ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 1, 2023

PSYCHOBIOTICS AND MENTAL HEALTH: A REVIEW

Smt. Aparna Devi Kante, Research Scholar, SPMVV, Tirupathi, Lecturer in Home Science D.K. Government College for Women(A), Nellore and Prof. E. Manju Vani, Department of Home Science, SPMVV, Tirupathi, aparnadkw@gmail.com, 9182323406

ABSTRACT

PSYCHOBIOTICS previously known as probiotics, live bacteria in human gut, has been an emerging field of research that speaks about psychological and physiological health benefits. Research based evidences provided comprehensive awareness of psychobiotics in treating psychiatric disorders such as schizophrenia, alzeihmer's disease, anxiety, depression etc. it has also shown breathtaking proof in ameliorating cognitive functioning of brain. A significant role is being played by intestinal microbiota via activity of the microbiota-gut-brain axis a bi-directional communication on several functions of brain such as learning, memory etc. the present narrative research focused on the health benefits of psychobioticsin proper functioning and its impact in healing neurodegenerative disorders. The conclusions revealed that the gut microbiota has found to have profounding effect in curing mental illnesses also in improving the human cognition. Yet, more research has to be carried out to appendage the existing body of research that unravel the benefits in various domains of human life such as social, behavioural, language, conceptual and emotional etc.,

KEYWORDS : psychobiotics, mental health, anxiety, depression, mental illness, gut-brain axis, memory, prebiotics, probiotics, schizophrenia etc.,

1. Introduction:

A significant term used to expound probiotic bacteria and prebiotic bacteria is Psychobiotics which has potency in treating psychiatric diseases (Dinan et.al.,) 2013. Probiotics being micro-organisms include streptococcus thermophiles, Bifidobacterium animalis, Bifidobacterium bifidum, Bifidobacterium longum, Lactobacillus bulgaricus, Lactococcus lactis, Lactobacillus acidophilus, Lactobacillus lactis, Lactobacillus reuteri, Lactobacillus paracasei, Lactobacillus helveticus, Lactobacillus rhamnosus, Bacillus coagulans, Clostridium butyricum etc. will aid in conferring mental health which was documented in psychotic disorders (Cheng et al., 2019; Gualtieri et al., 2020; Vaghefmehrabany et al., 2020). It is a known fact that probiotics which are live bacteria can be frequently administered in treating gastrointestinal disorders. These microbiomes in the human gut has been found to be shown in assisting the production

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 1, 2023

of neurotic substances through referral axis called microbiota-gut-brain axis, a bi- directional communication between the intestinal microbiome and the brain. This complex interplay, influence multiple physiological systems, such as the gastrointestinal system and its microbiota, the central, automatic and enteric nervous systems, the immune system and the neuroendocrine system. The neuroactive substance gamma amino butyric acid(GABA), norepinephrine, dopamine, acetylcholine, cholecystokinin, serotonin, substance glutamate, glucagon like peptide- 1, glucagon like peptide-2, peptide yy (PYY), neuropeptide Y(NPY) production was assisted by probiotic bacteria when given in adequate amounts. These may modulate proteins like brain-derived neurotrophic factor (BNDF) which play a pivotal role in the functioning of central nervous system and also in gut-brain communication through immunological, humoral, neural and metabolic pathways (Cheng et al., 2019; Dinan et al.,2015, 2013; Lyte, 2013).

Involvement of microbiota-gut brain axis was observed in the treatment of psychiatric dirsorders by (Carabotti et al., 2015; Evrensel and Ceylan, 2015; Sucksdorff et al., 2015; Cenit et al., 2017; Maglhaer-Guedes, 2020). The output of scientific research evidences was the result of input of examination of animal and human studies of nuerodepressed and non-neurodepressed animals/humans when gut mircrobiome composition was compared (Foster et al., 2017; Inserra et al., 2018; Patrick et al.,2018; Papalini et al., 2019). A notable point is that more strains of probiotic microorganisms in relation to treating psychiatric disorders are to be studied in order to identify psychobiotic potential and their role in neuropathology. In this review, we report the efficiency of psychobiotic therapy against various psychiatric disorders like anxiety, depression and schizophrenia diseases.

METHODOLOGY

To collect data and information on psychobiotics against psychiatric disorders a bibliographic research study was used. Digital media such as Google Scholar, PsychINFO, Pubmed, Elsevier, Betham science were utilized to yield information. Probiotics, prebiotics, psychobiotics, depression, anxiety, schizophrenia, gut-brain axis, psychiatric disorders, were the indexed terms used. Unrelevant information was excluded. A total of 30 articles and abstracts were reviewed for this particular study.

