Novel approach on nutritional status and body weight among the college students using statistical analysis

Mohamed Adil A.A[1,2]*, Saba Fathima[1], Ashok Kumar pandurangan[3], Shyam kumar[4], Revathi. K[2]*, Anandraj Vaithy[5], Dannie Macrin[2]NVV karthik[2]

[1]Meenakshi academy of higher education and research, chennai, India

[2]Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Thandalam, Chennai – India

3. B.S.Abdur Rahman Crescent institute of science and technology, Chennai, India

4. School of medicine, John Hopkins University, Baltimore, Maryland, United states of America

5. Faculty of Medicine, Mahatma Gandhi medical college and research institute (SBV), Pondicherry, India

ABSTRACT

Aim: This study aimed to estimate the nutritional status and body weight among male and female students based on the dietary habits and BMI rate.

Materials and Methods: This study was a cross-sectional study with a sample of 277 students with a mean of 20 years old. Data was collected in an online questionnaire. Answers on each topic were collected and statistical analysis was performed using the SPSS software. Parameters used for nutritional status include Body mass index (BMI), diet information, conditions associated with increased nutritional risks. The sample size was calculated by maintaining G-power 80%,α=0.05,confidence interval 95%

Results: The participants were in the range of 18-21years, Where 57% females and 29% males had retarded weight condition. The female students (60%) were starving by avoiding food with deficiency in nutrition. Chi square results of BMI is 34.807 and the percentage of food starvation among students is 3.677.

Conclusion: The outcome showsfemale students were underweight as they consume less quantity of nutritional food.

Keywords: Nutritional status, BMI, Male, Female, SPSS, body weight, Body Mass Index, Novel approach, Community medicine, Public health

1. INTRODUCTION

Nutritional status is a requirement of a person's health as determined by diet, nutrient levels in the body. A well-balanced diet throughout childhood and adolescence is critical not only for the child's health and growth (Vijayaraghavan 2002) but also for the development of healthy eating habits that will last throughout life (Panda et al. 2000). Adequate energy and macronutrient consumption, for example, is vital to the adolescent's overall physical development. Adults' health and nutritional status are indicators of the country's investment in its future workforce growth. (Morrow 2019).The main applications are to determine a population's nutritional status, classify those at risk of chronic malnutrition, examine current nutritional issues, and inform evidence-based nutrition policies (Gurinović et al. 2017).

This research was found to be relevant to 87 studies in PubMed and 162 studies in Google scholar. The related google scholar literature shows that when they shift to college life, college students will certainly face a new world for meal preparation, preparing, and eating. Although many college students are aware of the value of adhering to dietary guidelines. (Laxmaiah et al. 2012) and their understanding and attitude will make it difficult for them to change their ways. Many other considerations play a role in their decision-making process. The male college students consumed more fast food and junk food than the female students. (Stockton and Baker 2013). It is important to meet daily nutritional requirements for one's body to properly function and maintain health levels. Most of the nutrition was obtained by food as in the carbohydrates, fat, protein forms. It was shown that each nutrient plays an important role in establishing metabolism, growth, and proper health and functions of the body (Brown, O'Connor, and Savaiano 2014).

There are different studies done on the awareness of the nutritional levels, prevalence of malnutrition, nutritional habits of the students and results. There are no combined investigations related to nutritional status along with body weight. Our study aimed to estimate the nutritional status and body weight among male and female students based on the dietary habits and Body mass index (BMI) rate.

2. MATERIALS AND METHODS

This study was a cross-sectional study with a sample of 277 students (61.6% males and 34.8% females) with a mean of 20 years was drawn from the university campus students were selected from the classroom and online media during January to March 2021.Ethical Approval: Approval of the respondents to participate in the study was obtained. Total number of groups are two, Group A:Male students; Group B:Female students. The sample size was calculated by maintaining G-power 80%,α=0.05,confidence interval 95% using clincalc.com(Radu et al. 2021).

