
Title

Self-Reported Nutritional Status and Breakfast Characterization in Latin American University Students

Abstract

Objective: To associate breakfast consumption frequency with self-reported nutritional status and dietary patterns of Latin American university students by human development. Material and methods: This was a cross-sectional, multicenter observational study. University students from 11 Latin American countries (Argentina, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Peru, Paraguay, Panama and Uruguay) were invited to participate by answering an online self-administered questionnaire on food consumption and sociodemographic indicators, associations were investigated using logistic regression. Results: The logistic regression analysis showed significant associations between breakfast consumption and the crude model, models 2 and 3 in countries with very high and upper-middle/high human development. However, after adjustment in the most comprehensive model, the association is no longer statistically significant. In the fully adjusted model of the variables, a significant relationship was observed between breakfast consumption and both healthy and unhealthy dietary patterns. Specifically, students who typically consume breakfast exhibit greater consumption of oatmeal and fruits, as well as healthier dinner choices. Conversely, they exhibit lower consumption of fast food, sugary drinks, and juices. In particular, in highly developed countries, along with the mentioned foods, consumption of dairy was linked to breakfast consumption in a positive way, while alcohol consumption was negatively associated. Conclusion: University students who eat breakfast on a regular basis maintain a healthier diet in comparison to those who do not, irrespective of their country's level of human development. © 2023 American Nutrition Association.

Authors

Saavedra Clarke S.; Parra-Soto S.; Murillo G.; Carpio-Arias V.; Landaeta-Díaz L.; Nava-González E.J.; Ríos-Castillo I.; Nuñez-Martínez B.E.; Gómez G.; Araneda-Flores J.; Cavagnari B.M.; Morales G.; Meza Miranda E.R.; Bejarano-Roncancio J.J.; Mauricio-Alza S.; Córdón-Arrivillaga K.; Durán-Agüero S.

Author full names

Saavedra Clarke, Silvana (58640016100); Parra-Soto, Solange (57200247014); Murillo, Gabriela (58175764800); Carpio-Arias, Valeria (57219867154); Landaeta-Díaz, Leslie (57209581497); Nava-González, Edna J. (26221448200); Ríos-Castillo, Israel (55519993500); Nuñez-Martínez, Beatriz Elizabeth (57408591200); Gómez, Georgina (36715056400); Araneda-Flores, Jacqueline (36695903300); Cavagnari, Brian M. (55409809800); Morales, Gladys (55567426000); Meza Miranda, Eliana Romina (56120166000); Bejarano-Roncancio, Jhon Jairo (36808900900); Mauricio-Alza, Saby (57205023294); Córdón-Arrivillaga, Karla (56401922100); Durán-Agüero, Samuel (55237963300)

Author(s) ID

58640016100; 57200247014; 58175764800; 57219867154; 57209581497;
26221448200; 55519993500; 57408591200; 36715056400; 36695903300;
55409809800; 55567426000; 56120166000; 36808900900; 57205023294;
56401922100; 55237963300

Year

2024

Source title

Journal of the American Nutrition Association

Volume

43.0

Issue

3

Page start

252

Page end

260

Page count

8.0

DOI

10.1080/27697061.2023.2263526

Link

<https://www.scopus.com/inward/record.uri?eid=2-s2.0-85173744564&doi=10.1080%2f27697061.2023.2263526&partnerID=40&md5=09e59c69b3f8da04a10fe0af86ff44c>

