Volume 6, Issue 10 – January – June -2020

ECORFAN

Journal-Republic of Guatemala

ISSN-On line: 2410-8849

ECORFAN®

ECORFAN Journal-Republic of Guatemala, Volume 6, Issue 10, January - June 2020, is a journal edited semestral by ECORFAN. Kilometer 16, American Highway, House Terra Alta, House D7 Mixco Zona 1, Republic of Guatemala. WEB: www.ecorfan.org/republicofguatemala/, journal@ecorfan.org. Editor in Chief: MARTÍNEZ-HERRERA, Erick Obed. MsC. ISSN On line: 2414-8849. Responsible for the latest update of this number ECORFAN Computer Unit. ESCAMILLA-BOUCHÁN, Imelda, LUNA-SOTO, Vladimir, Kilometer 16, American Highway, House Terra Alta, House D7 Mixco Zona 1, Republic of Guatemala, last updated June 30, 2020.

ECORFAN Journal Republic of Guatemala

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Knowledge Area

The works must be unpublished and refer to topics of Biological and Health Sciences, Medical Mycology, Dermatology, Immunology, Human Ecology, Parasitology, Pediatric Infectious Diseasesand other topics related to Medicine and Health Sciences.

Presentation of Content

In the first article we present, *Adhesive bond strength between orthodontic resin and acrylic surfaces*, by TORRES-CAPETILLO, Evelyn Guadalupe, CAPETILLO-HERNÁNDEZ, Guadalupe Rosalía, ROESCH-RAMOS, Laura and MORENO-MARIN, Flora, with adscription in the Universidad Veracruzana, as the following article we present, *Use of cell phones in the transmission of preventive messages about COVID-19 to pregnant women in Yucatan, Mexico. Preliminary data*, by RODRÍGUEZ-ANGULO, Elsa, ROSADO-ALCOCER, Ligia, CABALLERO-CANUL Ricardo and GÓMEZ-CASTILLO, José, with adscription in the Universidad Autónoma de Yucatán, as the following article we present, *The role of probiotics in times of the COVID-19 pandemic*, by LARA-LÓPEZ, Ivonne Montserrat, SANTIESTEBAN-LOPEZ, Norma Angélica, CERÓN-CARRILLO, Teresa Gladys and MORALES-PAREDES, Yesbek Rocío, with adscription in the Universidad de Guadalajara, as the following article we present, *Quality of life related with health and academic satisfaction of university students*, by GARCÍA-GARCÍA, Jesús Alberto, CUFARFÁN-LÓPEZ, Julio, FARIAS-BRACAMONTES, Juan Carlos and GARCÍA-CONTRERAS, Laura Patricia, with adscription in the Universidad Autónoma de Coahuila.

Content

Article **ECORFAN Journal-Republic of Guatemala**
June 2020 Vol.6 No.10 1-5

Adhesive bond strength between orthodontic resin and acrylic surfaces

Fuerza de unión adhesiva entre resina de ortodoncia y superficies acrílicas

TORRES-CAPETILLO, Evelyn Guadalupe†, CAPETILLO-HERNÁNDEZ, Guadalupe Rosalía*, ROESCH-RAMOS, Laura and MORENO-MARIN, Flora

Universidad Veracruzana, Facultad de Odontología, Región Veracruz, México

ID 1st Author: *Evelyn Guadalupe, Torres-Capetillo* / **ORC ID:** 0000-0003-0576-0327, **Researcher ID Thomson**: T-1680-2018, **CVU CONACYT ID:** 308188

ID 1st Coauthor: *Guadalupe Rosalía, Capetillo-Hernández* / **ORC ID:** 0000-0002-2033-4660, **Researcher ID Thomson**: S-7875-2018, **CVU CONACYT ID:** 386320

ID 2nd Coauthor: *Laura, Roesch-Ramos* / **ORC ID:** 0000-0003-0188-797X, **Researcher ID Thomson:** Q-8349-2016, **PubMed Author ID**: LAURA ROESCH RAMOS, **CVU CONACYT ID**: 324897

ID 3rd Coauthor: *Flora, Moreno-Marín* / **CVU CONACYT ID:** 421753

DOI: 10.35429/EJRG.2020.10.6.1.5 Received March 12, 2020; Accepted June 30, 2020

Abstract

The use of orthodontic treatments in patients with temporary prostheses has been increasing, the purpose of this in vitro research is to measure the adhesive bond strength between orthodontic resin and acrylic surfaces by applying different procedures. Objective. To compare the adhesive bonding strength between orthodontic resin and acrylic surfaces under different application protocols. Methodology. Transversal, experimental, prospective study. In vitro with acrylic provisions, was carried out in the laboratory of the Faculty of Dentistry of the Universidad Veracruzana region of Veracruz. In the period of February-June of the year 2019. The sample was conformed by two control groups of specimens and four experimental ones, each group conformed by 20 specimens, in total 120 provisional ones were made in acrylic Nic Tone of quick self-cure. The tests performed by the ULTRATESTER machine were expressed in MPa. Later, the data obtained were processed in Excel tables (version) for statistical processing in SPSS version 24. Contribution. When comparing the pre-cutting protocol of acrylic surfaces with fine diamond bur and the protocol without pre-cutting, no statistically significant differences were found, therefore, this step could be omitted in clinical practice.