Data were collected in random sampling methods by selecting the students randomly. For this step, students were asked to complete an online questionnaire. It consisted of questions related to students demographics, nutritional habits, and health status was divided into 3 parts as follows: Demographic characters: contain questions related to age, gender. Nutritional habits (Breakfast, egg, Fast Food , Meat, Fish, Fruits, Leafy vegetables). Health status: appetite, vomit sensation, pain, food allergy, constipation, difficulty in eating problems (Stockton and Baker 2013). The questions were in the form of multiple-choice, checkmark type of options were given for easy to fill the form to get the results easily.

A questionnaire was sent to 300 participants selected using online social media. The resulting sample was representative of college students. The responses were collected in google forms that enable quick and analyzed data. Parameters used for nutritional assessment include Body mass index (BMI), diet information, conditions associated with increased nutritional risks.

Statistical analysis

All the collected data were tabulated and analysis was done by using SPSS statistical software. Data was obtained, Chi-square test was utilized to compute sex differences in nutritional status among the college students.

3.RESULTS

The survey analysis was observed and found that male participants (61.6%) were more commanding than female students (38.4%). In Table 1. The food items consumed by students' analysis showed that students who avoided the food by fasting were 49.2% and the students who ate fast foods were 76.9%. In Table 2 food items consumed by students daily were found within the percentage values based upon the food consumed recommended by the recommended dietary allowance.

Table 3. Represents the health related problems associated with retardation of food intake with nutritional values. Majority of students suffered with loss of appetite (84.6%) and also suffered with abdominal pain (34.5%). Fig. 1 explains the comparison of avoiding food with the male and female students. The deviation suggest female students avoid food by dieting and retarded consumption from the male students. It was found to have statistical insignificance with comparison of male and female students for fasting of food .

Figure 2. represents the comparison of BMI status with the male and female students. The results suggest male students having a high Body mass index rate compared to female students.There is a statistical insignificance between the data. Table. 4, 4a describes the male and female students avoiding food by starvation. It suggests female students are avoiding their food (60%) rather than consuming (40%) the food with nutritional value. Table 5 suggested the comparison of gender based with BMI.Table. 5a describes the comparison of male and female students with their BMI rate. It shows females students (57%) are mostly in underweight condition compared to male students (29%)**.** InTable. 5 chi-square test was performed to compute sex differences in nutritional status among the college students were found to be statistically insignificant for the variables.

4. DISCUSSION

This study shows that the majority of respondents out of 277 participants' ages ranged from 18 to 21 years old, with a mean of 20.96 ± 2.66 years,Where 57% females and 29% males had retarded weight condition. The female students (60%) were starving by avoiding food with deficiency in nutrition. Chi square results of BMI is 34.807 and food avoiding percentage among students is 3.677.the study comparatively similar findings with the present study, that shows 50% of male students and 45.9% female students are avoiding the food. The (Motadi et al. 2020; Rothman et al. 2019) considered as opposite findings to this paper, it states that 49.2% of urban students were suffering with nutritional deficiency, and 65.5% rural area students. The study conducted by (Wen, Tchong, and Ching 2015) had comparatively similar findings with the present study, namely that 40-45% of the students

prefer to eat burger, pizza (junk foods) as their meal. These results were almost similar to this paper. When comparison was done between male and female, Though the percentage of female participants was less than male, female had comparatively more nutritional deficient than males("Correlates Of Nutritional Status Of Adolescent Girls In The Rural Area Of Varanasi" 2009; Cappa et al. 2012).

