

Correlation Between Body Mass Index and Antibody Titers Post COVID-19 Vaccination: Exploring the Impact of Heartfulness Meditation

Mamta Dubey¹, R.B.Kamal², Poonam Gupta³, Kavita Chawla⁴, Reena Sachan⁵, Saraswati J Yadav⁶, Enam Ahmad⁷, Rakesh Kumar Pathak⁸

¹Junior Resident, Department of Physiology, Motilal Nehru Medical College, Prayagraj

²Principal, Maa Vindhyaasini, Autonomous State Medical College, Uttar Pradesh

³Professor, Department of Physiology, MLN Medical College, Prayagraj

⁴Professor, Department of Physiology, MLN Medical College, Prayagraj

⁵Associate Professor, Department of Microbiology, MLN Medical College, Prayagraj

⁶Associate Professor, Department of Physiology, MLN Medical College, Prayagraj

⁷Associate Professor, Government Medical College and Super Facility Hospital, Azamgarh

⁸Assistant Professor, Department of Physiology, Motilal Nehru Medical College, Prayagraj

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ABSTRACT

Background: The global development and distribution of vaccinations against the COVID-19 pandemic has been accelerated. If we want our vaccines to work as well as possible, we need to know what makes the immune response to them tick. One such factor that determines immunological response is body mass index (BMI), which is a measure of how much fat a person has. Heartfulness meditation, a practice that promotes emotional well-being, has also shown promise in enhancing immune function. This study aims to explore the correlation between BMI and antibody titers post COVID-19 vaccination and investigate the potential impact of Heartfulness meditation on this relationship.

Methods: A cross-sectional study was conducted on a sample of individuals who received the COVID-19 vaccine. BMI was calculated based on height and weight measurements. Antibody titers were assessed using standardized laboratory tests. Participants were categorized into BMI groups (normal weight, overweight, and obese) for analysis. Heartfulness meditation practice was assessed through self-report measures.

Results: The study included 72 participants who had received the COVID-19 vaccine. Analysis revealed a no significant correlation between BMI and antibody titers post vaccination. The study participants fell into the category of "normal" and "underweight". In the underweight group, neutralising antibodies were detected at 0 months (97.2098 ± 4.65125), 3 months (97.8168 ± 2.55290), and 6 months (98.5063 ± 0.80221), while in the normal body weight group, they were detected at 0 months (95.5272 ± 11.40342), at 3 months (-95.4111 ± 10.26813), and at 6 months (96.3005 ± 7.76224). This shows no difference in antibody titre between the different body weight.

Conclusion: This study demonstrates no association between BMI and antibody titers post COVID-19 vaccination, suggesting that obesity may adversely affect the immune response. Future research should explore the underlying mechanisms and conduct longitudinal studies to evaluate the sustainability of these effects. Implementing meditation interventions alongside vaccination efforts may help optimize immune response, particularly in individuals with higher BMIs.

Keywords: heartfulness meditation, body mass index, vaccine, antibody titre, COVID -19.

INTRODUCTION

Globally, the COVID-19 epidemic has caused a great deal of suffering and death.[1] One of the most important strategies for stopping the spread of the virus and making illnesses less severe is vaccination. However, the effectiveness of vaccines can vary among individuals, with factors such as age, underlying health conditions, and lifestyle choices potentially influencing immune responses.[2]

Body Mass Index (BMI), a measure of body fat based on height and weight, has been identified as a potential factor affecting immune response to vaccines.[3]

Higher BMI levels have been associated with decreased vaccine efficacy and lower antibody titers in various infectious diseases. Understanding the impact of BMI on COVID-19 vaccine

effectiveness is crucial, as obesity rates have been steadily rising worldwide.[4]

In recent years, there has been growing interest in the practice of meditation for its potential health benefits. Heartfulness Meditation, a technique that focuses on inner connection has gained popularity for its stress-reducing and relaxation effects. However, its impact on vaccine response, particularly in relation to BMI, remains relatively unexplored.[5]

This study aims to investigate the correlation between BMI and antibody titers following COVID-19 vaccination, while also exploring the potential influence of Heartfulness Meditation on immune response. By examining these factors together, we can gain valuable insights into the interplay between BMI, meditation practices, and vaccine effectiveness. The findings of this study hold significant implications for public health strategies, as they can help identify individuals who may be at higher risk of reduced vaccine efficacy due to their BMI. Additionally, understanding the potential benefits of Heartfulness Meditation in improving vaccine response can inform interventions aimed at optimizing immune outcomes.

