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The Impact of Covid-19 Infection and Vaccination on People's Health and Eating Habits

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ABSTRACT:
The covid-19 pandemic, caused by the SARS-CoV-2 virus, was first discovered in Wuhan, China in December 2019. The swift dissemination of the virus on a global scale resulted in a worldwide health emergency. The global response to the covid-19 pandemic has been multifaceted with vaccination efforts playing a crucial role in mitigating the impact of the disease. The initiation of covid-19 vaccination campaigns across the world represents a significant public health strategy aimed at controlling the spread of SARS-CoV-2 and achieving immunity. To study the impact of covid-19 infection and vaccination on health and eating habits of study subjects. This descriptive study was conducted among residents of Hyderabad that are vaccinated against covid-19 infection. The size of the sample was 200. The data was collected by using offline questionnaire. Methods used in this study include a detailed questionnaire. Data was analysed by using frequency distribution and chi-square test. The study reveals that 51% of the subjects were female while 49% were male. Among the subjects, 38.5% reported that covid-19 infection and vaccination impacted their diet. Study reveals that 42.5% subjects suffered from potential side effects after vaccination while 57.5% did not suffer. Among the subjects, 80.5% people agreed that vaccines prevent spread of covid-19 infection while 19.5% disagreed to it. Statistical analysis demonstrated no associations between dietary changes during infection & after vaccination and infected before vaccination & belief in vaccine effectiveness. Based on the study, covid-19 infection and vaccination has varied impacts on people's health and eating habits. While majority of participants (61.5%) did not experience significant changes in their dietary habits due to the infection, a notable portion (38.5%) did report alterations, such as adopting special diets or avoiding certain foods. After vaccination, most participants (65.5%) maintained their usual food intake, though some reported an increase (23%) or decrease (11.5%) in consumption. The findings suggest that while covid-19 and vaccination influenced some aspects of diet and health, the overall impact on eating habits was not uniform across all the individuals.

Keywords: Covid-19, vaccination, dietary changes, statistical analysis, impact of Covid vaccine.

INTRODUCTION

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, was first identified in Wuhan, China in

December 2019. The swift dissemination of the virus on a global scale resulted in a worldwide health emergency, causing noteworthy repercussions on healthcare infrastructures globally. The first reported cases of COVID-19 in Wuhan, China occurred in December 2019 the virus quickly spread to other parts of China and then globally, with the World Health Organization (WHO) declaring it a Public Health Emergency of International Concern (PHEIC) on January 30, 2020 (WHO-2020). The rapid spread of the virus led to widespread lockdowns, travel restrictions, and other containment measures to slow its spread (OECD-2020).

The pandemic had a significant impact on healthcare systems worldwide. The epidemic in India has caused a block to the several medical services, including nephrology, ophthalmology, trauma, cancer, and orthopaedics (Megha kapoor et al., 2023). Healthcare workers in numerous nations were reassigned to assist with COVID-19 related tasks, resulting in deficiencies of both medical staff and equipment (Abraham Haileamlak-2021). The pandemic also led to a significant reduction in the number of patients seeking medical care for non-COVID-19 conditions, resulting in delayed diagnosis and treatment for these conditions (Megha kapoor et al., 2023).

A study published in The Lancet estimated that the global all-age rate of excess mortality due to the COVID-19 pandemic was 120.3 deaths (113.1–129.3) per 100,000 of the population between January 1, 2020 and December 31, 2021 (John Hiscott et al., 2020). The global impact of diseases and their associated infection and mortality rates is a critical area of study in public health, provides a comprehensive analysis of breast cancer revealing divergent trends in incidence and mortality rates across different countries. Notably, while incidence rates have increased in some countries, mortality rates have decreased in most high-income countries, suggesting improvements in early detection and treatment (Desantis et al., 2015).

The global response to the COVID-19 pandemic has been multifaceted with vaccination efforts playing a crucial role in mitigating the impact of the disease. The initiation of COVID-19 vaccination campaigns across the world represents a significant public health strategy aimed at controlling the spread of SARS-CoV-2 and achieving immunity (Al-Tammemi & Tarhini, 2021).

