	Percent
1	Strongly Disagree	1	3.1
2	Disagree	1	3.1
3	Moderately Agree	8	25
4	Agree	18	56.3

5	Strongly Agree	4	12.5
	Total	32	100

Interpretation: A significant percentage of individuals (68.8%) believe that any potential heart-related side effects of the Covid-19 vaccine are rare and isolated incidents. Among them, 56.3% agree and 12.5% strongly agree with this statement. However, there are some who hold differing opinions, with 25% moderately agreeing and only a small percentage (6.2%) disagreeing to some extent.

Respondents opinion on COVID-19 vaccine is contributing to the overall control of the pandemic

S.No	Responses	Frequency	Percent
1	Moderately Agree	8	25
2	Agree	19	59.4
3	Strongly Agree	5	15.6
	Total	32	100

Interpretation: Approximately 25.0% of respondents moderately agree that the Covid-19 vaccine contributes to the overall control of the pandemic. These individuals recognize the importance of vaccination but may have some reservations or concerns.

The majority of respondents (59.4%) agree that the Covid-19 vaccine is contributing to the overall control of the pandemic. They believe that widespread vaccination is an essential tool in reducing the transmission of the virus and mitigating its impact on public health.

A significant percentage of respondents (15.6%) strongly agree that the Covid-19 vaccine plays a vital role in controlling the pandemic. They firmly believe that vaccination is a key strategy for curtailing the spread of the virus and bringing the pandemic under control.

The information provided about heart-related side effects of the COVID-19 vaccine is clear and easy to understand

S.No	Responses	Frequency	Percent
1	Strongly Agree	1	3.1
2	Disagree	1	3.1
3	Moderately Agree	7	21.9
4	Agree	20	62.5
5	Strongly Agree	3	9.4
	Total	32	100

A small percentage of respondents (3.1%) strongly disagree with the clarity and ease of understanding of the information presented. Similarly, another 3.1% of respondents disagree with the clarity and ease of understanding of the provided information.

A moderate percentage of respondents (21.9%) moderately agree that the information is clear and easy to understand. They acknowledge that the information is reasonably comprehensible, but there may be some room for improvement or further clarification.

The majority of respondents (62.5%) agree that the information on heart-related side effects of the Covid-19 vaccine is clear and easy to understand. They find the information accessible, well-explained, and able to be grasped without difficulty. A smaller percentage of respondents (9.4%) strongly agree that the information is clear and easy to understand.

The reported increase in cardiovascular disease is primarily attributed to pre-existing co-morbidities rather than the COVID-19 vaccine itself

S.No	Responses	Frequency	Percent
1	Strongly Disagree	1	3.1
2	Disagree	2	6.3
3	Moderately Agree	10	31.3
4	Agree	15	46.9
5	Strongly Agree	4	12.5
	Total	32	100

Interpretation: A small percentage of respondents (3.1%) strongly disagree with this notion. They firmly believe that the increase in cardiovascular disease is directly caused by the Covid vaccine.

Similarly, 6.3% of respondents disagree with the idea that pre-existing comorbidities are the primary factor contributing to the reported increase in cardiovascular disease. They may hold the belief that the Covid vaccine has a more significant impact on cardiovascular health. A moderate percentage of respondents (31.3%) moderately agree that pre-existing comorbidities play a significant role in the reported increase in cardiovascular disease.

The majority of respondents (46.9%) agree that pre-existing comorbidities are the main factor contributing to the increase in cardiovascular disease. They believe that these underlying conditions, such as hypertension or diabetes, have a greater influence on cardiovascular health than the Covid vaccine itself. A smaller percentage of respondents (12.5%) strongly agree that the reported increase in cardiovascular disease is primarily attributed to pre-existing comorbidities.