Participants of the study were compared based on the body weight and body mass index and could not compare with associated factors leading with metabolic disorders, physical properties associating malnutrition among the students.The longer term scope of this study is the creation of algorithms for preparing and proposing electronic health records. Preparation of database for generating applications for disease prognosis and lifestyle management in this present study.
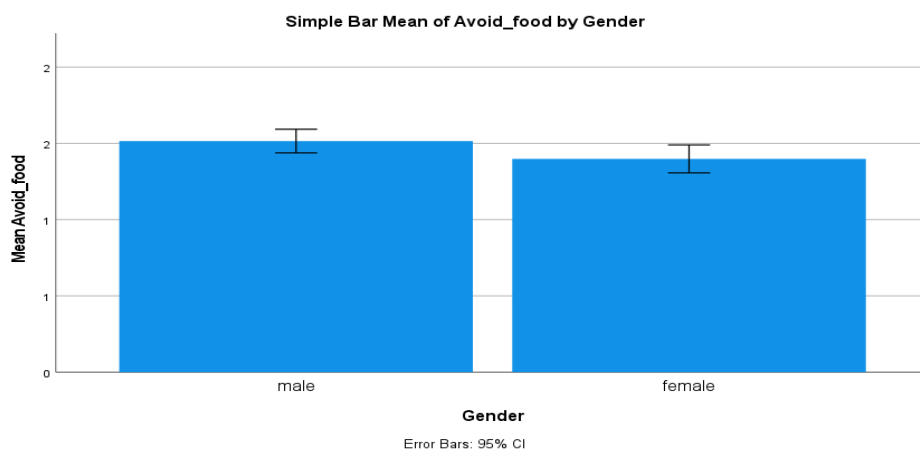

Fig. 1. Bar chart represents the comparison of avoiding food with the male and female students.There is a statistical insignificance between the data . The deviation shows female students avoiding food more than male. X malevs female students Y Axis:Mean avoiding food ±1 SD.
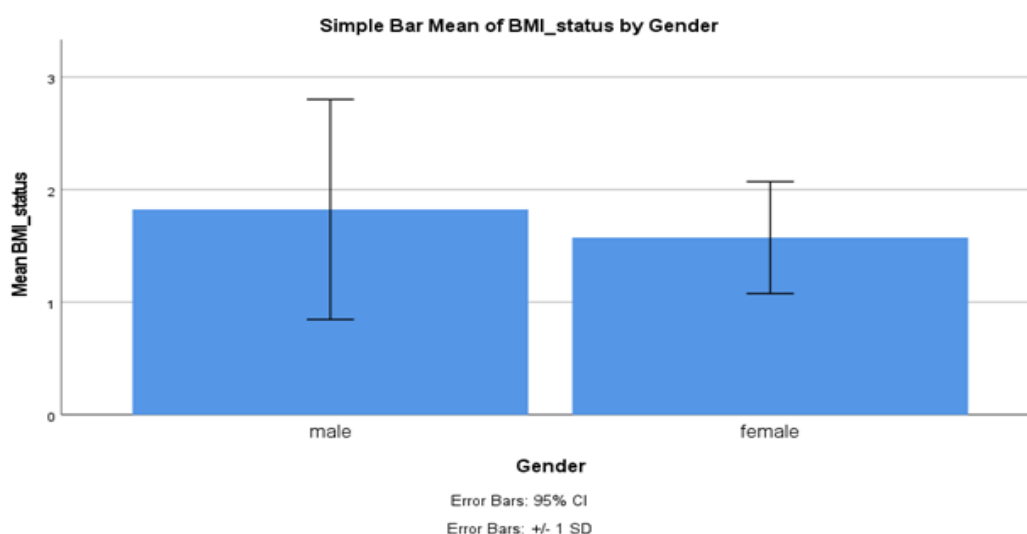
Fig. 2. Bar chart represents the comparison of BMI status with the male and female students.There is a statistical insignificance between the data . The deviation bar shows male students having a high BMI rate compared to female students.X male vs female students Y Axis:Mean BMI status ± 1 SD.

Table 1: Representing the Sociodemographicdeterminants.It was observed that male participants (61.6%) were dominating than female participants(38.4%).

Variable		Frequency	%
Gender	Male	162	61.6
	Female	101	38.4
Age range	18-21	207	77.6
	22-25	43	22.4

Table 2: Representing the food items consumed by students daily within the percentage values. It shows that students avoiding meals (49.2%) prefer to have fast foods (76.9%).