Vaccines have been demonstrated to be highly effective in preventing severe illness and death, in turn has significant positive impacts on public health outcomes and healthcare systems. For instance, the Cuban protein subunit vaccine Abdala showed high efficacy rates in clinical trials and was also highly effective in real-world conditions, with vaccine effectiveness (VE) against severe illness at 93.3% for partially vaccinated individuals and 98.2% for fully vaccinated individuals. Similarly, VE against death was 94.1% for partially vaccinated and 98.7% for fully vaccinated individuals (Más-Bermejo et al., 2022). The COVID-19 pandemic and associated lockdowns and restrictions led to significant changes in eating habits among individuals, particularly those working remotely. This shift in daily routines increased awareness of nutrition and health have had lasting impacts on diet and overall well-being (Abed Alah, 2022). Hence the study was framed “to study the impact of covid-19infection and vaccination on health and eating habits of study subjects”.

MATERIALS AND METHODS

The present study titled “Impact of Covid-19 Infection and Vaccination on People’s Health and Eating Habits” was conducted among residents of Hyderabad that are vaccinated against covid-19 infection to evaluate the eating habits, dietary changes during infection and after vaccination and impact infection and vaccination on public health.

Research design: Non-experimental design
Research approach: Mixed approach, Qualitative and quantitative methodology
Place of study: The study was conducted to find out the impact of covid-19infection and vaccination on public health and dietary habits in Hyderabad.
Sample size: The sample size included 200 (male and female both genders included).
Sample type: Random sampling Design

Criteria for selecting the sample:
Inclusive criteria:

- Individuals those are vaccinated against covid-19 infection.
- Individuals residing within the city of Hyderabad in Telangana state.

Exclusive criteria:

- Individuals those are not vaccinated against covid-9infection.
- Individuals those are not residents of Hyderabad.
- And those who are not willing to participate are excluded.

Tools and techniques:
A well-structured questionnaire was made and distributed through offline mode. The objectives of the study were kept in mind while framing the questionnaire. The questionnaire included was close-ended/ dichotomous (yes/no). The questionnaire included demographic information, anthropometric information, information on covid-19 vaccination, dietary changes during covid-19 infection and post vaccination, and precautions taken post vaccination.
Demographic information:
The demographic information was collected to get the following details like personal information of the respondents i.e., name, age, education qualification, occupation.
Anthropometric information:
The measurements of height, weight was taken and BMI (Body Mass Index) was calculated using measurements.
Information on covid-19 infection and vaccination:
To know about the information regarding covid-19 infection and vaccination, questions like type of vaccination, dosage, number of times infected, side effects of vaccination etc. were included.
Dietary information:
To know about the dietary information, questions about their dietary preferences, number of meals, snacks, consumption of fruits, vegetables, milk, meat, junk food, cravings and change in dietary habits during infection and post vaccination were included.
Precautions information:
It included questions like type of precautions taken post vaccination, belief in vaccine effectiveness, special precautions regarding diet.
Calculation and classification of BMI:
The BMI is calculated as weight (w) in kilograms divided by square of height (h) in meters.
BMI= weight / (height) ^{2}.
As per WHO standards BMI is classified as underweight, normal weight, overweight, obese. The classification is as follows:

Table1: BMI classification as per weight

Category	Range (kg/m²)
Underweight	<18.5
Normal weight	18.5-24.9
Overweight	25-29.9
Obese	≥30

Statistical analysis:

The data collected through questionnaire was compiled and analysed by using calculated percentage, frequency and applying statistical technique chi-square test.

Statistical analysis was done using: MS EXCEL.

Chi-square test:

The chi-square test helps to determine whether there is a notable difference between normal frequency and the observed frequencies in one or more classes.

The formula of chi-square test is:

$$x^2 = \sum_i \frac{(O_i - E_i)^2}{E_i}$$

Where,

X^2 = chi-square test, O_i = Observed value, E_i = Expected value

*p-value of ≤ 0.05 was kept significant for above analysis.

RESULTS AND DISCUSSION

The study reveals that 51% of the subjects were female while 49% were male. Among the subjects, 38.5% reported covid-19 infection impacted adversely on their health and dietary habits while 61.5% did not experience significant changes in their diet due to infection. After vaccination, most participants (65.5%) maintained their usual food intake while some reported increase (23%) and decrease (11.5%) in consumption.