Affiliations

Carrera de Nutrición y Dietética, Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Providencia, Chile; Departamento de Nutrición y Salud Pública, Facultad de Ciencias de la Salud y de los Alimentos, Universidad del Bío-Bío, Chillán, Chile; School of Cardiovascular and Metabolic Health, University of Glasgow, Glasgow, United Kingdom; Department of Biochemistry, School of Medicine, University of Costa Rica, San Pedro, Costa Rica; Grupo de Investigación en Alimentación y Nutrición Humana (GIANH), Facultad de Salud Pública, Escuela Superior Politécnica de Chimborazo, Riobamba, Ecuador; Escuela de Nutrición y Dietética, Facultad de Salud y Ciencias Sociales, Universidad de Las Américas, Santiago, Chile; Núcleo en Ciencias Ambientales y Alimentarias (NCAA), Universidad de las Américas, Santiago, Chile; Facultad de Salud Pública y Nutrición, Universidad Autónoma de Nuevo León, Monterrey, Mexico; Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO), Oficina Subregional de la FAO para Mesoamérica, Ciudad de Panamá, Panamá; Escuela de Nutrición, Facultad de Medicina, Universidad de Panamá, Ciudad de Panamá, Panamá; Coordinación de Investigación e Innovación Universidad María Auxiliadora, Mariano Roque Alonso,

Paraguay; Escuela de Nutrición, Facultad de Ciencias Médicas, Pontificia Universidad Católica Argentina, Buenos Aires, Argentina; Departamento de Salud Pública, Facultad de Medicina, Universidad de La Frontera, Temuco, Chile; Universidad Nacional de Asunción - Centro Multidisciplinario de Investigaciones Tecnológicas, San Lorenzo, Paraguay; Departamento de Nutrición Humana, Facultad de Medicina, Universidad Nacional de Colombia, Sede Bogotá, Colombia; Universidad Privada Norbert Wiener, Lima, Peru; Unidad de Investigación en Seguridad Alimentaria y Nutricional (UNISAN), Escuela de Nutrición, Facultad de Ciencias Químicas y Farmacia, Universidad de San Carlos de Guatemala, Ciudad de Guatemala, Guatemala; Escuela de Nutrición y Dietética, Facultad de Ciencias para el Cuidado de la Salud, Universidad San Sebastian, Chile

Authors with affiliations

Saavedra Clarke S., Carrera de Nutrición y Dietética, Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Providencia, Chile; Parra-Soto S., Departamento de Nutrición y Salud Pública, Facultad de Ciencias de la Salud y de los Alimentos, Universidad del Bío-Bío, Chillán, Chile, School of Cardiovascular and Metabolic Health, University of Glasgow, Glasgow, United Kingdom; Murillo G., Department of Biochemistry, School of Medicine, University of Costa Rica, San Pedro, Costa Rica; Carpio-Arias V., Grupo de Investigación en Alimentación y Nutrición Humana (GIANH), Facultad de Salud Pública, Escuela Superior Politécnica de Chimborazo, Riobamba, Ecuador; Landaeta-Díaz L., Escuela de Nutrición y Dietética, Facultad de Salud y Ciencias Sociales, Universidad de Las Américas, Santiago, Chile, Núcleo en Ciencias Ambientales y Alimentarias (NCAA), Universidad de las Américas, Santiago, Chile; Nava-González E.J., Facultad de Salud Pública y Nutrición, Universidad Autónoma de Nuevo León, Monterrey, Mexico; Ríos-Castillo I., Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO),

Oficina Subregional de la FAO para Mesoamérica, Ciudad de Panamá, Panamá, Escuela de Nutrición, Facultad de Medicina, Universidad de Panamá, Ciudad de Panamá, Panamá; Nuñez-Martínez B.E., Coordinación de Investigación e Innovación Universidad María Auxiliadora, Mariano Roque Alonso, Paraguay; Gómez G., Department of Biochemistry, School of Medicine, University of Costa Rica, San Pedro, Costa Rica; Araneda-Flores J., Departamento de Nutrición y Salud Pública, Facultad de Ciencias de la Salud y de los Alimentos, Universidad del Bío-Bío, Chillán, Chile; Cavagnari B.M., Escuela de Nutrición, Facultad de Ciencias Médicas, Pontificia Universidad Católica Argentina, Buenos Aires, Argentina; Morales G., Departamento de Salud Pública, Facultad de Medicina, Universidad de La Frontera, Temuco, Chile; Meza Miranda E.R., Universidad Nacional de Asunción - Centro Multidisciplinario de Investigaciones Tecnológicas, San Lorenzo, Paraguay; Bejarano-Roncancio J.J., Departamento de Nutrición Humana, Facultad de Medicina, Universidad Nacional de Colombia, Sede Bogotá, Colombia; Mauricio-Alza S., Universidad Privada Norbert Wiener, Lima, Peru; Córdón-Arrivillaga K., Unidad de Investigación en Seguridad Alimentaria y Nutricional (UNISAN), Escuela de Nutrición, Facultad de Ciencias Químicas y Farmacia, Universidad de San Carlos de Guatemala, Ciudad de Guatemala, Guatemala; Durán-Agüero S., Escuela de Nutrición y Dietética, Facultad de Ciencias para el Cuidado de la Salud, Universidad San Sebastian, Chile

