

A CROSS SECTIONAL STUDY TO ASSESS THE RELATIONSHIP BETWEEN FOOD PATTERN AND MENTAL HEALTH

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ABSTRACT

Introduction: Ayurveda, the life science, not only mentions the healthy food pattern but also the effect of varied patterns on one's mental health status. Many studies have been published regarding the relationship between somatic diseases and food patterns. But those studies that explain the relationship of food pattern with mental status are comparatively less documented till date; especially in an Indian scenario. Based on these findings, a study was planned to find out strong evidence from the population about this particular relationship by means of survey. **Method:** A cross sectional survey was conducted by selecting one ward each from Ottapalam Panchayath of Palakkad district and Edarikkode Panchayath of Malappuram districts from Kerala. 50 participants from each ward were selected by convenient sampling method as per the inclusion criteria; thus making a sample size of 100. Survey was conducted using a pre-formulated questionnaire about food pattern along with the Mental Health Inventory – 38. **Result:** Chi-square test for association and also Odds ratio were used for analysis. Results showed specific positive and negative associations in many domains of mental status with food patterns. **Discussion:** Many domains like depression, emotional ties and life satisfaction showed significant association with unhealthy food patterns which is supportive of those mentioned in Indian literatures and some published studies. **Conclusion:** It was supportive of the relation between food pattern and mental health and hence a strong relationship can be assumed.

Key words: Food pattern, mental health, Mental Health Inventory-38

INTRODUCTION

Relation between food patterns and somatic diseases is already established. But in the case of mental status and psychological disorders it is still a dilemma. Many studies were published in foreign countries about this relation, i.e., association between habitual diet and common mental disorders¹, the type of food and mental disease², association of food contents with mental disorders³⁻⁵ and certain diets in the treatment of mental disorders^{6, 7}. But still most of us are not assured about this association. Even though many Indian literatures are having such references, no published studies are available in an Indian scenario.

More over the prevalence of Psychiatric disorders especially in Kerala is increasing in an alarming rate^{8,9}. Studies show high prevalence of psychological distress among females in Malappuram and Calicut districts of Kerala¹⁰. Hence, it is highly recommended to clarify the relation between the food pattern and mental health. This study mainly aimed to conduct a cross sectional survey to find a clue about this relation in population.

Methods

The sample size for the cross sectional survey was 100. The areas for conducting the survey were selected based on feasibility, i.e.

non probability. Thus Edarikkode Panchayat from Malappuram district and Ottapalam Municipality from Palakkad district in Kerala were selected. Thus, ward number 02 from Edarikkode Panchayath and ward number 09 from Ottapalam Municipality were selected by lottery method. 50 individuals were surveyed for assessing their food habits and mental states from each ward. Inclusion criteria were members from either sex or the age limit was 30-60 years. Primarily those individuals with any chronic illnesses, recently those who faced an acute adversity in their lives such as sudden loss of life partner, those with any appreciable amount of stress at the time of the survey or those who were on psycho active drugs were primarily excluded from the survey, i.e. apparently healthy individuals were opted for the survey. This was done to avoid the possibility of confounding factors afflicting the mental health.

A food frequency questionnaire was formulated on the basis of a previously conducted study. This tool contained 47 closed ended questions that assessed basically two conditions i.e. either a predominant healthier food habit or its opposite of unhealthy feeding habits. Also *Saatvika* (Virtuous), *Raajasa* (Quality that which thought to promote sensuality, greed, jealousy, anger, delusion, and irreligious feelings) and *Taamasa* (Quality that which thought to promote pessimism, ignorance, laziness, criminal tendencies, and doubt) predominance in dietary habits were also assessed (*Satva*, *rajas* and *tamas*). Scoring was done for possible questions on a 05 point basis based on the frequencies of indulgence. A score of ≥ 48 for healthy food habits, ≥ 63 for unhealthy food habits, ≥ 6 for *Saatvika* food habits, ≥ 9 for *Raajasa* food habits and ≥ 9

for *Taamasa* food were considered as significantly high scores.

The Mental Health Inventory (MHI) – 38 scales includes positive aspects of well-being as well as negative aspects of mental health. All of the scales, except two, are scored on a six-point scale. A number of summary scores were derived from the MHI such as Global Mental Health Index score, Psychological distress and well-being scores, six sub-scale scores representing anxiety, depression, and loss of behavioral or emotional control, general positive effect, emotional ties and life satisfaction. Scoring was done based on obtaining higher scores alone, in each domain¹¹.

Individuals from each ward were selected based on feasibility, approachability and their willingness to participate in the survey. Mostly, a home based survey was conducted with only an individual from a single home. It took around 30 days to complete the survey. Thus after the survey, they were assessed for their dietary patterns using the newly developed Food Frequency Questionnaire and their mental states were determined using MHI- 38. The results were analyzed using Chi-square test and Odds ratio for association.