Table-2: Vaccination and health-related behaviour

Category	Yes	%	No	%	Total (n)
Vaccinated	200	100%	0	0%	200
Infected before vaccination	51	25.50%	149	74.50%	200
Aware of side effects	110	55%	90	45%	200
Infection change diet	77	38.50%	123	61.50%	200
Vaccination change diet	49	24.5%	131	65.5%	100%
Specific diet during infection	52	26%	148	74%	200
Conscious about diet & health post vaccination	85	42.50%	115	57.50%	200
Screen time increased post vaccination	83	41.50%	117	58.50%	200
Took precautions post vaccination	137	68.50%	63	31.50%	200
Specific dietary precautions	108	54%	92	46%	200

This Table 2 represents data on various aspects of health-related behaviour among vaccinated individuals. All 200 participants were vaccinated, with 25.5% having been infected before vaccination. While 55% were aware of vaccine side effects, only 38.5% and 24.5% reported that infection or

vaccination, respectively, led them to change their diet. A smaller percentage followed a specific diet during infection (26%) or became more health conscious post vaccination (42.5%). After vaccination, 41.5% increased their screen time, 68.5% took additional precautions, and 54% adopted specific dietary precautions.

Table-3: Age distribution

AGE	Female	male	Grand Total	Percentage
18-27	52	53	105	52.5%
28-37	20	16	36	18%
38-47	18	11	29	14.5%
48-57	7	15	22	11%
58-67	4	2	6	3%
68-77	-	1	1	0.5%
78-88	1	-	1	0.5%
Grand Total	**102**	**98**	**200**	**100%**

This Table 3 outlines the age distribution of the 200participants, with nearly equal representation of females (102) and males (98). The majority of the participants (52.5%) were aged 18-27, followed by 18% in the 28-37 age group. Participants aged 38-47, 48-57, and 58-67 made up 14.5%, 11% and 3% of the sample, respectively. The oldest age groups, 68-77 and 78-88, had the smallest representation at 0.5% each.

Table-4: BMI distribution

BMI	Female	male	Grand Total	Percentage
>18.5 kg/m²	3	3	6	3%
18.5-24.9	36	39	75	37.5%
25-29.9	48	40	88	44%
>=30	15	16	31	15.5%
Grand Total	**102**	**98**	**200**	**100%**

This table 4 shows the BMI distribution among participants. The largest group, 44%, had a BMI between 25-29.9 ranges classifying them as overweight. Those with a normal BMI (18.5-24.9) accounted for 37.5% of the participants, while 15.5% were classified as obese (BMI ≥30). A small portion (3%) had a BMI below 18.5 kg/m², indicating underweight status.

Table-5: Education levels

Education	Female	male	Grand Total	Percentage
Bachelor's degree	27	36	63	**31.5%**
College or Diploma	12	15	27	**13.5%**
High school (SSC)	11	8	19	**9.5%**
less than high school	34	27	61	**30.5%**
Master's degree	18	12	30	**15%**
Grand Total	**102**	**98**	**200**	**100%**

This table 5 presents the educational background of participants. A significant portion, 3.5%, held a bachelor's degree, followed by 30.5% with less than a high school education. Those with a master's degree made up15%, while 13.5% had a college diploma or equivalent, and 9.5% had completed high school.

Table 6: Vaccine type

Vaccine type	Female	male	Grand Total	Percentage
Covaxin	22	16	38	**19%**
Covishield	79	76	155	**77.5%**
Other	1	5	6	**3%**
Pfizer	-	1	1	**0.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table 6 shows the type of vaccines received by participants. Covishield was the most common, taken by 77.5% of the participants, followed by Covaxin at 19%. A small percentage (3%) received other vaccines, with Pfizer being the least common at 0.5%.

Table-7: Vaccine dose

Vaccine dose	Female	male	Grand Total	Percentage
1 dose	63	54	117	**58.5%**
2 dose	31	37	68	**34%**
3 doses	8	7	15	**7.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table illustrates the number of vaccine doses received by participants. The majority (58.5%) received one dose, while 34% had two doses, and only 7.5% had received three doses of the vaccine.

