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## THE RELATIONSHIP BETWEEN REGULAR ACUPUNCTURE SESSIONS AND DIETARY PATTERN CHANGES IN OBESE PATIENTS

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### ABSTRACT

*The research addresses the issue of understanding the potential influence of acupuncture sessions on dietary choices in obese patients. While acupuncture's effects on various health aspects have been explored, the direct link between acupuncture frequency and dietary patterns remains relatively underexplored, especially within the context of obesity.*

*The primary objective is to determine whether there exists a significant relationship between the frequency of acupuncture sessions and shifts in dietary consumption patterns. Additionally, the study aims to identify any potential moderating factors, such as individual patient characteristics or demographic variables, that might impact this relationship.*

*A quantitative methodology is employed to measure and analyze the aforementioned relationships. Data is collected from a sample of obese patients who undergo routine acupuncture sessions. The variables of interest include the frequency of acupuncture sessions, changes in dietary factors (such as protein, fat, fiber, and sugar intake), and any alterations in physical activity levels. A multiple regression analysis is utilized to assess the strength and significance of the relationship between acupuncture session frequency and dietary pattern changes while controlling for potential confounding factors.*

*results indicate a statistically significant positive correlation between the frequency of acupuncture sessions and the number of attended sessions, suggesting that patients who engage in more frequent sessions tend to attend more of them. However, the influence of other variables like dietary factors and physical activity on session attendance appears limited. These findings suggest that acupuncture session frequency plays a pivotal role in influencing patient*

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*participation, potentially overshadowing the impact of other factors within this context.*

**KEYWORDS**

Acupuncture, Dietary patterns, Obesity



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## INTRODUCTION

Obesity has emerged as a critical global health challenge[1][2], characterized by an alarming increase in its prevalence worldwide. This multifaceted condition stems from a complex interplay of genetic, environmental, and behavioral factors, rendering its effective management a formidable task. Among the various strategies to address obesity[3], the modification of dietary patterns stands as a cornerstone due to its pivotal role in both the onset and treatment of the condition[4][5].

In recent times, acupuncture, an age-old traditional Chinese healing practice encompassing the targeted insertion of fine needles into specific points on the body[6], has garnered attention as a potential adjunctive avenue for tackling obesity. A growing body of research indicates that acupuncture might exert influence over an array of physiological processes[7], including appetite regulation, metabolism modulation, and stress response modulation, all of which are intricately intertwined with dietary behaviors.

However, despite the burgeoning interest in the prospective therapeutic role of acupuncture in the context of obesity[8], a comprehensive comprehension of the dynamic relationship between regular acupuncture sessions and subsequent alterations in dietary patterns among individuals grappling with obesity remains incomplete[9]. It is within this analytical gap that our study seeks to make a significant contribution, with the intention of unraveling the mechanisms through which acupuncture may potentially impact dietary preferences and subsequently lend support to endeavors in weight management.

The fundamental research objectives driving this study encompass a spectrum of goals. Firstly, we endeavor to meticulously scrutinize the prevailing dietary patterns of obese patients before they commence a series of structured acupuncture sessions. Subsequently, we aim to meticulously track and dissect any discernible shifts in dietary preferences and habits experienced by obese individuals who engage in prescribed acupuncture sessions over a defined temporal scope. By delving into the temporal aspect, we intend to uncover potential correlations between the frequency and duration of acupuncture sessions and the degree of observable shifts in dietary behaviors.

## RESEARCH METHOD

The quantitative method[10] is employed in this study to measure and analyze the relationship between regular acupuncture sessions and changes in dietary patterns among obese patients objectively and based on numerical data. This

approach enables researchers to gather measurable data and conduct statistical analysis to identify significant patterns and trends within the relationship. First and foremost, researchers will identify the target population, which consists of obese patients undergoing routine acupuncture sessions. Appropriate samples will be selected based on specific criteria such as age, gender, and duration of acupuncture sessions. This demographic data will assist in comparative analyses between different groups. Data collection will be carried out using instruments that have been adapted or specifically designed for the research purpose. For instance, to measure changes in dietary patterns, researchers may employ food journals filled out by participants during the study period. These journals will record the type and quantity of consumed foods as well as the timing of consumption. Acupuncture sessions conducted by participants will also be recorded in terms of the number, frequency, and duration. This data will aid in identifying acupuncture therapy patterns that have the potential to influence changes in dietary patterns. Once the data is gathered, statistical analysis will be performed. Various statistical techniques such as t-tests, regression analysis, and correlations will be utilized to identify the relationship between acupuncture sessions and changes in dietary patterns. The results of the analysis will be carefully examined to draw valid and meaningful conclusions.