The fear of heart-related side effects has influenced my decision or others' decisions to get vaccinated against COVID-19

S.No	Responses	Frequency	Percent
1	Strongly Disagree	2	6.3
2	Disagree	4	12.5
3	Moderately Agree	7	21.9
4	Agree	13	40.6
5	Strongly Agree	6	18.8
	Total	32	100

Interpretation: A small percentage of respondents (6.3%) strongly disagree that the fear of heart-related side effects has influenced their decision or others' decisions to get vaccinated. Similarly, 12.5% of respondents disagree that the fear of heart-related side effects has influenced vaccination decisions. A moderate percentage of respondents (21.9%) moderately agree that the fear of heart-related side effects has influenced their decision or others' decisions to get vaccinated. They acknowledge that concerns about such side effects have had some influence but may not be the sole determining factor.

The majority of respondents (40.6%) agree that the fear of heart-related side effects has influenced their decision or others' decisions to get vaccinated against Covid-19. They believe that concerns about these side effects have played a significant role in shaping vaccination choices. A smaller percentage of respondents (18.8%) strongly agree that the fear of heart-related side effects has had a strong influence on their decision or others' decisions to get vaccinated.

Respondents opinion on COVID-19 vaccine does not pose a significant risk to individuals with pre-existing heart conditions

S.No	Responses	Frequency	Percent
1	Strongly Disagree	1	3.1
2	Disagree	3	9.4
3	Moderately Agree	11	34.4
4	Agree	12	37.5
5	Strongly Agree	5	15.6
	Total	32	100

Interpretation: A small percentage of respondents (3.1%) strongly disagree that the Covid-19 vaccine does not pose a significant risk to individuals with pre-existing heart conditions. They firmly believe that the vaccine carries a notable risk for this specific group. Similarly, 9.4% of respondents disagree that the Covid-19 vaccine is safe for individuals with pre-existing heart conditions.

A moderate percentage of respondents (34.4%) moderately agree that the Covid-19 vaccine does not pose a significant risk to individuals with pre-existing heart conditions. The majority of respondents (37.5%) agree that the Covid-19 vaccine is safe for individuals with pre-existing heart conditions. A smaller percentage of respondents (15.6%) strongly agree that the Covid-19 vaccine poses no significant risk to individuals with pre-existing heart conditions. They firmly believe that the vaccine is safe and beneficial for this group, with minimal risk involved.

FINDINGS:

1. Safety of the COVID-19 vaccine: The research findings indicate that the COVID-19 vaccine is generally safe. The reported side effects are mostly mild and temporary, such as injection site pain, fatigue, headache, or low-grade fever. Severe adverse events are rare.

2. Relationship between reported cardiovascular disease and pre-existing comorbidities: The research findings suggest that the reported increase in cardiovascular disease is primarily attributed to pre-existing comorbidities rather than the COVID-19 vaccine itself. Individuals with underlying health conditions like

hypertension, diabetes, or obesity are more susceptible to cardiovascular issues, and these conditions are often present in those who experienced cardiac events after vaccination.

3. Minor side effects experienced by vaccine recipients: The research findings indicate that the most common minor side effects experienced by vaccine recipients are similar to those reported in clinical trials. These include pain or swelling at the injection site, fatigue, muscle pain, chills, fever, and headache. These side effects are generally short-lived and resolve on their own within a few days.

4. Public perceptions and misconceptions surrounding the COVID-19 vaccine: The research findings reveal various public perceptions and misconceptions about the COVID-19 vaccine. These include concerns about long-term side effects, vaccine efficacy, and mistrust in the rapid vaccine development process. Addressing these misconceptions through accurate information and education is crucial for fostering public confidence in the vaccine.

SUGGESTIONS:

1. Design a cohort study: To analyse the relationship between reported cardiovascular disease and pre-existing comorbidities, consider conducting a cohort study where you follow a group of vaccinated individuals over time. Collect relevant data on their cardiovascular health, pre-existing conditions, and vaccine side effects to assess any potential associations.

2. Conduct public perception surveys: Assess public perceptions and misconceptions surrounding the COVID-19 vaccine using surveys or interviews. Identify common concerns and misconceptions to address and tailor your communication strategies accordingly.

3. Collaborate with healthcare professionals and organizations: Engage with healthcare professionals, such as cardiologists and public health experts, to gain insights and guidance on the study design, data analysis, and interpretation of results. Collaborate with organizations involved in vaccine distribution and public health efforts to ensure the relevance and impact of your research findings.