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 1, 2023

RESULTS

PSYCHOBIOTICS AND ANXIETY

Psychobiotics oral suspension (1 bag of 3g of POS) was administered on 30 patients between 21 and 72 years old for a period of 4 months the subjects with anxiety behavior before treatment, concluded a significant reduction of scores on Hamilton anxiety rating scale (HAM-A) (Carmela colica; Ennio Ariolo; Patrizio Bollero; Renata costa de Miranda; Simono Ferraro et al., 2017). A significant decrease in both state and trait anxiety was recorded after 8 week probiotic intervention of PS128 TM (Lactobacillus plantarum) among pregnant and post-partum women by using Mandarin Version of STAI. After the examination of 28 days of daily intake of probiotics among 76 healthy college students proved to improve panic anxiety (Nihan Tran, Masha Zhebrak, Christine Yacoub, Joseph Pelletier, Darby Hariley, 2019). Lactobacillus Cassei $1X10^9$ CFU shirota strain was administered for 8 weeks among young adult male football players, aged 18 to 21 years. Anxiety level was measured under 3 dimensions namely cognitive anxiety, somatic anxiety and self confidence by using competitive State Trait Anxiety Inventory – 2R (CSAI 2R) developed by Cox, Martens and Russell and the reports revealed that statistically significant differences in cognitive anxiety (Adikari, Mahnderan Appukutty, Garry Kuan, 2019). Bifidobacterium longum administration showed a notable effect in the treatment of anxiety symptoms (Savignac et al., 2014).

PSYCHOBIOTICS AND DEPRESSION:

Lactobacillus ROO52 and Bifidobacterium longum RO175 evidenced a beneficial effect in improving depression scores when supplemented for 8 weeks which resulted in significantly higher serum BDNF levels (Nazanin Heidarzadeh-Rad, Hulya gokemen- Ozel, Asma Kazemi, Negin Almasi and Kurosh Djafarrian 2020). Faecalibacterium and Coprococcus microbes which produce butyrate seem to be decreasing in patients suffering from depression (Hu S, Li A, Huang T, Lai J, Li J, Sublette M E et al., 2019). Probiotics has been considered an effective adjuvant therapy in treating the patients suffering from major depression (Logan and Katzman, 2005). Daily intake of Bifidobacterium strains reduces the symptoms of depression (Savignac et al., 2014). Probiotic supplements such as Lactobacillus plantarum PS128, Lactobacillus planatarum 299, Lactobacills rhamnosus GG, Probiostick and vivomixx ® evidenced to combat depression (Mohammadi et al., 2016).

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 1, 2023

PSYCHOBIOTICS AND SCHIZOPHRENIA:

In detecting neurodegenerative diseases like Schizophrenia it was found that there is an alteration in gut microbiota and also the modulation of tryptophan metabolism and the relationship between these two was assessed (Plitman, E; Jwata, Y; Caravaggio et al., 2017). Clostridium difficile frequency in the gut of humans seem to be higher in the Schizophrenia affected patients (Argou-Cardozo, I; Zeiden-chulia, F; 2018). Streptococcus vestibularis a microbiome which is found to be enriched in the Schizophrenia patients was observed (Zhu et al., 2020). The main reason for increasing risk of developing Schizophrenia is due to the microbial infections in the foetus (Brown et al., 2010). When vitamin D along with probiotic supplements like Lactobacillus acidophilus, Bifidobacterium bifidum, Lactobacillys reuteri and Lactobacillus fermentum was administered for 12 weeks to chronic schizophrenic patients an increase of score on Positive and Negative syndrome scale was reported (Ghaderi, A, Banafshe 2019).

DISCUSSION

Research based scientific studies presented in this review is on the effects of psychobiotics on psychiatric disorders encompassing Anxiety, Depression and Schizophrenia. The evidences showed that there is an association link between gut microbiota imbalance and psychiatric disorders (Konterek et al., 2011; Hemarajata and Versalovic, 2013; Sucksdroff et al., 2015; Ross, 2017; Cenit et al., 2017; Magalhaes-Guedes, 2020). Administering psychobiotics in alleviating the effects of intestinal dysbiosis is considered as a strategy to maintain good mental health. Dysbiosis associated with several disease states (Wilkins et al., 2019) including neuropsychiatric and neurodegenerative diseases has been added to the existing body of research. The combination of multiple microbial strains helps in the improvement of the functioning of central nervous system, including mood, anxiety, stress and depression (PQLASD, 2020).