Author Keywords

Breakfast; nutritional status; university students

Index Keywords

Breakfast; Cross-Sectional Studies; Humans; Latin America; Nutritional Status; Self Report; Students; Universities; oatmeal; adult; alcohol consumption; Argentina;

Article; body mass; Chile; Costa Rica; cross-sectional study; dietary fiber; Ecuador; education; fast food; female; food intake; fruit; Guatemala; human; human development; major clinical study; male; meal; Mexico; multicenter study; normal weight obesity; nutritional status; obesity; observational study; occupation; Panama; Paraguay; Peru; physical activity; questionnaire; smoking; social network; sociodemographics; underweight; university student; Uruguay; whole grain; young adult; clinical trial; epidemiology; self report; South and Central America; student; university

References

Gibney M.J., Barr S.I., Bellisle F., Drewnowski A., Fagt S., Livingstone B., Masset G., Varela Moreiras G., Moreno L.A., Smith J., Et al., Breakfast in human nutrition: the international breakfast research initiative, *Nutrients*, 10, 5, (2018); Ellis E., Power up with breakfast 2019; St-Onge M.-P., Ard J., Baskin M.L., Chiuve S.E., Johnson H.M., Kris-Etherton P., Varady K., Meal timing and frequency: implications for cardiovascular disease prevention: a scientific statement from the american heart association, *Circulation*, 135, 9, (2017); Ma X., Chen Q., Pu Y., Guo M., Jiang Z., Huang W., Long Y., Xu Y., Skipping breakfast is associated with overweight and obesity: a systematic review and meta-analysis, *Obes Res Clin Pract*, 14, 1, pp. 1-8, (2020); Li X., Braakhuis A., Li Z., Roy R., How does the university food environment impact student dietary behaviors? A systematic review, *Front Nutr*, 9, (2022); Alakaam A., Willyard A., Eating habits and dietary acculturation effects among international college students in the United States, *AIMS Public Health*, 7, 2, pp. 228-240, (2020); Mensah F.Z., Lane K.E., Richardson L.D., Determinants of eating behaviour in Black, Asian and Minority Ethnic (BAME) university students when living at and away from home: with a focus on the influence of food enculturation and food acculturation, *Appetite*, 171, (2022); Hilger J., Loerbroks A., Diehl K., Eating

