International Journal of **Health Science**

RISK OF PREVALENCE OF DYSBIOSIS IN NUTRITION COURSE STUDENTS DURING COVID-19 QUARANTINE

Denise Frazilho
Unicsul – Universidade Cruzeiro do Sul
São Paulo – SP
http://lattes.cnpq.br/6336393846988279

Josiane Gil da Cunha Abreu
Unicsul – Universidade Cruzeiro do Sul
São Paulo – SP
http://lattes.cnpq.br/7273612833164007

Maria Cristina de Jesus Gomes
Unicsul – Universidade Cruzeiro do Sul
São Paulo – SP
http://lattes.cnpq.br/2688755830749907

Acácio da Silva Barros
Unicsul – Universidade Cruzeiro do Sul
São Paulo – SP
http://lattes.cnpq.br/1633130117042897

Fernanda Galante
Unicsul – Universidade Cruzeiro do Sul
São Paulo – SP
http://lattes.cnpq.br/2870757552414551

Abstract: The present study made an analysis of the current behavior of the student of the Nutrition course in the face of the pandemic of covid-19 under the investigation of risk of prevalence of Dysbiosis, intestinal imbalance that affects health silently and is generating more attention to health professionals, especially doctors and nutritionists. The undergraduate in Nutrition, throughout the course, gathered a series of references and knowledge about pathology prevention, health maintenance and also the dissemination of information about the influence of healthy habits in the daily life of society. However, given the reality that was imposed on the current world, full of uncertainties, subjected to moments of stress and, possibly, anxiety, it is debatable the impact that quarantine may have had on the daily lives of these students. The object of the analysis is to investigate whether the consequences of the lockdown, imposed by the current government, were positive or negative in the behavior of these students, observing, through a cross-sectional study, the change in eating habits and lifestyle that occurred during this period of isolation in order to ascertain the risk of prevalence of Dysbiosis among this population.

Keywords: Behavior, quarantine, habits, bowel, dysbiosis.

INTRODUCTION

There are two main influences: staying at home (which includes digital education, smart work, limiting outdoor physical activities and the gym) and stocking food due to restrictions on food purchases. In addition, the interruption of the work routine caused by quarantine can result in boredom, which in turn is associated with increased energy intake. Aside from boredom, listening or continually reading about COVID-19 in the media can be stressful. Stress leads individuals to overeat, especially sugar-rich "comfort foods" defined as "craving for food." These foods, mainly rich in simple carbohydrates, can reduce stress because they stimulate serotonin production with a positive effect on mood. However, this effect of desire for carbohydrate foods is proportional to the glycemic index of foods that is associated with increased risk of developing obesity and cardiovascular diseases, in addition to a chronic state of inflammation, which has been shown to increase the risk of more severe complications of COVID-19 (DI RENZO et al., 2020).

The brain and intestine form a bidirectional axis, in a dynamic and complex way, where its balance depends on the intestinal microbial composition so that the ecosystem can play a modulating role, acting on the brain-intestine axis and human behavior. And when this homeotase is in disarray, it negatively affects the health of the host, and can cause several psychiatric pathologies (SILVESTRE, 2015).

The composition of the intestinal microbiota is in constant flux under the influence of factors such as diet, ingested medications, intestinal mucosa, immune system and the microbiota itself. Natural variations in the intestinal microbiota can deteriorate to a state of dysbiosis when stress conditions rapidly decrease microbial diversity and promote the expansion of specific bacterial rate. The mechanisms underlying intestinal dysbiosis often remain unclear, given that combinations of natural variations and stress factors support cascades of destabilizing events. Oxidative stress, induction of bacteriophages and secretion of bacterial toxins can trigger rapid changes between microbial groups thus producing dysbiosis. A multitude of diseases, including inflammatory bowel diseases, but also metabolic disorders such as obesity and type II diabetes are associated with intestinal dysbiosis. The characterization of changes

that lead to intestinal dysbiosis and the identification of microbial rate contributing to pathological diseases effects are essential prerequisites to better understand the impact of microbiota on health and disease (WEISS; HENNET, 2017).

The microbiota offers many benefits to the host, through a series of physiological functions, such as strengthening intestinal integrity or shaping the intestinal epithelium, capturing energy, protecting against pathogens and regulating host immunity. However, there is potential for these mechanisms to be discontinued as a result of an altered microbial composition, known as dysbiosis. With increasingly sophisticated methods to profile and characterize complex ecosystems in development, a role of the microbiota in a large number of intestinal and extra intestinal diseases has become increasingly apparent. (THURSBY; JUGE, 2017).