Adhesive System, Provisional, Acrylic Resin, Orthodontic Resin

Resumen

El uso de tratamientos de ortodoncia en pacientes con prótesis provisionales ha ido en aumento, el propósito de esta investigación *in vitro* es medir la resistencia de unión adhesiva entre resina de ortodoncia y superficies acrílicas aplicando diferentes procedimientos. Objetivo. Comparar la fuerza de unión adhesiva entre resina de ortodoncia y superficies acrílicas bajo diferentes protocolos de aplicación. Metodología. Estudio transversal, experimental, prospectivo. in vitro con provisionales de acrílico, se llevó a cabo en el laboratorio de la Facultad de Odontología de la Universidad Veracruzana región Veracruz. En el periodo de febrero-junio del año 2019. La muestra estuvo conformada por dos grupos control de especímenes y cuatro experimentales, cada grupo conformado por 20 especímenes, en total se realizaron 120 provisionales en acrílico Nic Tone de autocurado rápido. Las pruebas realizadas por la máquina ULTRATESTER fueron expresadas en MPa. Posteriormente los datos obtenidos fueron procesados en tablas de Excel (versión) para su procesamiento estadístico en SPSS versión 24. Contribución. Al establecer la comparación entre el protocolo de tallado previo de superficies acrílicas con fresa de diamante fino y el protocolo sin tallado previo, no se encontraron diferencias estadísticamente significativas, por lo tanto, se podría omitir este paso en la práctica clínica.

Sistema Adhesivo, Provisional, Resina Acrílica, Resina de Ortodoncia

Citation: TORRES-CAPETILLO, Evelyn Guadalupe, CAPETILLO-HERNÁNDEZ, Guadalupe Rosalía, ROESCH-RAMOS, Laura and MORENO-MARIN, Flora. Adhesive bond strength between orthodontic resin and acrylic surfaces. ECORFAN Journal-Republic of Guatemala. 2020, 6-10: 1-5

* Correspondence to Author (email: gcapetillo@uv.mx)
† Researcher contributing first author.

Introduction

At present, adhesive systems are of utmost importance for restorations in dentistry, since they can provide different treatment options depending on the indications and needs of each patient. The adhesives allow to reduce the operative times of the treatments to be carried out. Hence the importance of determining which is the material or technique that provides the best adhesive bonding strength on the surfaces to be treated.

Every day it is more common to perform orthodontic treatments in patients who use prostheses or individual provisional restorations, this point requires a greater understanding of the subject related to the use of materials and techniques different from conventional ones, which can guarantee excellent adhesion of the brackets to the surface of the provisional, as well as the good condition of the restorations.

Currently, the progress of adhesion biomaterials is focused on the improvement of their components, the functioning of the material and the simplification of techniques in clinical procedures, in order to achieve better results in less time.

However, the bond strength between orthodontic resin, adhesive, and acrylic surfaces remains a concern during orthodontic treatment, as the literature is still quite sparse when it comes to adhesive bonding to acrylic provisionals.

The purpose of this in vitro research is to measure the adhesive bond strength between orthodontic resin and acrylic surfaces applying different treatments.

Adhesion is of great importance for current dentistry since there are studies that show its failure, due to various factors, both internal and external, either through the operator or the adhesive system, also associated at the same time with factors such as be of mechanical, chemical origin or due to environmental issues such as saliva or blood, due to the absence of absolute isolation and, in addition to them, it is manifested that the more steps the placement of them takes in the dental organs to be treated, the more susceptible to commit some error in your application.

Accession

Adherence in the dental field is of great importance, since a large part of the success of dental treatments depends on it. Today, there is a constant updating of materials and the relationship of adhesive systems with different dental tissues and restorative materials. Days, 2015.

It is the state by which two different surfaces or materials are held together by interfacial forces, either by physical bonds, by chemical bonds, or by both.

It is all that substance placed in the middle of two surfaces in contact by mechanical means with one another, which can maintain their union either chemically or physico-chemically. Adherence protocols have become the foundation of dentistry. The transformation of adhesive systems has been obtained through various investigations that bifurcated into effective formulas.