MATERIALS AND METHODS

This study employed a prospective cohort design to investigate the correlation between Body Mass Index (BMI) and antibody titers post COVID-19 vaccination. Participants' demographic information, BMI measurements, vaccination history, and meditation practices were collected and analyzed. The study adhered to ethical guidelines and obtained approval from the Institutional Ethics Committee of Motilal Nehru Medical college, Prayagraj. Informed consent was obtained from all participants, ensuring confidentiality, privacy, and voluntary participation.

Participant Selection

Medical students in their first year of residency selected an ethnically and racially diverse group of adults who had all been vaccinated against COVID-19. Participants have to have given their informed permission and be 18 or older to get a COVID-19 vaccination. Participants were not allowed to participate if they had a history of immunosuppressive medication, an allergy to any portion of the COVID-19 vaccination, or a mental health issue that may impact their ability to meditate.

BMI Measurement

Height and weight measurements was taken using standardized procedures. BMI will be calculated as weight (kg) divided by height squared (m^2)

Vaccination History

Participants were asked to provide information on the type of COVID-19 vaccine

received, the number of doses administered, and the dates of vaccination.

Heartfulness Meditation Practice: Was done in the following manner

A brief summary of the research and instructions on how to practice mindfulness meditation were given to all participants in the meditation group.

One of the most common practices in mindfulness meditation is to sit in a comfortable position and bring one's awareness, with the eyes closed, to the center of one's own heart. We requested that instead of attempting to picture it, people just tune into their hearts and be receptive to whatever it is that they may feel. Participants were instructed to gently guide their thoughts back to their hearts if they found themselves straying. It was suggested to do this for 20 minutes first thing in the morning and again for 5 minutes before bed. In a 30-minute group meditation session taught by a mindfulness trainer, participants were requested to apply the same approach on a weekly basis.

The suggested nighttime exercise lasted fifteen minutes and included having people visualize heavy tension, pollutants, and complexity discharging from their bodies via the back as vapor or smoke. A current of innocence, lightness, and newness was to replace these complexity and impurities. Instead than ruminating on the things they were letting go of, participants were encouraged to just brush them aside.

After that, each participant received a practice information page. The group meditation session's attendance was taken down.

Blood Sample Collection

Participants blood sample was collected. Standard aseptic techniques was employed to collect venous blood samples.

Antibody Testing

Tests for SARS-CoV-2 antibody titers were measured using an enzyme-linked immunosorbent assay (ELISA). A qualified laboratory tested the samples according to normal methods.

Study respondents were followed for a period of 6 months. Sample were collected on 3 time points: First sample -before the start of the study(at 0 months); Second sample- three months after the first sample and Third sample – six months after the first sample.

Data Analysis

We used SPSS version 25.0 to analyze the data that was extracted and then pasted into spreadsheets.

The data is shown in tables, percentages, and means with standard deviations. The data was tested for normalcy using the Kolmogorov Smirnov

test. Using repeated measures analysis of variance (repeated measures ANOVA), continuous variables were examined over time periods of 0, 3, and 6

months. Statistical significance was defined as a p-value of 0.05 or below.

RESULTS

Table 1: Table showing comparative evaluation of antibody response with BMI

BMI	N	Mean	S.D	Mean difference	Std.Error Difference	't' statistic	P value
Antibody titre 0 month							
Underweight	14	97.2098	4.65125	1.68255	2.54904	.660	.511 (NS)
Normal	58	95.5272	11.40342				
Antibody titre 3 months							
Underweight	14	97.8168	2.55290	2.40562	2.26628	1.061	.291 (NS)
Normal	58	95.4111	10.26813				
Antibody titre 6 months							
Underweight	14	98.5063	.80221	2.20575	1.70239	1.296	.198 (NS)
Normal	58	96.3005	7.76224				