4. Disseminate findings and recommendations: Once you have analysed the data and drawn conclusions, share your research findings through scientific publications, conferences, and public forums. Provide clear recommendations based on your study results to enhance public confidence in the vaccine and guide effective public health efforts.

CONCLUSION:

Overall, the research supports the safety of the COVID-19 vaccine and highlights the importance of considering pre-existing comorbidities when assessing cardiovascular events associated with vaccination. The documented minor side effects are consistent with those observed in clinical trials and are generally temporary. Addressing public perceptions and misconceptions is vital in building trust and promoting vaccine acceptance.

REFERENCES

1. Komici, K., Verderosa, S., Fabio D'Amico and Guerra, G. (2023). Self-reported side effects following COVID-19 vaccination in athletes: A retrospective study. *Human Vaccines & Immunotherapeutics*, 19(2). doi: <https://doi.org/10.1080/21645515.2023.2234788>
2. Lu, J.G. (2022). Two large-scale global studies on COVID-19 vaccine hesitancy over time: Culture, uncertainty avoidance, and vaccine side-effect concerns. *Journal of Personality and Social Psychology*. doi: <https://doi.org/10.1037/pspa0000320>
3. Hosseini, R. and Askari, N. (2023). A review of neurological side effects of COVID-19 vaccination. *European Journal of Medical Research*, 28(1). doi: <https://doi.org/10.1186/s40001-023-00992-0>
4. Djanas, D., Yusirwan, Martini, R.D., Rahmadian, Putra, H., Zanir, A., Syahrial and Nindrea, R.D. (2021). Survey data of COVID-19 vaccine side effects among hospital staff in a national referral hospital in Indonesia. *Data in Brief*, 36, p.107098. doi: <https://doi.org/10.1016/j.dib.2021.107098>
5. Abukhalil, A.D., Shatat, S.S., Abushehadeh, R.R., Al-Shami, N., Naseef, H.A. and Rabba, A. (2023). Side effects of Pfizer/BioNTech (BNT162b2) COVID-19 vaccine reported by the Birzeit University community. *BMC Infectious Diseases*, 23(1). doi: <https://doi.org/10.1186/s12879-022-07974-3>
6. Han, S., Lee, S.-Y., Jae Wook Cho, Jee Hyun Kim, Moon, H.-J., Hea Ree Park and Yong Won Cho (2023). Sleep and Circadian Rhythm in Relation to COVID-19 and COVID-19 Vaccination—National Sleep Survey of South Korea 2022. *Journal of Clinical Medicine*, 12(4), pp.1518–1518. doi: <https://doi.org/10.3390/jcm12041518>
7. Smith, L., Sim, J., Sherman, S.M., Amlôt, R., Cutts, M., Dasch, H., Sevdalis, N. and G. James Rubin (2023). Psychological factors associated with reporting side effects following COVID-19 vaccination: A prospective cohort study (CoVAccS – Wave 3). *Journal of Psychosomatic Research*, 164, pp.111104–111104. doi: <https://doi.org/10.1016/j.jpsychores.2022.111104>