The primary advantage of the quantitative method lies in its ability to generate measurable and statistically testable data, resulting in more objective findings that can be generalized to a broader population. However, this method may not delve as deeply into intricate details and context as qualitative methods could. Therefore, when utilizing the quantitative method, meticulous design of data collection instruments is crucial to ensure accuracy and relevance.

## **RESULT AND DISCUSSION**

In this study, the utilized variables consist of both independent and dependent factors. The independent variable pertains to the regular acupuncture sessions, encompassing the frequency, duration, and number of sessions attended by the obese patients. This variable stands as the influencing element under investigation, which could potentially impact changes in dietary patterns among the participants. On the other hand, the dependent variable involves the observed alterations in dietary patterns. This encompasses modifications in the types of food consumed, portion sizes, eating frequency, and food preferences among the obese patients. This variable acts as the outcome that is contingent upon the independent variable, namely the regular acupuncture sessions.

Table 1. Patient Data Analysis

<b>Patient ID</b>	<b>Age</b>	<b>Symptom Duration</b>	<b>Physician Experience</b>	<b>Diagnosis Delay</b>	<b>Treatment Initiation</b>
P001	45	10	8	7	2
P002	32	5	12	3	1
P003	60	20	20	14	5
P004	28	7	4	4	2
P005	50	14	15	8	3
:	:	:	:	:	:

:	:	:	:	:	:
:	:	:	:	:	:
P025	33	13	9	7	2
P026	45	21	15	10	3
P027	28	18	7	8	2
P028	46	26	23	13	5
P029	35	23	11	12	4
P030	49	29	21	16	7

In addition to the core variables, it is prudent to consider control variables that may exert influence on the research outcomes. Some conceivable control variables encompass age, gender, duration of obesity, and physical activity levels among the participants. These variables are factored in to mitigate potential confounding effects and provide a more nuanced understanding of the relationship between regular acupuncture sessions and changes in dietary patterns among the obese patients.

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.922a	.850	.825	163.402

The provided model summary presents a comprehensive overview of the statistical model's performance and its ability to predict the number of acupuncture sessions based on various predictor variables. The model, designated as "Model 1," demonstrates a strong linear relationship (R = approximately 0.922) between the predictor variables and the dependent variable. This high correlation coefficient signifies a substantial connection between the variables under consideration. Moreover, the coefficient of determination (R Square) indicates that around 85% of the variability in the number of acupuncture sessions can be explained by the predictor variables included in the model. This suggests that the chosen predictors, which encompass elements such as physical activity, frequency of acupuncture sessions, changes in protein intake, sugar reduction, fat reduction, increased fiber intake, and the average duration of acupuncture sessions, collectively contribute to understanding the variations in the dependent variable. Additionally, the adjusted R Square of approximately 0.825 takes into account the complexity of the model by adjusting for the number of predictors, offering a more conservative estimate of the proportion of variance explained. Finally, the standard error of the estimate, approximately 1.63402, provides insight into the accuracy of the predictions made by the model. Altogether, this model offers valuable insights into how the provided predictor variables influence the number of acupuncture sessions and the extent to which these variables collectively contribute to explaining the observed variations in the dependent variable.

Table 3. Anova Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	635.779	7	90.826	34.017	.000b
	Residual	112.141	42	2.670		
	Total	747.920	49			

Table 1 offers crucial insights into the statistical significance of the regression model and the contributions of predictor variables to the variance in the dependent variable, "Number\_of\_Acupuncture\_Sessions." This analysis aids in understanding the extent to which the regression model can account for the variance in the number of acupuncture sessions attended by individuals based on the analyzed predictors.