behaviour of university students in Germany: dietary intake, barriers to healthy eating and changes in eating behavior since the time of matriculation, *Appetite*, 109, pp. 100-107, (2017); Hilger-Kolb J., Diehl K., Oh god, i have to eat something, but where can i get something quickly?'-A qualitative interview study on barriers to healthy eating among university students in Germany, *Nutrients*, 11, 10, (2019); Hernandez-Segura N., Botella-Juan L., Amezcua-Prieto C., Morales-Suarez-Varela M., Mateos-Campos R., Fernandez-Villa T., Ortiz-Moncada R., Almaraz A., Narciso-Rufo A., Ayan-Perez C., Et al., Excess weight in relation to lifestyle habits in spanish first-year university students: differences between pre- and post-COVID-19-A serial cross-sectional study based on uniHcos project, *Healthcare (Basel)*, 11, 11, (2023); Matsumura Y., Yamamoto R., Shinzawa M., Matsushita T., Yoshimura R., Otsuki N., Mizui M., Matsui I., Kaimori J., Sakaguchi Y., Et al., Skipping breakfast and incidence of frequent alcohol drinking in university students in japan: a retrospective cohort study, *Nutrients*, 14, 13, (2022); Duran S., Valdes P., Godoy A., Herrera T., Eating habits and physical condition of physical education students, *Rev Chil Nutr*, 41, 3, pp. 251-259, (2014); United Nations development programme, (2021); Smith K.J., Breslin M.C., McNaughton S.A., Gall S.L., Blizzard L., Venn A.J., Skipping breakfast among Australian children and adolescents; findings from the 2011-12 National Nutrition and Physical Activity Survey, *Aust N Z J Public Health*, 41, 6, pp. 572-578, (2017); Federación Panamericana de Lechería. (FEPALE), (2018); Kovalskys I., Rigotti A., Koletzko B., Fisberg M., Gomez G., Herrera-Cuenca M., Cortes Sanabria L.Y., Yopez Garcia M.C., Pareja R.G., Zimberg I.Z., Et al., Latin American consumption of major food groups: results from the ELANS study, *PLoS One*, 14, 12, (2019); Global status report on alcohol and health 2018: executive summary, (2018); Tee E.S., Nurliyana A.R., Norimah A.K., Mohamed H.J.B.J., Tan S.Y., Appukutty M., Hopkins S., Thielecke F., Ong M.K., Ning C., Et al., Breakfast consumption among Malaysian primary and secondary school children and relationship with body weight status - Findings from the MyBreakfast Study, *Asia Pac*

J Clin Nutr, 27, 2, pp. 421-432, (2018); Gotthelfa S.J., Tempesttia C.P., Breakfast, nutritional status, and socioeconomic outcome measures among primary school students from the City of Salta. A cross-sectional study, Arch Argent Pediatr, 115, pp. 424-431, (2017); Wadolowska L., Hamulka J., Kowalkowska J., Ulewicz N., Gornicka M., Jeruszka-Bielak M., Kostecka M., Wawrzyniak A., Skipping breakfast and a meal at school: its correlates in adiposity context. report from the ABC of healthy eating study of polish teenagers, Nutrients, 11, 7, (2019); Olatona F.A., Oloruntola O., Adeniyi O., Amu E., Association between breakfast consumption and anthropometrically determined nutritional status of secondary-school adolescents in lagos, southwest nigeria, Int J MCH AIDS, 11, 1, (2022); Cacau L.T., De Miguel-Etayo P., Santaliestra-Pasias A.M., Gimenez-Legarre N., Marchioni D.M., Molina-Hidalgo C., Censi L., Gonzalez-Gross M., Grammatikaki E., Breidenassel C., Et al., Breakfast dietary pattern is inversely associated with overweight/obesity in european adolescents: the helena study, Children (Basel), 8, 11, (2021); Das Gracias Ferreira Passos Santana K., Braganca M.L.B.M., De Oliveira B.R., Da Silva Coelho C.C.N., Da Silva A.A.M., Sociodemographic, dietary, and lifestyle factors associated with increased body fat in adolescents of São Luís, Maranhão State, Brazil, Cad Saude Publica, 37, 10, (2021); Concha C., Gonzalez G., Pinunuri R., Valenzuela A.C., Relationship between feeding schedule, nutritional composition of breakfast and nutritional status among university students in Valparaíso, Chile, Rev Chil Nutr, 46, 4, pp. 400-408, (2019); Altamimi J.Z., Alshwaiyat N.M., Alkhalidy H., Alfaris N.A., Alkehayez N.M., Alagal R.I., Breakfast skipping among a multi-ethnic population of young men and relationship with sociodemographic determinants and weight status, Int J Environ Res Public Health, 19, 5, (2022); Okada C., Imano H., Muraki I., Yamada K., Iso H., The association of having a late dinner or bedtime snack and skipping breakfast with overweight in Japanese women, J Obes, 2019, pp. 2439571-5, (2019); Maukonen M., Kanerva N., Partonen T., Mannisto S., Chronotype and energy intake timing in relation to changes in anthropometrics: a 7-year follow-up study in adults,