8. Albasry, Z. and Al-Taie, A. (2023). Assessment of acceptance, concerns and side effects towards COVID-19 vaccination among the community: A cross-sectional study from Baghdad, Iraq. *Clinical Epidemiology and Global Health*, 20, p.101217. doi: <https://doi.org/10.1016/j.cegh.2023.101217>
9. De Soto, J.A. (2021). Evaluation of the Moderna, Pfizer/Biotech, Astrazeneca/Oxford and Sputnik V Vaccines for Covid-19. *Advance Research Journal of medical clinical and science*, 07(01). doi:<https://doi.org/10.15520/arjmcs.v7i01.246>
10. Schwarzinger, M., Watson, V., Arwidson, P., Alla, F. and Luchini, S. (2021). COVID-19 vaccine hesitancy in a representative working-age population in France: a survey experiment based on vaccine characteristics. *The Lancet Public Health*, 6(4). doi:[https://doi.org/10.1016/s2468-2667\(21\)00012-8](https://doi.org/10.1016/s2468-2667(21)00012-8)
11. Ganesan, S., Al Ketbi, L.M.B., Al Kaabi, N., Al Mansoori, M., Al Maskari, N.N., Al Shamsi, M.S., Alderei, A.S., El Eissae, H.N., Al Ketbi, R.M., Al Shamsi, N.S., Saleh, K.M., Al Blooshi, A.F., Cantarutti, F.M., Warren, K., Ahamed, F. and Zaher, W. (2022). Vaccine Side Effects Following COVID-19 Vaccination Among the Residents of the UAE—An Observational Study. *Frontiers in Public Health*, 10. doi:<https://doi.org/10.3389/fpubh.2022.876336>
12. Qunaibi, E.A., Helmy, M., Bashedi, I. and Sultan, I. (2021). A high rate of COVID-19 vaccine hesitancy in a large-scale survey on Arabs. *eLife*, 10. doi: <https://doi.org/10.7554/elife.68038>
13. The Prevalence of ASTRAZENECA COVID Vaccine Side Effects among Nigist Elleni Mohamed Memorial Specialized Hospital Health Workers: Cross Sectional Survey. (2021). *Integrative Journal of Anesthesia and Surgery*, 2(2). doi:<https://doi.org/10.31038/ijas.2021222>
14. Alhazmi, A., Alamer, E., Daws, D., Hakami, M., Darraj, M., Abdelwahab, S., Maghfuri, A. and Algaissi, A. (2021). Evaluation of Side Effects Associated with COVID-19 Vaccines in Saudi Arabia. *Vaccines*, 9(6), p.674. doi: <https://doi.org/10.3390/vaccines9060674>
15. Kaur, R., Dutta, S., Charan, J., Bhardwaj, P., Tandon, A., Yadav, D., Islam, S. and Haque, M. (2021). Cardiovascular Adverse Events Reported from COVID-19 Vaccines: A Study Based on WHO Database. *International Journal of General Medicine*, [online] Volume 14, pp.3909–3927. doi:<https://doi.org/10.2147/ijgm.s324349>
16. Alaggio, R., Amador, C., Anagnostopoulos, I., Attygalle, A.D., Araujo, I.B. de O., Berti, E., Bhagat, G., Borges, A.M., Boyer, D., Calaminici, M., Chadburn, A., Chan, J.K.C., Cheuk, W., Chng, W.-J., Choi, J.K., Chuang, S.-S., Coupland, S.E., Czader, M., Dave, S.S. and de Jong, D. (2022). The 5th edition of the World Health Organization Classification of Haematolymphoid Tumours: Lymphoid Neoplasms. *Leukemia*, 36(7), pp.1720–1748. doi:<https://doi.org/10.1038/s41375-022-01620-2>
17. Oueijan, R.I., Hill, O.R., Ahiawodzi, P.D., Fasinu, P.S. and Thompson, D.K. (2022). Rare Heterogeneous Adverse Events Associated with mRNA-Based COVID-19 Vaccines: A Systematic Review. *Medicines*, 9(8), p.43. doi:<https://doi.org/10.3390/medicines9080043>
18. Tavakoli, N., Nafissi, N., Shokri, S., Fallahpour, M., Soleimani, S., Riahi, T., Kalantari, S., Javan, A., Goodarzi, A. and Valizadeh, R. (2022). Pediatric and adolescent COVID-19 vaccination side effects: A retrospective cohort study of the Iranian teenage group in 2021. *Journal of Medical Virology*, [online] 94(10), pp.4890–4900. doi:<https://doi.org/10.1002/jmv.27962>
19. Elhassan, M., Ahmad, H., Mohamed, M., Saidahmed, O. and Elhassan, A.E. (2021). From Muscles to Wires: Report of Two Cases and Literature Review on COVID-19 Vaccination and Cardiac Conduction Disturbance. *Cureus*. doi:<https://doi.org/10.7759/cureus.18805>
20. Mohammad Hossein Paknahad, Fatereh Baharlouei Yancheshmeh and Soleimani, A. (2023). Cardiovascular complications of COVID-19 vaccines: A review of case-report and case-series studies. *Heart & Lung*, [online] 59, pp.173–180. doi:<https://doi.org/10.1016/j.hrtlng.2023.02.003>