Understanding how to modulate the composition and metabolism of the intestinal microbiota through a nutritional approach can be a strategy for disease control. The therapeutic goal is to achieve remission of the disease and possibly maintain an ideal homeotase and prevent any recurrence through a specific and individualized diet. The hypothesis that nutrition can contribute to achieving and maintaining the remission of the disease is at the same time challenging and attractive. Future perspectives should include the investigation of the correlation between nutrients and microbiome through appropriate, well-planned and targeted clinical studies (MENTELLA et al., 2020).

Quarantine-related stress also results in sleep disorders that, in turn, further worsen stress and increase food intake, giving rise to a dangerous vicious cycle. Therefore, it is important to consume foods that contain or promote the synthesis of serotonin and melatonin at dinner. A considerable variety of plant species, including roots, leaves, fruits and seeds such as almonds, bananas, cherries and oats, contain melatonin and/or serotonin. These foods may also contain tryptophan, which is a precursor to serotonin and melatonin. Protein foods, such as milk and dairy products, are the main sources of the sleep-inducing amino acid tryptophan. In addition, Tryptophan is involved in regulating satiety and caloric intake via serotonin, which mainly reduces the intake of carbohydrates and fats and inhibits the neuropeptide Y, the most powerful hypothalamic orexigenous peptide (MUSCOGIURI et al., 2020).

Dysbiosis is an inflammation in the small intestine that presents imbalance between pathogenic and non-pathogenic bacteria characterized by any changes in the function or composition of the intestinal microbiota, which may increase its permeability, thus triggering a series of health complications.

Dysbiosis may occur in the face of unhealthy eating habits and a sedentary lifestyle, and can also be added to alcohol consumption and smoking. Sleep is also a primary factor in this context because its deprivation has been related to several pathologies, including the alteration of the composition of the intestinal microbiota that presents significant changes in microbial populations associated with metabolic problems and obesity, which may contribute to occurrences of these imbalances, as well as to psychiatric problems. It turns out that these changes can generate greater response to stress, inflammation and hinder the production of neurotransmitters, offering dysfunction in the Central Nervous System (CNS), causing a vicious cycle.

One study showed that dysbiosis may also be correlated with food and autoimmune intolerance through Celiac Disease, in addition to other serious diseases that affect individuals suffering from destabilization of the intestinal

microbiota, such as cardiovascular problems, colorectal cancer in adults, Type I diabetes, necrosal enterocolitis in newborns, etc.

There are also numerous diseases, who's intestinal dysbiosis influences stroke and severity. Typical examples including IBD, type 1 diabetes, celiac disease, and cardiovascular disease have been covered extensively in other reviews. Here we focus our discussion on three diseases affecting humans at different stages of life, namely necrotizing enterocolitis in newborns, colorectal cancer in adults, diarrhea associated with difficile in elderly people. Given the resilience of the intestinal microbiota in response to changes, the occurrence of dysbiosis in necrotizing enterocolitis is probably the result of a chain of events combining an inadequate supply of protective and prebiotic nutrients, an immature immune system, and insufficient intestinal mucus secretion (WEISS; HENNET, 2017).

The main symptoms related to dysbiosis are chronic constipation, flatulence, bloating, pain on palpation of the abdomen, fatigue, behavior changes, anxiety, depression, among other conditions.

It is clear that an individual, in order to avoid any type of chronic inflammation in the intestine and its consequences, needs to adapt to a healthy eating routine, where the option for real food is their basis. Inflammatory foods such as industrialised products filled with trans fats, excess sugar, chemical additives, refined flours and dairy products should be removed altogether - as a large part of the population has genetic predisposition to the imbalance that gluten and lactose and cow's milk proteins can cause in the intestinal mucosa - which are considered one of the key factors in the construction of intestinal hyperpermeability. Fodmap's are also cited, which despite being healthy foods and fall into the category "real food", can generate discomfort, such as bloating, cramps, diarrhea and other symptoms, due to the excessive fermentation they cause in the intestine of most people.

The low FODMAP diet involves, similar to SCD, a reduction in the high absorption of fermentable carbohydrates (monosaccharides, disaccharides, oligosaccharides and polyols), with the difference that the intake of monosaccharides is favored in df, while it is discouraged in FODMAP; the premise underlying the two diets is similar, namely that carbohydrates that are poorly absorbed can lead to large bowel dysbiosis, inflammation, fermentation, water secretion and lumen distension (MENTELLA et al., 2020).