Daily consumption of beneficial microbiomes can help reduce several neurodegenerative diseases.

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 1, 2023

CONCLUSION:

In this review, the benefits and effect of psychobiotics and psychobiotic therapy against psychiatric disorders was reported. Administration of psychobiotics proved considerable neurological benefits which opens avenues for novel scientific research towards treating psychiatric disorders.

REFERENCES:

1. Adikari, Mahendaren Appukutty, Garry Kuan (2019). Effects of Daily Probiotic supplementation on Football Player's stress and anxiety, Advances in Social Science, Education and Humanities Research, volume 362.
2. Annie Temblay, Lucie Lingrand, Morgane Maillard, Berengere Feuz, Thomas A. Tompkins (2020). The effects of psychoiotics on the microbiota-gut-brain axis in early life stress and neuropsychiatric disorders. http://doi.org/10.1016/j.pnpbp.2020.110142.
3. Argou-Cardozo,I,; Zeidan-chulia, F. clostridium Bacteria and Autism Spectrum conditions: A systematic Review and Hypothetical Contribution of Environmental Glyphosate Levels. Med. Sci. 2018, 6, 29.
4. Brown, A.S.; Derkits, E.J. Prenatal infection and Schizophrenia: A review of epidemiologic and translational studies. Am. J. Psychiatry 2010, 167, 261-280.
5. Carmela colica, Emnio Aviolo, Patrizio Bollero, Renata Costa de Miranda, Simono Ferraro (2017). Evidences of a new Psychobiotic Formulation on Body composition and anxiety, Mediators of Inflammation vol (2017), Article ID 5650627. https://doi.org/10.1155/2017/56505627.
6. Carabotti M, Scirocco A, Maselli MA, Severi C (2015). The intestine brain axis: Interactions between enteric microbiota, central and enteric nervous systems. Annals of Gastroenterology 28:203-209.
7. Dinan TG, Stanton c, Cryan JF (2013). Psychobiotics: A novel class of psychotropic, Biological Psychiatry 74:720-726.
8. Evrensel A, Ceylan ME (2015). The gut-brain Axis: the missing link in depression. Clinical psychopharmacology and neuroscience: The official Scientific Journal of the Korean College of Neuropsychopharmacology 13(3):239e44.
9. Ghaderi, A.; Banafshe, H.R.; Mirhosseini, N.; Moradi, M.; Karimi, M.A,; Mehrzad, F.; Asemi,Z. Clinical and metabolic response to vitamin d plus probiotic in

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 1, 2023

schizophrenia patiencts. BMC Psychiatry 2019, 19, 77. (Pubmed).

10. Logan, AC, Katzman M. (2005) Major Depressive Disorder. Probiotics may be an adjuvant therapy 64:533-538.
11. Nihan Tran, Masha Zhebrak, Christine Yacoub, Joseph Pelletier, Darby Hawley (2019). The gut-brain axis relationship: Investigating the effect of multispecies probiotics on anxiety in a randomized placebo-controlled trail of healthy young adults: Journal of Affective Disorders, vol.252:271-277.
12. Nazanin Heidarzadeh-Rad, Hulya Gokmen-Ozel, Asma Kazemi, Negin Almasi and Kurosh Djafarrian(2020). Effects of a psychobiotic supplement on serum brain derived Neutrophic Factor levels in Depressive patients: A Post Hoc analysis of a Randomized Clinical trial. Journal of Neurogastroenerol Motil, 26(4): 486-499.
13. Plitman, E.; Iwata, Y.; Caravaggio, F.;Nakajima, S.; Chung, J.K.; Takeuchi, H.; Chakravarty, M.M.; Remington, G.; et al. Kyneuric Acid in Schizophrenia: A Systematic Review and Meta-analysis. Schizophr. Bull. 2017, 43, 764-777.
14. Zhu, F.; Guo, R.; Wang, W.; Ju, Y.; Wang, Q.; Ma, Q.; Sun, Q.; Fan,Y.; Xie, Y.; Yang, Z.; et al. Transplantation of microbiota from drug-free patients with schizophrenia causes schizophrenia-like abnormal behaviors and dysregulated kynurenine metabolism in mice. Mol. Psychiatry 2020, 25, 2905-2918.