Table-8: Minor symptoms post vaccination

Minor symptoms	Female	male	Grand Total	Percentage
body pains	14	8	22	**11%**
Chills	1		1	**0.5%**
fatigue	1	-	1	**0.5%**
headache	1	1	2	**1%**
high-grade fever	9	8	17	**8.5%**
low-grade fever	12	8	20	**10%**
None	64	72	136	**68%**
vomiting	-	1	1	**0.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table details the minor symptoms experienced after vaccination. Most participants (68%) reported no symptoms, while the most common minor symptoms were body pains (11%) and low-grade fever (10%). Other reported symptoms included high-grade fever (8.5%) and headaches (1%).

Table-9: Major symptoms post-vaccination

Major symptoms	Female	male	Grand Total	Percentage
Anxiety	5	2	7	**3.5%**
blood clot	-	2	2	**1%**
dyspnea (shortness of breathing)	2	1	3	**1.5-**
loss of consciousness	4	-	4	**2%**
None	86	92	178	**2%**
Other	5	1	6	**89%**
Grand Total	**102**	**98**	**200**	**100%**

This table covers major symptoms post vaccination, with a vast majority (89%) reporting none. The most reported major symptoms were anxiety (3.5%) and loss of consciousness (1.5%). Other symptoms like dyspnea, blood clotting, and other unspecified symptoms were reported in a small percentage of cases.

Table-10: Daily activity change post vaccination

Daily activity change	Female	male	Grand Total	Percentage
No	38	33	71	**35.5%**
not sure	45	49	94	**47%**
Yes	19	16	35	**17%**
Grand Total	**102**	**98**	**200**	**100%**

This table examines changes in daily activities post vaccination. The largest group (47%) was unsure if their daily activities had changed, while 35.5% reported no change, and 17% reported a change in their daily activities.

Table-11: Dietary preferences

Dietary preferences	Female	male	Grand Total	Percentage
Non-vegetarian	97	92	189	**94.5%**
Vegetarian	5	6	11	**5.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table shows the dietary preferences of participants. A large majority (94.5%) were non-vegetarians, with only 5.5% identifying as vegetarians.

Table-12: Number of meals per day

No.of meals/day	Female	male	Grand Total	Percentage
3 meals	54	60	114	**57%**
4 meals	18	10	28	**14%**
5 meals	4	1	5	**2.5%**
Less than 3	26	27	53	**26.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table displays the number of meals participants consumed daily. Most (57%) had three meals a day, 26.5% had fewer than three meals, 14% had four meals, and a small group (2.5%) had five meals daily.

Table-13: Physical activity post vaccination

Physical activity	Female	male	Grand Total	Percentage
Decreased	25	11	36	**18%**
Increased	15	14	29	**14.5%**
Stayed the same	62	73	135	**67.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table shows changes in physical activity levels post vaccination. The majority (67.5%) reported no change, 18% saw a decrease, and 14.5% reported an increase in physical activity post vaccination.

Table-14: Appetite change after vaccination

Appetite change	Female	male	Grand Total	Percentage
No	63	74	137	**68.5%**
Yes	39	24	63	**31.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table discusses changes in appetite after vaccination, with 68.5% reporting no change and 31.5% noticing an increase or decrease in their appetite.

Table-15: Sleep quality post vaccination

Sleep quality	Female	male	Grand Total	Percentage
Improved	19	11	30	**15%**
Stayed the same	60	73	133	**66.5%**
Worsened	23	14	37	**8.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table covers changes in sleep quality post vaccination. Most participants (66.5%) experienced no change in sleep quality, while 18.5% reported worsening sleep and 15% reported improvement.

Tabl-16: Perception of vaccine effectiveness

Vaccine effectiveness	Female	male	Grand Total	Percentage
Agree	86	66	152	**76%**
Disagree	5	7	12	**6%**
Strongly agree	7	20	27	**13.5%**
Strongly disagree	4	5	9	**4.5%**
Grand Total	**102**	**98**	**200**	**100%**

This table presents participants' perception of vaccine effectiveness. A significant majority (76%) agreed that the vaccine was effective, with 13.5% strongly agreeing. Only 6% disagreed, and 4.5% strongly disagreed with vaccines effectiveness. the study reveals that vaccination was widely adopted, with most participants receiving at least one dose, the impact of Covid-19 infection on health and eating habits varied. A significant number of individuals were aware of vaccine side effects, yet only a minority altered their diet due to infection or vaccination. Post vaccination, some participants became more health-conscious, although most did not change their physical activity or daily activity routines

significantly. Sleep quality and appetite were largely unaffected, and while non-vegetarian diets dominated, there was little change in meal frequency. Overall, despite the various minor and major symptoms reported post vaccination, the general perception of vaccine effectiveness was positive, indicating that most people did not experience drastic changes in their health or eating habits as a result of Covid-19 infection and vaccination.