Results

In the study population, around 85% were predominantly on a non-vegetarian diet (almost daily); whereas remaining 15% were predominantly on a vegetarian diet (non vegetarian diet once or twice in a month). There were only 4 individuals who were strictly vegetarians and never ate any sort of non-vegetarian stuff including eggs. More of healthier food patterns were observed among the female population i.e. around 60%. Males comparatively had less of healthier food habits i.e. around 40%. Male practiced a

predominantly unhealthier food patterns (69%) than females (31%). Majority of people (54%) had life satisfaction and a good mental health index (50%). Least number of participants had the features of anxiety (15%).

Considering the male and female distribution of the psychological domains, features of anxiety, depression and psychological distress were more predominant in the female population in this particular setting. Whereas, the domains of Loss of

behavior, General positive effect, Emotional ties, Psychological wellbeing and the Mental Health Index were more among male participants. The domain of life satisfaction was equally distributed among male and female participants.

Following were the data in different domains, obtained from the survey using MHI – 38 scale and questionnaire. Chi-square test and Odds ratio were performed.

Table No.1: Anxiety versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	0.674	0.495	0.481
Unhealthy food	2.315	2.117	0.145
Satwika food	0.150	5.724	0.017
Rajasika food	2.815	2.047	0.153
Tamasika food	1.985	1.490	0.222

Table No 2 - Depression versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	0.923	0.032	0.857
Unhealthy food	5	11.64	0.0006
Satwika food	0.587	1.35	0.244
Rajasika food	2.35	3.44	0.063
Tamasika food	2.789	5.083	0.024

Table No. 3 - Loss of behavior versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	0.806	0.216	0.641
Unhealthy food	5.166	11.71	0.0006
Satwika food	0.483	2.27	0.131
Rajasika food	1.825	1.619	0.203
Tamasika food	1.892	1.824	0.176

Table No. 4 - General positive affect versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	1.625	0.779	0.377
Unhealthy food	0.3277	1.35	0.244
Saatvika food	3.636	5.418	0.019

Rajasika food	1.195	0.141	0.706
Tamasika food	0.5729	1.427	0.124

Table No 5 - Emotional ties versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	1.195	0.141	0.706
Unhealthy food	0.490	0.863	0.353
Satwika food	2.032	2.268	0.132
Rajasika food	0.548	1.62	0.201
Tamasika food	1.02	0.0015	0.968

Table No 6: Life satisfaction versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	2.39	4.56	0.032
Unhealthy food	0.804	0.226	0.634
Satwika food	0.95	0.014	0.903
Rajasika food	0.468	3.44	0.063
Tamasika food	1.493	0.865	0.352

Table No 7 - Psychological distress versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	0.904	0.035	0.851
Unhealthy food	4.36	7.72	0.005
Satwika food	0.315	2.842	0.092
Rajasika food	2.45	2.54	0.11
Tamasika food	2.062	1.831	0.176

Table No 8 - Psychological wellbeing versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	1.810	1.200	0.271
Unhealthy food	0.302	1.673	0.196
Satwika food	2.960	4.160	0.040
Rajasika food	0.658	0.645	0.422
Tamasika food	0.522	1.427	0.232

Table No 9 - Mental health index versus food pattern

	Odds ratio	Chi square	p - value
Healthy food	1.080	0.040	0.840
Unhealthy food	0.420	3.320	0.068
Satwika food	2.935	6.880	0.009

Rajasika food	0.407	4.857	0.028
Tamasika food	0.762	0.407	0.523

DISCUSSION

While six subscales were analyzed, the negative domains of mental health namely – anxiety was more prevalent in the females than in males. Acaarya Cakrapaani has commented that females have *durbalacetas*, i.e. weak minded and can't tolerate even mild stressors¹². As far as features of depression were considered, it was somewhat evenly distributed among male and female participants with a slight hike among female. In the negative domain of mental health, the loss of behavior; the prevalence was marginally more among male participants than females. This might be because as such, males are more aggressive and spontaneous while responding to any life situation. And they have to take abrupt decisions in adversities. Moreover, loss of behavior is an impulsivity determining factor of mental states. As per a published study, there is higher incidence of impulsivity related conditions in men than women¹³.

Positive states of mental health namely, general positive effect, and emotional ties were more observed in males than in females. Many factors that may be attributed towards depleting mental states of females are lesser social mingling, state of dependency, change of the environmental conditions after marriage, monthly hormonal variations, and more burdens in parenting when compared to the male counterpart. In the domain of life satisfaction, there was equal prevalence among male and females. A reason that may be attributed to this finding is the age group selected for the survey. By the age of 30 years and above, most of the people get adapted to their overall life circumstances.