Variable	Percentage of food consumed	Percentage of Food not consumed
Fast foods	213(76.9%)	64(23.1%)
Meat	137(48.4%)	159(57.6%)
Fish	118(42.8%)	159(57.4%)

Fruits	200(72.2%)	77(27.8%)
Leafy veg	114(42.7%)	172(62.3%)
Noodles	208(75.1%)	68(24.6%)
Egg	129(49.2%)	133(50.8%)

Table 3: Representing   the various health-related problems It shows that the majority of students suffered with loss of appetite (84.6%) and minorly suffered with pain (34.5%).

Variable	Percentage of health issues	Percentage of no complications
Physical discomfort	222(79.4%)	57(20.7%)
Appetite	245 (84.6%)	30(18.1%)
Constipation	212 (76.8%)	64(23.2%)
Nausea	200 (75.7%)	67(24.3%)
Abdominal Pain	95(34.5%)	181(65.6%)
Food allergy	115(41.7%)	161(58.3%)

STATISTICAL ANALYSIS:

Table 4. Representing the male and female students avoiding food by starvation. It shows female students are mostly avoiding their food (60%) than the consuming(40%).

		Avoid_food		
		consuming %	Avoiding %	Total
Gender	male	79(48%)	84(52%)	163

	female	45(40%)	68(60%)	113
Total		147	129	276

Table 4a. The statistical analysis for Representing the male and female students avoiding food by starvation. It shows female students are mostly fasting rather than consuming food. The P>0.05 was found to be statistically significant.

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.677a	1	0.055		
Continuity Correction	3.221	1	0.073		
Likelihood Ratio	3.693	1	0.055		
Fisher's Exact Test				0.066	0.036
Linear-by-Linear Association	3.663	1	0.056		
N of Valid Cases	276				

Table 5. Representing the comparison of male and female students with their BMI rate.

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * BMI_status	255	100.00%	0	0.00%	255	100.00%

Table 5a: Representing the comparison of male and female students with their BMI rate. It shows female students(57%)are mostly in underweight condition compared to male students (29%)**.**

		BMI_status			
		Normal weight	Underweight	Obese	Overweight
Gender	**male**	75(49%)	45(29%)	20(13%)	14(9%)
	female	43(43%)	58(57%)	0(0%)	0(0%)
percentage		46	40	8	6

Table 5.b It represents the Pearson Chi-Square with the significance for BMI status was found not significant.

	Value	df	Asymptotic Significance (2-sided)

Pearson Chi-Square	34.807	3	0.77
Likelihood Ratio	46.47	3	0
Linear-by-Linear Association	5.559	1	0.018
N of Valid Cases	255		

5. CONCLUSION

From this study we suggestthat female students were in underweight conditions and they consumed low quantities of nutritional food. The new survey parameters used for this study were specifically targeted with dietary habits and Body Mass Index. This could help in targeting factors associated with malnutrition by focusing on this novel approach.

REFERENCES

1. Anbu, R. Tamil, V. Suresh, RevathyGounder, and AbinayaKannan. 2019. "Comparison of the Efficacy of Three Different Bone Regeneration Materials: An Animal Study." *European Journal of Dentistry* 13 (1): 22–28.

2. Ashok, V., and DhanrajGanapathy. 2019. "A Geometrical Method to Classify Face Forms." *Journal of Oral Biology and Craniofacial Research* 9 (3): 232–35.

3. Avinash, Kavarthapu, SankariMalaippan, and JayakumarNadathurDooraiswamy. 2017. "Methods of Isolation and Characterization of Stem Cells from Different Regions of Oral Cavity Using Markers: A Systematic Review." *International Journal of Stem Cells* 10 (1): 12–20.

4. Brown, Onikia N., Lauren E. O'Connor, and Dennis Savaiano. 2014. "Mobile MyPlate: A Pilot Study Using Text Messaging to Provide Nutrition Education and Promote Better Dietary Choices in College Students." *Journal of American College Health: J of ACH* 62 (5): 320–27.