*=Significant; NS=Not Significant

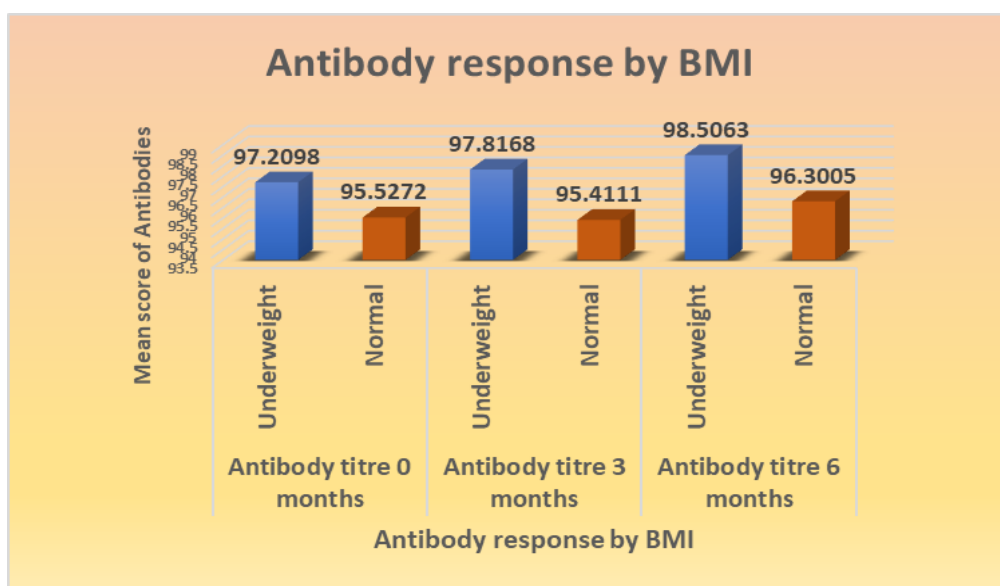


Figure 1: Graph showing comparative evaluation of antibody response with BMI

A total of 90 respondents were recruited for the study, of which complete data of 82 were obtained in the first month. 10 subjects were lost to follow up in the first follow up and finally 72 were present in final analysis. Male members were found to be found in majority (62.2%) as compared to females 37.8% of the study population.

The current study population had adults falling into the “underweight” and “normal” category. In the underweight group, neutralising antibodies were detected at 0 months (97.2098 ±4.65125), 3 months (97.8168 ±2.55290), and 6 months (98.5063 ±.80221), while in the normal body weight group, they were detected at 0 months (95.5272 ±11.40342, at 3 months (95.4111

±10.26813), and at 6 months (96.3005 ± 7.76224).

DISCUSSION

The COVID-19 pandemic has spurred extensive efforts worldwide to develop and distribute effective vaccines. Vaccination plays a critical role in curbing the spread of the virus and reducing the severity of the disease. However, emerging research suggests that various factors, including body mass index (BMI), can influence the immune response to vaccination. [6]

Additionally, recent studies have shown promising results regarding the impact of meditation practices on immune system function. In this article, we explore the correlation between BMI and antibody titers post COVID-19 vaccination and

investigate the potential influence of Heartfulness meditation on this relationship.

Meditation practices have gained attention for their potential benefits on mental, emotional, and physical well-being. Heartfulness meditation, a technique that involves focusing on the heart and cultivating feelings of love and compassion, has shown positive effects on stress reduction and emotional resilience.[7] Recent research has also suggested that meditation practices may influence immune function and enhance vaccine response.[8] Heartfulness meditation may potentially exert a positive impact on the correlation between BMI and antibody titers post COVID-19 vaccination. By reducing stress levels and promoting emotional well-being, this meditation practice might mitigate the negative effects of obesity on the immune system. Stress has been shown to have detrimental effects on immune function, and chronic stress, often associated with obesity, can impair vaccine response.[9]

We set out to examine the effects of Heartfulness meditation on antibody retention after the COVID-19 vaccination in this research. The COVID-19 pandemic has caused an unprecedented global catastrophe and tremendous economic devastation, with over 524 million cases and 6.27 million deaths recorded. Two sources: [10,11] Although antiviral drugs against SARS-CoV-2, the COVID-19-causing virus, have been developed, public health programs and immunizations continue to be the best defenses against this global menace. Even while anti-SARS-CoV-2 vaccinations reduce death and morbidity rates, and having neutralizing antibodies protects against severe COVID-19 [12–14], reinfection breakthrough infections with SARS-CoV-2 do happen in rare cases.