While the features of anxiety were assessed in relation with food patterns, no significant association was found between anxiety and either healthier or the unhealthier food habits. But as and when anxiety features were assessed with *saatvika* predominant diet, it was observed that there was a negative significant association. The more one indulges in *saatvika* predominant diet there is a very lesser chance that he develops features of anxiety. But no association was observed between either *raajasaor taamasa* predominant dietary patterns with features of anxiety. In the domain of anxiety and food patterns less than a few studies seem available. As far as this study is considered through odds ratio there was a positive association between unhealthier food habits and features of anxiety (Odds ratio ~ 2, indicating unhealthier food habits as a risk factor in developing anxiety). But the study revealed insignificant results statistically.

When depressive features in individuals were assessed with their food habits, a high significance was observed between unhealthier food habits and features of depression. Also the odds ratio was 5, indicating a high strength of positive association. Unhealthier food habits thus prove to be a risk factor towards development of depressive features. Similarly there was significance between unhealthier food habits and *taamasa* predominant dietary habits. With Odds ratio of 2, there was a strong positive association between *raajasa* predominant dietary patterns and depressive features but with no statistical significance. There was a negative association between healthier food habits and *saatvika* predominant dietary

patterns with features of depression. The association between unhealthier food habits and development of depressive features has been well established in a study conducted by Walid EL Ansari *et.al*; which goes parallel to the results of this study as well¹⁴.

As and when loss of behavior was assessed with food patterns in individuals, a high statistical significance was observed between unhealthier food patterns and loss of behavior with a high odd's of 5. This shows that unhealthier food habits are a risk factor in developing features of loss of behavior. As far as healthier food patterns were considered, there was a negative association with respect to odds ratio. *Raajasa* food habits and *taamasa* food habits were positively related to loss of behavior. A cross sectional study conducted on association between diet quality and mental health in socially disadvantaged New Zealand adolescents with a large sample (N = 4249), concluded that eating a healthy diet was significantly associated with better emotional health with a high significance¹⁵.

The observations of General positive effect, a positive domain of mental health when assessed with food patterns didn't give any significant associations with either healthier or unhealthier food habits. But, when *saatvika* predominant dietary habits were assessed with GPA, there was significant association with an odd's ~3. This study identifies *saatvika* predominant dietary habits having a causal relationship with GPA. An interesting finding remains that *raajasa* predominant dietary habits also seemed to have a causal association with GPA, as the odds ratio was >1. This could be because; *raajasa* dietary patterns have exclusive influences over one's taste desires and contentment. That is, comparatively *raajasa* patterns of food intake are tastier than *saatvika* and *taamasa* patterns of food intake. Hence, a

positive effect, i.e. euphoric feel is obtained after intake of *raajasa* patterns of food.

On assessing the positive domain of emotional ties with food patterns, there was no significance with any of the dietary patterns. This was a contradictory result found in this study when compared to worldwide studies published till date. As mentioned earlier, while explaining the domain of loss of behavior and food patterns there was a causal association between healthier food patterns and emotional wellbeing¹⁵. This study couldn't find any such associations.

On assessing life satisfaction with food habits of individuals, a significant association was observed between healthier food habits and life satisfaction. This study identifies healthier food habits as having a causal relationship with life satisfaction of individuals. In other domains of food patterns no significance was observed

The study revealed high significance between psychological distress and unhealthier patterns of food intake. There was 4 times the chance of developing psychological distress in individuals who consumed unhealthier food patterns which goes parallel to a study conducted by Walid EL Ansari *etal*¹⁶. We found high associations between perceived stress and unhealthier patterns of food intake among individuals. Among the other domains, no significance was observed between psychological distress and healthier, *saatvika* predominant, *raajasa* predominant or *taamasa* predominant dietary habits.

The global scale of psychological wellbeing was not associated to either healthier or unhealthier food habits statistically. But odds ratio showed a tendency of positive association between Psychological wellbeing and healthier food habits. Studies prove that a healthier dietary habit improves the mental wellbeing, promotes the personality

and is a decisive factor among individual differences in behaviors¹⁷. This finding was not ascertained through this study.

The observations of Mental Health Index, the total score of mental health of an individual, when assessed with food patterns didn't give any significant associations with healthier food habits, unhealthier food habits or *taamasa* food habits. But a systematic review based on 12 epidemiological studies conducted by *Adrienne O'Neil et.al*, concluded that there was a consistent trend for relationship between good quality diet and better mental health and some evidence of the reverse¹⁸. When *saatvika* predominant dietary habits were assessed with MHI, there was a very high significance of association with an odd's ~3. This study identifies *saatvika* predominant dietary habits having a definite causal relationship with MHI. *Raajasa* predominant dietary habits seemed to have a negative association with significance with respect to MHI, as the odds ratio was < 1. Hence there was a lesser chance for an individual to have a high MHI with concomitant practice of *raajasa* predominant dietary habit.

CONCLUSION

This study showed a definite relationship between food pattern and mental health status in this setting. Hence the alternate hypothesis was accepted. In certain domains, we could not get a statistical significance. This is may be due to the sampling errors or insufficient sample size. Hence further studies are warranted with effective sample size and sampling techniques in this arena to establish this relation.

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