5. Cappa, Claudia, Tessa Wardlaw, Catherine Langevin-Falcon, and Judith Diers. 2012. "Progress for Children: A Report Card on Adolescents." *The Lancet*. https://doi.org/10.1016/s0140-6736(12)60531-5.

6. Chandrasekar, Raghavan, Shyamala Chandrasekhar, K. K. ShanthaSundari, and Poornima Ravi. 2020. "Development and Validation of a Formula for Objective Assessment of Cervical Vertebral Bone Age." *Progress in Orthodontics* 21 (1): 38.

7. "Correlates Of Nutritional Status Of Adolescent Girls In The Rural Area Of Varanasi." 2009. *The Internet Journal of Nutrition and Wellness*. https://doi.org/10.5580/520.

8. Ezhilarasan, Devaraj, Velluru S. Apoorva, and Nandhigam Ashok Vardhan. 2019. "SyzygiumCumini Extract Induced Reactive Oxygen Species-Mediated Apoptosis in Human Oral Squamous Carcinoma Cells." *Journal of Oral Pathology & Medicine: Official Publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology* 48 (2): 115–21.

9. Felicita, A. Sumathi. 2017. "Quantification of Intrusive/retraction Force and Moment Generated during En-Masse Retraction of Maxillary Anterior Teeth Using Mini-

Implants: A Conceptual Approach." *Dental Press Journal of Orthodontics* 22 (5): 47–55.

10. 2018. "Orthodontic Extrusion of Ellis Class VIII Fracture of Maxillary Lateral Incisor - The Sling Shot Method." *The Saudi Dental Journal* 30 (3): 265–69.

11. Gurinović, Mirjana, MilicaZeković, JelenaMilešević, Marina Nikolić, and Maria Glibetić. 2017. "Nutritional Assessment." In *Reference Module in Food Science*. Elsevier.

12. Jain, Ashish R. 2017a. "Clinical and Functional Outcomes of Implant Prostheses in Fibula Free Flaps." *World Journal of Dentistry* 8 (3): 171–76.

13. 2017b. "Prevalence of Partial Edentulousness and Treatment Needs in Rural Population of South India." *World Journal of Dentistry* 8 (3): 213–17.

14. Laxmaiah, Avula, Madhavan K. Nair, Nimmathota Arlappa, Pullakhandam Raghu, Nagalla Balakrishna, Kodavanti Mallikharjuna Rao, Chitty Galreddy, et al. 2012. "Prevalence of Ocular Signs and Subclinical Vitamin A Deficiency and Its Determinants among Rural Pre-School Children in India." *Public Health Nutrition*. https://doi.org/10.1017/s136898001100214x.

15. Mathew, Mebin George, S. R. Samuel, AshuJagdishSoni, and KorishettarBasavarajRoopa. 2020. "Evaluation of Adhesion of Streptococcus Mutans, Plaque Accumulation on Zirconia and Stainless Steel Crowns, and Surrounding Gingival Inflammation in Primary Molars: Randomized Controlled Trial." *Clinical Oral Investigations*, 1–6.

16. Mehta, Meenu, Deeksha, DeveshTewari, Gaurav Gupta, RajendraAwasthi, Harjeet Singh, Parijat Pandey, et al. 2019. "Oligonucleotide Therapy: An Emerging Focus Area for Drug Delivery in Chronic Inflammatory Respiratory Diseases." *Chemico-Biological Interactions* 308 (August): 206–15.

17. Morrow, Robert W. 2019. "Charren, Peggy (9 Mar. 1928–21 July 2015), Children's Television Activist." *American National Biography Online*. https://doi.org/10.1093/anb/9780198606697.013.00685.