Producing neutralizing antibodies that identify the viral S protein is the objective of SARS-CoV-2 vaccines. Preventing virus-human cell contact and aiding in the early phases of infection may be achieved with the help of anti-spike neutralizing antibodies. Each vaccine is unique in the way it works, the way it is given, and the immunological response it elicits. Based on their vaccines' central points, key immunological evaluation indices including neutralizing antibody level and T cell immune response intensity have been shown in animal and clinical experiments. Important protective immunological indices for evaluating vaccination effectiveness include neutralizing antibody immunity, however the exact method by which SARS-CoV-2 interacts with the immune response is yet unclear.

Reduced sense of pain intensity is one way in which meditation boosts immunity. Elevated pain or disability tolerance, Lessened emotional distress, Reduced use of, and response to, analgesic,

anxiolytic, and antidepressant drugs Improvements in reflection on treatment decisions (such as whether to get a second opinion), The ability to follow prescribed medical procedures increasingly; Elevated drive to alter dietary habits, exercise routines, cigarette smoking habits, or other aspects of one's daily routine, Alterations to health-related biochemical processes, including the immune system, neuroendocrine function, and the autonomic nerve system; and improved interpersonal connections and social engagement. Nothing concrete has come out of most of these possibilities. But research has linked mental stress to a host of health problems. Research suggests that physiological and psychological factors may be impacted by training in mindfulness meditation, leading to an improvement in immunity. For the purpose of determining whether or whether a sustained protective effect is possible and, if so, for what duration, observational studies are required.

In mindfulness meditation, the focus shifts from the rational mind to the emotional self. Embracing life with a calm heart brings a sense of peace from worry and tension. We get the insight and clarity to make better life choices as we delve more into our spiritual practices. We are more capable of experiencing pleasure, love, and empathy when we are calm and clear within. In a good manner, these traits affect our relationships and daily routines.

Correlation Between BMI and Antibody Titers

Body mass index, a measure of body fat based on height and weight, has been recognized as a significant risk factor for various health conditions. Studies have shown that individuals with a higher BMI often exhibit altered immune responses, including decreased antibody production. This has led to investigations into whether BMI could influence the immune response to COVID-19 vaccination. The current study population had adults falling into the “underweight” and “normal” category. In the underweight group, neutralising antibodies were detected at 0 months (97.2098 ± 4.65125), 3 months (97.8168 ± 2.55290), and 6 months (98.5063 ± 8.0221), while in the normal body weight group, they were detected at 0 months (95.5272 ± 11.40342, at 3 months (-95.4111 ± 10.26813), and at 6 months (96.3005 ± 7.76224). We found that the antibody response to Covid-19 vaccination remained constant for 6 months in our subjects

In contrast to our study, the findings of Zhai B et al. (2022) showed different results. Patients with virologically proven SARS-CoV-2 infection exhibited higher serum anti body concentrations, according to Zhai B et al (2022). They discovered that serum anti body titer and body mass index were positively correlated [15]. However, in our situation,

Heartfulness meditation had no effect on the relationship between BMI and antibody titre.

However, further studies are needed to establish a definitive link between BMI and antibody titers, as other factors such as age, comorbidities, and genetics may also contribute to the observed differences.

Potential limitations of the study may include the reliance on self-reported data for meditation practices and potential recall bias. The study's cohort design may not establish causality between BMI, meditation, and antibody response. Longitudinal studies or randomized controlled trials may provide further insights into these associations.

Implications and Future Directions

Understanding the correlation between BMI and antibody titers post COVID-19 vaccination is crucial for optimizing vaccine effectiveness and identifying vulnerable populations. By exploring the potential impact of Heartfulness meditation on this relationship, we open up avenues for future research and interventions.

To further understand how Heartfulness meditation influences the immunological response to vaccines, future research should use rigorous approaches such as randomized controlled trials. To determine if the advantages are long-lasting and to understand how they work, longitudinal studies are necessary. Additionally, research should consider other factors that may influence vaccine response, such as age, gender, and pre-existing medical conditions.

CONCLUSION

The correlation between BMI and antibody titers post COVID-19 vaccination does not highlight any potential influence of obesity on the immune response. Exploring the effects of Heartfulness meditation offers a potential way to improve vaccination response in those with higher BMIs, however further study is needed to validate this association. By promoting emotional well-being and modulating immune system activity, meditation practices might help bridge the gap in antibody titers observed between individuals with varying BMIs. Continued investigation in this area has the potential to inform interventions and contribute to more effective vaccination

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