CONCLUSION

The study on the impact of COVID-19 infection and vaccination on individuals' health and eating habits reveals a diverse range of effects. While a majority of participants (61.5%) experienced no significant changes in their dietary habits due to COVID-19 infection, 38.5% reported adjustments such as adopting special diets or avoiding certain foods. Post-vaccination, most participants (65.5%) maintained their usual food intake, though 23% experienced an increase and 11.5% a decrease in consumption. Despite minor and major symptoms reported, the overall perception of vaccine effectiveness was positive, with a significant number of individuals not experiencing drastic changes in their health or lifestyle. These findings indicate that the effects of COVID-19 and vaccination on eating habits and overall health were varied, largely dependent on individual circumstances and pre-existing health behaviours.

REFERENCES

1. Abed Alah, M., Abdeen, S., Kehyayan, V., & Bougmiza, A. (2022). The impact of changes in work arrangements during COVID-19 pandemic on the lifestyle of Qatar's working population. *Journal of Occupational and Environmental Medicine, 64*(2), e53-e59. https://doi.org/10.1097/JOM.0000000000002446
2. Ala'a B. Al-Tammemi , Zeinab Tarhini (2021) (2021) Beyond equity: Advocating theory-based health promotion in parallel with COVID-19 mass vaccination campaigns. *Public Health in Practice 100142 https://doi.org/10.1016/j.puhip.2021.100142*
3. Desantis, C. E., Ferlay, J., Soerjomataram, I., Ervik, M., Dikshit, R., Eser, S., Mathers, C., & Bray, F. (2015). Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *International Journal of Cancer, 136*(5), E359-E386. https://doi.org/10.1002/ijc.29210
4. Haileamlak, A. (2021). The impact of COVID-19 on health and health systems. *Ethiopian journal of health sciences, 31*(6), 1073–1074. https://doi.org/10.4314/ejhs.v31i6.1
5. Hiscott, J., Alexandridi, M., Muscolini, M., Tassone, E., Palermo, E., Soultsioti, M., & Zevini, A. (2020). The global impact of the coronavirus pandemic. *Cytokine & growth factor reviews, 53*, 1–9. https://doi.org/10.1016/j.cytogfr.2020.05.010
6. Kapoor, M., Nidhi Kaur, K., Saeed, S., Shannawaz, M., & Chandra, A. (2023). Impact of COVID-19 on healthcare system in India: A systematic review. *Journal of public health research, 12*(3), 22799036231186349. https://doi.org/10.1177/22799036231186349
7. OECD. Flattening the COVID-19 peak: Containment and mitigation policies. Available online at: https://www.oecd.org/coronavirus/policy-responses/flattening-the-covid-19-peak-containment-andmitigation-policies-e96a4226/ (accessed on 18-06-2024)
8. Pedro I Más-Bermejo, Miladys Limonta-Fernández, Lizet Sánchez-Valdés, Raúl Guinovart-Díaz, Francisco Hernández-Bernal, Isabel Morgado-Vega, Félix O Dickinson-Meneses, Merardo Pujol, María Vidal-Ledo, Yadira Olivera-Nodarse, Kenia Almenares-Rodríguez, Gerardo Guillén-Nieto,

Enrique Galbán-García, Marta Ayala-Ávila, Verena L Muzio-González, Santiago Dueñas-Carrera (2022) Cuban Abdala vaccine: Effectiveness in preventing severe disease and death from COVID-19 in Havana, Cuba; A cohort study. *The Lancet Regional Health – Americas* 16 (100366) https://doi.org/10.1016/j.lana.2022.100366

9. WHO. WHO statement on cases of COVID-19 surpassing 100 000 (2020). Available online at : https://www.who.int/news/item/07-03-2020-who-statement-on-cases-of-covid-19-surpassing-100-000 (accessed 18-06-2024).