Throughout this study, it will be shown how much the pandemic and social isolation can positively or negatively interfere in the eating habits and lifestyle of these students around Brazil. Knowing that this population understands, knows and disseminates the prevention and maintenance of health to society and, given the information about the importance of establishing the health of the immune system so that negative reactions do not occur to those who suffer the transmission of the Covid-19 virus, began to worry about a healthy routine for health maintenance or ignored their knowledge for a life without much care, obtaining risk of inflammation in the intestine, consequently causing a picture of Dysbiosis.

OBJECTIVE

The aim of this study is to verify that, if students of the nutrition course, in any academic period, because they have a greater knowledge about food and nutrition, when compared to the rest of the population, they have a low or high risk of the prevalence of dysbiosis.

METHODS

I. **TYPE AND PLACE OF STUDY:** This is a quantitative, descriptive and cross-sectional research through a questionnaire sent by a mailing of students under national territory.

II. **STUDY POPULATION:** Undergraduates of the higher course of Nutrition of all semesters that covers the national territory.

III. **STUDY VARIABLES:** Individuals aged 17 years and older, married or not, both sexes, without nationality requirement and nutrition students.

It is worth mentioning that, although in recent years the demand for the nutrition course by the male public with regard to higher education courses in nutrition has increased, the female demand is still higher than the male's, which is why we have more women participating in this scientific research.

IV. **DATA COLLECTION: research** based on the "Dysbiosis Risk Questionnaire". (FQM, 2018).

Previously adapted to a virtual form and sent by e-mail to students, obtaining 477 responses during the period of 24 hours in the month of May 2021.

This questionnaire consists of 17 questions, and these questions generate scores ranging from 0 to 3 points according to the individual's answers, and this score at the end of the questionnaire is added to a result where the individual is framed in: low risk of dysbiosis, medium risk of dysbiosis, high risk of dysbiosis and very high risk of dysbiosis.

V. **DATA ANALYSIS:** based on the results that Google Forms has compiled and extracted from Excel that has made more analysis possibilities available to complement the research.

RESULTS AND DISCUSSION

There were 477 responses obtained among the students within 24 hours. The aligned expectation was at least 360 responses.

Among this number, 87% of the responses were from women and only 13% of men.

The results obtained through the research show that there is a large proportion of students at medium risk of Dysbiosis, a total of 61%.

On the other, 37% of nutrition students are at low risk of having a picture of the disease.

The remainder that established a total of 3%, these being the minority, are in the "High Risk" group of the disease. Already in the group of "Very High Risk"; the results were null, obtaining a total of zero responses.

Another variable analyzed was that 36% of the women who responded to the studies presented a low risk of prevalence of dysbiosis, while men are in 45%.

The most worrying part is the medium risk, which among women is 62% and men 55%.

It should be noted that the statistics are positive for the group of high and very high risk of prevalence of dysbiosis, appearing at most 5% for women, as shown in the image below.

The table below shows that there is a high prevalence of stress among students due to the pandemic and social isolation.

It is worth noting that when it comes to higher education in Nutrition, there is more demand for women than for men, even if this number has grown in recent years. And that's why we had more female than male participation in this Scientific Study.

There is increasing concern and studies to better understand the intestinal microbiota, since a dysbiosis can increase intestinal permeability, and may generate several pathologies, including respiratory infections, which at this time of pandemic by SARS-Cov-2, it is extremely important to prevent

Final Search Table		
Low Risk Group - 0 to 10 points	176 students at low risk of Dysbiosis	37%
Middle Risk Group - 11 to 23 points	289 students at medium risk of Dysbiosis	61%
High Risk Group - 24 to 36 points	12 students at high risk of Dysbiosis	3%
Very High-Risk Group - 37 to 49 points	No response	0%

	TABLE DIVIDED INTO SEX	
FEMALE	413 REPLIES	87%
MALE	64 RESPONSES	13%
	BEING:	
WOMEN	147 women at low risk of dysbiosis	36%
	254 women at medium risk of dysbiosis	62%
	12 women with high level of dysbiosis	3%
	0 women at very high risk of dysbiosis	0%
MEN	29 men at low risk of dysbiosis	45%
	35 men at medium risk of dysbiosis	55%
	0 men with high level of dysbiosis	0%
	0 men at very high risk of dysbiosis	0%

Stress Level	
143 high and very high stress students	30%

this type of pathology, among others. (DHAR and MOHANTY, 2020).