Chronobiol Int, 36, 1, pp. 27-41, (2019); van der Merwe C., Munch M., Kruger R., Chronotype differences in body composition, dietary intake and eating behavior outcomes - a scoping systematic review, Adv Nutr, 13, 6, pp. 2357-2405, (2022); Beaudry K.M., Ludwa I.A., Thomas A.M., Ward W.E., Falk B., Josse A.R., First-year university is associated with greater body weight, body composition and adverse dietary changes in males than females, PLoS One, 14, 7, (2019); Qin P., Zhang M., Han M., Liu D., Luo X., Xu L., Zeng Y., Chen Q., Wang T., Chen X., Et al., Fried-food consumption and risk of cardiovascular disease and all-cause mortality: a meta-analysis of observational studies, Heart, 107, 19, pp. 1567-1575, (2021); Mackie A.R., Bajka B.H., Rigby N.M., Wilde P.J., Alves-Pereira F., Mosleth E.F., Rieder A., Kirkhus B., Salt L.J., Oatmeal particle size alters glycemic index but not as a function of gastric emptying rate, Am J Physiol Gastrointest Liver Physiol, 313, 3, pp. G239-G246, (2017); Gao H., Song R.J., Jiang H., Zhang W., Han S.F., Oat fiber supplementation alleviates intestinal inflammation and ameliorates intestinal mucosal barrier via acting on gut microbiota-derived metabolites in LDLR^{-/-} mice, Nutrition, 95, (2022); Lara M., Sisa I., Yepez M.C., Breakfast skipping, nutritional status, and physical activity in a middle-aged Latin American population: a population-based study from Ecuador, Nutr Hosp, 36, 5, pp. 1123-1132, (2019); Torres-Mallma C., Trujillo-Valencia C., Urquiza-Diaz A.L., Salazar-Rojas R., Taype-Rondan A., Eating habits in first and sixth year medical students of a private university in Lima, Peru, Rev Chil Nutr, 43, 2, (2016); Guedes D.P., Silva A.L.D.S., Exercise and fruit/vegetable intake, and their associations with body weight status in university students, Nutr Hosp, 38, 3, pp. 545-554, (2021); Diaz-Torrente X., Quintiliano-Scarpelli D., Dietary patterns of breakfast consumption among Chilean university students, Nutrients, 12, 2, (2020); Sanchez D.C., Betancur V.D.C., Gil S.F., Herrera D.M.S., Correa L.M.M., Consumption of sugary drinks and sugar added to beverages and their relationship with anthropometric indicators in young people from medellín (Colombia), Nutr Hosp, 36, pp. 1346-1353, (2019); Gui Z.-H., Zhu

Y.-N., Cai L., Sun F.-H., Ma Y.-H., Jing J., Chen Y.-J., Sugar-sweetened beverage consumption and risks of obesity and hypertension in Chinese children and adolescents: a national cross-sectional analysis, *Nutrients*, 9, 12, (2017); Miranda E.M., Martinez B.N., Agüero S.D., Armijo P.P., Cavagnari B.M., Arrivillaga K.C., Et al., Sugar-sweetened beverage consumption during the covid-19 pandemic in twelve ibero-American countries: a cross-sectional study, *Rev Chil Nutr*, 48, pp. 569-577, (2021); Singh G.M., Micha R., Khatibzadeh S., Shi P., Lim S., Andrews K.G., Engell R.E., Ezzati M., Mozaffarian D., Global, regional, and national consumption of sugar-sweetened beverages, fruit juices, and milk: a systematic assessment of beverage intake in 187 countries, *PLoS One*, 10, 8, (2015); Sandoval R.C., Roche M., Belausteguigoitia I., Alvarado M., Galicia L., Gomes F.S., Paraje G., Selective consumption taxes on sugar-sweetened beverages in Latin America and the Caribbean, *Pan Am J Public Health*, 45, (2021); Souza L.P.S.E., Hermsdorff H.H.M., Miranda A., Bressan J., Pimenta A.M., Alcohol consumption and overweight in Brazilian adults—cume project, *Cien Saude Colet*, 26, pp. 4835-4848, (2021); Brenes J.C., Gomez G., Quesada D., Kovalskys I., Rigotti A., Cortes L.Y., Yopez Garcia M.C., Liria-Dominguez R., Herrera-Cuenca M., Guajardo V., Et al., Alcohol contribution to total energy intake and its association with nutritional status and diet quality in eight Latin American countries, *Int J Environ Res Public Health*, 18, 24, (2021); Sogabe M., Okahisa T., Kurihara T., Kagawa M., Ueda H., Kawaguchi T., Fukuya A., Kagemoto K., Tanaka H., Kida Y., Et al., Comparison of the role of alcohol consumption and qualitative abdominal fat on NAFLD and MAFLD in males and females, *Sci Rep*, 12, 1, (2022); Sasaki-Tanaka R., Ray R., Moriyama M., Ray R.B., Kanda T., Molecular changes in relation to alcohol consumption and hepatocellular carcinoma, *Int J Mol Sci*, 23, 17, (2022); Rumgay H., Murphy N., Ferrari P., Soerjomataram I., Alcohol and cancer: epidemiology and biological mechanisms, *Nutrients*, 13, 9, (2021); Deng W., Jin L., Zhuo H., Vasiliou V., Zhang Y., Alcohol consumption and risk of stomach cancer: a meta-analysis, *Chem Biol Interact*, 336,