18. Motadi, Selekane Ananias, Zwidofhelangani Matsea, Palesa Harriet Mogane, Phumuzo Masidwali, Masindi Makwarela, and Lindelani Mushaphi. 2020. "Assessment of Nutritional Status and Dietary Intake of Pregnant Women in Rural Area of Vhembe District, Limpopo Province." *Ecology of Food and Nutrition*. https://doi.org/10.1080/03670244.2019.1690999.

19. Padavala, Sisira, and GheenaSukumaran. 2018. "Molar Incisor Hypomineralization and Its Prevalence." *Contemporary Clinical Dentistry* 9 (Suppl 2): S246–50.

20. Panda, P., A. I. Benjamin, Shavinder Singh, and P. Zachariah. 2000. "Health Status of School Children in Ludhiana City." *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine* 25 (4): 150.

21. Pc, J., T. Marimuthu, and P. Devadoss. 2018. "Prevalence and Measurement of Anterior Loop of the Mandibular Canal Using CBCT: A Cross Sectional Study." *Clinical Implant Dentistry and Related Research*. https://europepmc.org/article/med/29624863.

22. Ponnulakshmi, R., B. Shyamaladevi, P. Vijayalakshmi, and J. Selvaraj. 2019. "In Silico and in Vivo Analysis to Identify the Antidiabetic Activity of Beta Sitosterol in Adipose Tissue of High Fat Diet and Sucrose Induced Type-2 Diabetic Experimental Rats." *Toxicology Mechanisms and Methods* 29 (4): 276–90.

23. Radu, Elena, Markus Woegerbauer, Gerhard Rab, Matthias Oismüller, Peter Strauss, Peter Hufnagl, Richard A. Gottsberger, JörgKrampe, Karin Weyermair, and Norbert Kreuzinger. 2021. "Resilience of Agricultural Soils to Antibiotic Resistance Genes Introduced by Agricultural Management Practices." *The Science of the Total Environment* 756 (February): 143699.

24. Ramadurai, Neeraja, DeepaGurunathan, A. Victor Samuel, Emg Subramanian, and Steven J. L. Rodrigues. 2019. "Effectiveness of 2% Articaine as an Anesthetic Agent in Children: Randomized Controlled Trial." *Clinical Oral Investigations* 23 (9): 3543–50.

25. Ramesh, Asha, Sheeja Varghese, Nadathur D. Jayakumar, and SankariMalaiappan. 2018. "Comparative Estimation of Sulfiredoxin Levels between Chronic Periodontitis and Healthy Patients - A Case-Control Study." *Journal of Periodontology* 89 (10): 1241–48.

26. R, Hannah, R. Hannah, Pratibha Ramani, Arvind Ramanathan, Jancy Merlin R, S. Gheena, Abilasha Ramasubramanian, and K. Monika. 2020. "CYP2 C9 Polymorphism among Patients with Oral Squamous Cell Carcinoma and Its Role in Altering the Metabolism of Benzo[a]pyrene." *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*. https://doi.org/10.1016/j.oooo.2020.06.021.

27. Rothman, Marinel, MamotsemaiRanneileng, RietteNel, and Corinna Walsh. 2019. "Nutritional Status and Food Intake of Women Residing in Rural and Urban Areas of Lesotho." *The South African Journal of Clinical Nutrition: SAJCN: The Official Journal of the South African Society of Parenteral and Enteral Nutrition and the Association for Dietetics in South Africa* 32 (1): 21–27.

28. Samuel, Melvin S., Jayanta Bhattacharya, Sankalp Raj, NeedhidasanSanthanam, Hemant Singh, and N. D. Pradeep Singh. 2019. "Efficient Removal of Chromium(VI) from Aqueous Solution Using Chitosan Grafted Graphene Oxide (CS-GO) Nanocomposite." *International Journal of Biological Macromolecules* 121 (January): 285–92.

29. Samuel, Srinivasan Raj. 2021. "Can 5-Year-Olds Sensibly Self-Report the Impact of Developmental Enamel Defects on Their Quality of Life?" *International Journal of Paediatric Dentistry / the British Paedodontic Society [and] the International Association of Dentistry for Children* 31 (2): 285–86.