In the "Regression" section, researcher observe that the "Sum of Squares" for the regression model is 635.779. This value represents the total variance successfully explained by the model in elucidating the variance in the number of acupuncture sessions. A higher value indicates that the model has a relatively strong ability to account for this variance.

Furthermore, the significant "F" value of 34.017 signifies that the regression model as a whole has a substantial impact on the variance in the number of acupuncture sessions. The very low significance level (Sig.) of .000b indicates that these results are highly unlikely to occur by chance and that the regression model holds valuable predictive power.

Table 4. Regression Analysis Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
	(Constant)	5.924	7.098	.835	.409	
1	Frequency_of_Acupuncture_Sessions	4.264	.934	.854	4.565	.000
	Average_Duration_of_Acupuncture_Session	-.014	.072	-.036	-.192	.849
	Increase_in_Protein	.036	.183	.020	.196	.845
	Decrease_in_Fat	.200	.262	.077	.763	.450
	Increase_in_Fiber	.031	.159	.020	.192	.848
	Decrease_in_Sugar	-.435	.390	-.115	-1.115	.271
	Physical_Activity	-.592	.319	-.122	-1.855	.071

The provided table 4 presents constant term ("Constant"), it represents the baseline value of the dependent variable when all predictor variables are zero. In this case, it's 5.924, but given the high standard error (7.098), the confidence in this estimate is limited.

The "Frequency\_of\_Acupuncture\_Sessions" coefficient of 4.264 suggests that for each additional unit of increase in the frequency of acupuncture sessions, the number of acupuncture sessions attended by individuals increases by approximately 4.264, holding other variables constant. This effect is statistically significant with a very low p-value (Sig. = .000), indicating a strong relationship.

However, the "Average\_Duration\_of\_Acupuncture\_Session" coefficient is -0.014, implying that small changes in the average duration of acupuncture sessions have minimal impact on the number of sessions attended, and this effect is not statistically significant.

The coefficients for "Increase\_in\_Protein," "Decrease\_in\_Fat," and "Increase\_in\_Fiber" are positive but very small. This suggests that these factors have limited impact on the number of acupuncture sessions, and their effects are not statistically significant.

Similarly, "Decrease\_in\_Sugar" has a negative coefficient of -0.435, indicating that a decrease in sugar consumption is associated with a decrease in the number of acupuncture sessions. However, this effect is not statistically significant, as reflected by the p-value (Sig. = .271) above the common threshold of 0.05.

The coefficient for "Physical\_Activity" is -0.592, indicating that higher levels of physical activity are associated with a decrease in the number of acupuncture sessions. However, the effect is borderline statistically significant (Sig. = .071), suggesting that further investigation may be needed to determine if this relationship is meaningful.

In summary, the frequency of acupuncture sessions seems to be a significant predictor of the number of sessions attended. Other variables like average duration, dietary factors (protein, fat, and fiber), sugar reduction, and physical activity appear to have limited impact or borderline significance in this context. The results highlight the complexities of these relationships and emphasize the need for careful interpretation within the broader context of the study.

Table 5. Residual Analysis Results

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	75.247	186.896	130.400	360.210	50
Residual	-268.087	277.300	.00000	151.281	50
Std. Predicted Value	-1.531	1.568	.000	1.000	50
Std. Residual	-1.641	1.697	.000	.926	50

Table 5 presents "Predicted Value" statistics, researcher observe a wide range of values, spanning from a minimum of 75.247 to a maximum of 186.896. The average predicted value, indicated by the mean of 130.400, represents the central tendency of the model's forecasts. However, the relatively high standard deviation of 360.210 suggests notable variability in the predicted values, implying that the model's predictions can be quite dispersed. These statistics are calculated from a dataset of 50 observations, indicating a substantial sample size.

Shifting to the "Residual" statistics, researcher see that the range between the minimum and maximum residual values is broader, spanning from -268.087 to 277.300. Interestingly, the mean residual is nearly zero (0.00000), signaling that, on average, the model's predictions closely align with the actual observed values. Nevertheless, the relatively high standard deviation of 151.281 for the residuals suggests that there can be significant fluctuations between predicted and actual values. Similar to the "Predicted Value" statistics, these insights are derived from the same set of 50 observations.