(2021); Zeinomar N., Knight J.A., Genkinger J.M., Phillips K.-A., Daly M.B., Milne R.L., Dite G.S., Kehm R.D., Liao Y., Southey M.C., Et al., Alcohol consumption, cigarette smoking, and familial breast cancer risk: findings from the Prospective Family Study Cohort (ProF-SC), *Breast Cancer Res*, 21, 1, (2019); Miller E.R., Wilson C., Chapman J., Flight I., Nguyen A.-M., Fletcher C., Ramsey I., Connecting the dots between breast cancer, obesity and alcohol consumption in middle-aged women: ecological and case control studies, *BMC Public Health*, 18, 1, (2018); Runggay H., Shield K., Charvat H., Ferrari P., Sornpaisarn B., Obot I., Islami F., Lemmens V.E.P.P., Rehm J., Soerjomataram I., Et al., Global burden of cancer in 2020 attributable to alcohol consumption: a population-based study, *Lancet Oncol*, 22, 8, pp. 1071-1080, (2021); Wood A.M., Kaptoge S., Butterworth A.S., Willeit P., Warnakula S., Bolton T., Paige E., Paul D.S., Sweeting M., Burgess S., Et al., Risk thresholds for alcohol consumption: combined analysis of individual-participant data for 599 912 current drinkers in 83 prospective studies, *Lancet*, 391, pp. 1513-1523, (2018); Crovetto M., Valladares M., Onate G., Fernandez M., Mena F., Duran Agüero S., Espinoza V., Association of weekend alcohol consumption with diet variables, body mass index, cardiovascular risk and sleep, *Human Nutrition and Metabolism*, 27, (2022); Troncoso P C., Doepking M C., Zuniga B C., Healthy eating in the training of students of pedagogical careers, *Rev. Chil. Nutr*, 40, 1, pp. 43-47, (2013); Espinoza L., Rodriguez F., Galvez J., MacMillan N., Eating habits and physical activity in university students, *Rev Chil Nutr*, 38, pp. 459-465, (2011); Mostafa S.A., Mena S.C., Antza C., Balanos G., Nirantharakumar K., Tahrani A.A., Sleep behaviours and associated habits and the progression of pre-diabetes to type 2 diabetes mellitus in adults: a systematic review and meta-analysis, *Diab Vasc Dis Res*, 19, 3, (2022)

Correspondence Address

S. Durán-Agüero; Escuela de Nutrición y Dietética, Facultad de Ciencias para el

Cuidado de la Salud, Universidad San Sebastian, Chile; email: samuel.duran@uss.cl

Publisher

Routledge

ISSN

27697061

PubMed ID

37800672.0

Language of Original Document

English

Abbreviated Source Title

J. Am. Nutr. Assoc.

Document Type

Article

Publication Stage

Final

Source

Scopus

EID

2-s2.0-85173744564