30. Sridharan, Gokul, PratibhaRamani, and SangeetaPatankar. 2017. "Serum Metabolomics in Oral Leukoplakia and Oral Squamous Cell Carcinoma." *Journal of Cancer Research and Therapeutics* 13 (3): 556–61.

31. Sridharan, Gokul, PratibhaRamani, SangeetaPatankar, and RajagopalanVijayaraghavan. 2019. "Evaluation of Salivary Metabolomics in Oral Leukoplakia and Oral Squamous Cell Carcinoma." *Journal of Oral Pathology &*

Medicine: Official Publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology 48 (4): 299–306.

32. Stockton, Susan, and David Baker. 2013. "College Students' Perceptions of Fast Food Restaurant Menu Items on Health." *American Journal of Health Education.* https://doi.org/10.1080/19325037.2013.764242.

33. Varghese, SheejaSaji, Asha Ramesh, and Deepak NallaswamyVeeraiyan. 2019. "Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students." *Journal of Dental Education* 83 (4): 445–50.

34. Venu, Harish, LingesanSubramani, and V. DhanaRaju. 2019. "Emission Reduction in a DI Diesel Engine Using Exhaust Gas Recirculation (EGR) of Palm Biodiesel Blended with TiO2 Nano Additives." *Renewable Energy* 140 (September): 245–63.

35. Vijayaraghavan, K. 2002. "Control of Micronutrient Deficiencies in India: Obstacles and Strategies." *Nutrition Reviews* 60 (5 Pt 2): S73–76.

36. VijayashreePriyadharsini, Jayaseelan. 2019. "In Silico Validation of the Non-Antibiotic Drugs Acetaminophen and Ibuprofen as Antibacterial Agents against Red Complex Pathogens." *Journal of Periodontology* 90 (12): 1441–48.

37. VijayashreePriyadharsini, J., A. S. SmilineGirija, and A. Paramasivam. 2018. "In Silico Analysis of Virulence Genes in an Emerging Dental Pathogen A. Baumannii and Related Species." *Archives of Oral Biology* 94 (October): 93–98.

38. "Website." n.d. Accessed March 21, 2021. https://doi.org/10.3390/nu11010014.

39. Wen, Tzu-Hsing, Wei-Ling Tchong, and Gregory S. Ching. 2015. "A Study on the Relationship between College Students' Personality and Their Eating Habits." *International Journal of Information and Education Technology (IJIET)* 5 (2): 146–49.

40. Differential expression of Helios, Neuropilin-1 and FoxP3 in head and neck squamous cell carcinoma (HNSCC) patients A.A.Mohamed Adil, Anil Kumar Bommanabonia, AnandrajVaithy, Sateesh Kumar 3biotech 9 (178)

41. Protagonist of Immuno-Profiling, Immuno-Scoring, and Immunotherapy Towards Colitis-Associated Cancer: Systematic Review, Mohamed Adil a.a, AK Pandurangan, M Waseem, N Ahmed Diagnostic and Treatment Methods for Ulcerative Colitis and Colitis 2020

42. Emerging Role of Mitophagy in Inflammatory Diseases: Cellular and Molecular Episodes, Mohamed Adil AA, S Ameenudeen, A Kumar, S Hemalatha, N Ahmed, N Ali 2020 Curr Pharm Des. 2020;26(4):485-491. doi: 10.2174/1381612826666200107144810

43. Increased Expression of TGF-β and IFN-γ in Peripheral Blood Mononuclear Cells (PBMCs) Cultured in Conditioned Medium (CM) of K562 Cell Culture AAM Adil, L Vallinayagam, K Chitra, S Jamal, AK Pandurangan, N Ahmed Journal of Environmental Pathology, Toxicology and Oncology 38 (2)

44. Cancer immunotherapy: Targeting immunosuppressive tumor microenvironment NA A.A Mohamed Adil Oncobiology and Targets 2014