Similar studies had already been carried out, involving the risk of dysbiosis in health professionals. One of them was conducted with nursing teams, where they found that more than 50% of these professionals had a medium risk of dysbiosis. (GALDINO et al, 2016).

A healthy intestinal microbiota is essential for a better absorption of nutrients, and with this improves in various physiological profiles and thus aiding in the protection against pathogens. (PANTOJA *et al*, 2019).

CONCLUSION

The results of the study showed us that even with all the knowledge and experience that the nutrition degree offers students, there is a prevalence of medium risk of dysbiosis among them. When analyzing the data, it was clear that the habits of these individuals during the pandemic are in line with the maintenance and prevention of inflammations that can cause diseases in the medium and long term.

The medium risk of dysbiosis raises a state of attention in 61% of these students because, in addition to the chances of not being discarded if the lifestyle remains the same after social isolation, the number of students is considered high.

It is clear that many of them have chosen to improve their lifestyle aimed at maintaining health, but this number is also not high when it comes to the proportion between the total number of participants.

The high or very high stress level among the observed students - equivalent to 143 people or 30% in total - as a result of the social isolation and uncertainties about the pandemic in Brazil, is a relevant factor that generates concern, as it can influence the behavior of all who are affected by this symptom.

Educational intervention is necessary for these students, stressing the importance of eating properly, performing physical exercise regularly and cutting bad habits in order to remind them and inform them about the pathologies that may occur with the involvement of Dysbiosis; Metabolic Syndrome, Insulin Resistance, type II Diabetes and even cancer are some of these examples.

REFERENCES

Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., ... From Lorenzo, A. (2020). *Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. Journal of Translational Medicine, 18(1).* Doi:10.1186/s12967-020-02399-5

Chiara, M.M., Franco, S., Marco, P., Antonio, G., & Donato, M. G. A. (2020). *Nutrition, IBD and Gut Microbiota: A Review. Nutrients, 12(4), 944.* doi:10.3390/nu12040944

COSTA, A. F. G.; GALISA, M. S. Nutritional calculations: dietary analysis and planning. Sao Paulo: Pay, 2018.

Cruz PJSC, Melo Neto JF. Educação popular e nutrição social. Considerações teóricas sobre um diálogo possível. Scielo, 2014. Available in: https://www.scielosp.org/pdf/icse/2014.v18suppl2/1365-1376

Dhar D, Mohanty A. Gut microbiota and Covid-19- possible link and implications. Virus Res. 2020 Aug; 285:198018. doi: 10.1016/j.virusres.2020.198018. Epub 2020 May 13. PMID: 32430279; PMCID: PMC7217790.

FQM FARMA NUTRIÇÃO. Questionário de risco de disbiose. Available in: https://www.scribd.com/document/464864991/1-5071081604512743552-pdf

GALDINO, J.J. et al. Questionário de rastreamento metabólico voltado a disbiose intestinal em profissionais de Enfermagem. RBONE-Revista Brasileira de Obesidade, Nutrição e Emagrecimento, v. 10, n. 57, p. 117-122, 2016

MUSCOGIURI, G., ArREAB, L., SAVASTANO, S., & COLAO, A. (2020). Nutritional recommendations for CoVID-19 quarantine. European Journal of Clinical Nutrition. doi:10.1038/s41430-020-0635-2

PANTOJA, C.L. et al. Diagnóstico e tratamento da disbiose: Revisão Sistemática. Revista Eletrônica Acervo Saúde, n. 32, p. e1368-e1368, 2019.

SILVESTRE, Carina Maria Rôlo Ferreira, O diálogo entre o cérebro e o intestino - Qual o papel dos probióticos? Literature review. Lisbon: University of Lisbon; 2015. http://hdl.handle.net/10451/26287

Singh, S., Roy, D., Sinha, K., Parveen, S., Sharma, G., & Joshi, G. (2020). *Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. Psychiatry Research, 293, 113429.* doi:10.1016/j.psychres.2020.113429

WEISS, G.A., HENNET, T. Mechanisms and consequences of intestinal dysbiosis. *Cell. Mol. Sci Life.* **74,** 2959–2977 (2017). https://doi.org/10.1007/s00018-017-2509-x