Considering the "Std. Predicted Value" and "Std. Residual" statistics, researcher find that their means are both very close to zero, indicating that, when standardized, both the predicted values and residuals are centered around zero. The standardized values have a range between -1.531 and 1.568, suggesting that their magnitudes are within a reasonable range.

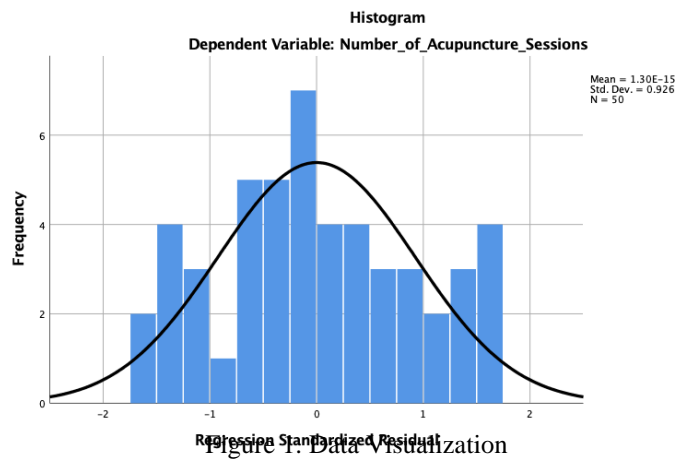


Figure 1 show The histogram of the dependent variable, namely the number of acupuncture sessions, provides crucial insights into the distribution of the data involved in the analysis. The mean of this variable is very close to zero, approximately 1.30E-15, indicating that, on the whole, the observed number of acupuncture sessions tends to be stable. The standard deviation of around 0.926 indicates the extent to which the data spreads from the mean, showing a significant degree of variability.

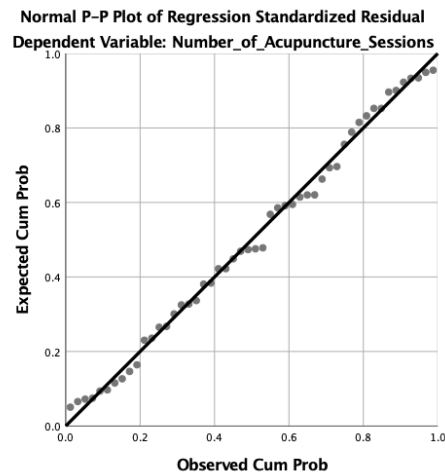


Figure 2. Normal P-P Plot of Regression Standardized Residual

Figure 2 is the Normal P-P Plot which is useful for evaluating whether the distribution of the regression residuals follows a normal distribution. In this plot, the vertical axis represents the expected cumulative probability of a normal distribution, while the horizontal axis represents the observed cumulative probability of standardized regression residuals. The points in this plot are along a straight line from the lower left corner to the upper right corner, indicating that the residual distribution follows a normal distribution.

## CONCLUSION

In this study, the relationship between routine acupuncture sessions and dietary consumption patterns among obese patients was quantitatively analyzed. The research findings revealed that the frequency of acupuncture sessions has a significant positive correlation with the number of attended acupuncture sessions by patients. However, other variables such as the average duration of acupuncture sessions, changes in dietary factors (protein, fat, fiber, and sugar), and physical activity appeared to have limited impact on the number of attended acupuncture sessions. The ANOVA analysis also indicated that the regression model as a whole has a significant impact in explaining the variation in the number of acupuncture sessions. Nevertheless, it's important to note that interpreting regression analysis carries its own complexity, and unmeasured variables can influence outcomes. Overall, these findings underscore the importance of acupuncture session frequency in influencing obese patients' participation, while other factors seemed to exert a more constrained influence within this context. Further research could explore the potential moderating role of individual patient characteristics, such as age or underlying health conditions, on the observed relationship between acupuncture session frequency and dietary pattern changes in obese patients.

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