Dental protocols and novel adhesion techniques have increased their effectiveness and reliability for the performance of various dental treatments, obtaining high efficiency in mechanical bonding in conjunction with enamel and dentin. With the emergence of hydrophilic adhesion systems, in synergy with dentin modification, a wide range of possibilities was obtained for the application of numerous treatments since, thanks to their characteristics, they offer multiple applications and advantages in restorative treatments, magnifying benefits. Camacho et al. 2014.

Currently, adhesion systems are the basis for the vast majority of dental procedures, such as those in rehabilitation by direct technique, cementation of inlays, onlays, crowns and fixed prostheses, whether aesthetic or metallic, placement of endoposts, whether fiberglass or metallic.

A double action mechanism process is characterized by the adhesive capacity of the adhesive systems, through adhesion to dental tissues and attachment to the restored area, the latter being a chemical or micromechanical bonding process, since bonding to enamel is a micromechanical bond that represents the main bonding mechanism. Santana de Ávila, E. L et al. 2019.

ISSN-On line: 2414-8849

Overall objective

Compare the adhesive bond strength between orthodontic resin and acrylic surfaces under different application protocols.

Specific objectives

- Fabricate 25 mm by mm epoxy resin specimens, with an acrylic resin provisional included.
- Submit specimens to adhesion protocols a) Conventional method, b) Silanized, c) with plastic packaging)
- Apply shear force on Ultratester (Ultradent)

Methodology

This research was carried out according to the ISO 29022: 2013 standard, which specifies a test method that is aimed at evaluating the strength of the adhesive bond between dental materials and dental structure, however, in this study, this modified method was used to measure adhesion to acrylic structure.

Study is cross-sectional, experimental, prospective

The in vitro study with acrylic provisionals was carried out in the laboratory of the Faculty of Dentistry of the Universidad Veracruzana in the Veracruz region. In the period of February-June of the year 2019.

The sample consisted of two control groups of specimens and four experimental, each group made up of 20 specimens, a total of 120 provisionals were made in quick self-curing Nic Tone acrylic, in shade 66, they were made with the polyvinyl siloxane key technique, sectioned with diamond disc and later placed in containers made of stainless steel 25 mm in diameter by 25 mm in height, to include them in epoxy acrylic resin, made according to ISO 29022: 2013, the specimens were polished with a sandpaper sheet of fine and ultra fine grade, aiming to smooth the acrylic surface. The specimens were cleaned and disinfected with ultrasound and distilled water for 5 minutes, later they were dried with hot air. Once the specimens were obtained, they were prepared in experimental groups, following the manufacturer's instructions for the different adhesion systems used.

A total of 120 specimens were obtained, dividing into two control groups (GC1 and GC2) and 4 experimental (GE1) (GE2) (GE3) (GE4) each consisting of 20 specimens.

In control group 1 (GC1), the conventional adhesive system comprising the application of Ortho Solo adhesive was applied to the uncut acrylic surface, it was light-cured for 20 seconds and then the orthodontic resin was placed and light-cured for 20 seconds with a Valo lamp. .

In control group 2 (GC2), the acrylic surface was carved with a fine diamond bur, the Ortho Solo adhesive system was applied, it was light-cured for 20 seconds and the orthodontic resin was placed light-curing for 20 seconds using the Valo lamp.

In experimental group 1 (GE1), silane was applied and carved with microbrush on the uncut acrylic surface, a period of 10 seconds was given for the silane to fulfill its function, Ortho Solo adhesive was applied, light-cured for 20 seconds and He proceeded to place the orthodontic resin, light-curing for 20 seconds with a Valo lamp.

Experimental group 2 (GE2) It was applied by scrubbing with a Reliance plastic conditioner microbrush, a period of 10 seconds was given for the Reliance plastic conditioner to fulfill its function, Ortho adhesive was applied alone, light-curing for 20 seconds and the orthodontic resin was placed light-curing for 20 seconds with a Valo lamp.

Experimental group 3 (GE3) The acrylic surface was carved with a fine diamond bur and the same procedure was carried out as in experimental group 1 (GE1).

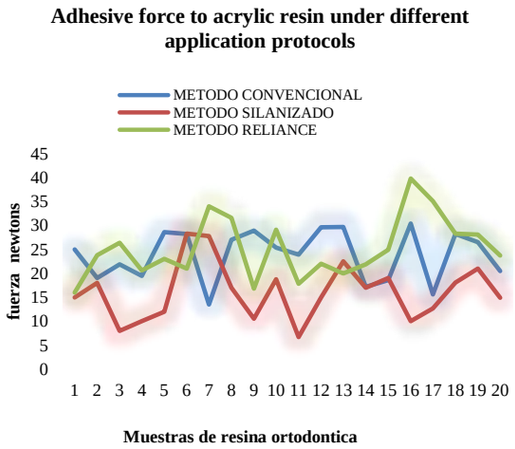
Experimental group 4 (GE4) The acrylic surface was carved with a fine diamond bur and the same procedure was carried out in experimental group 2 (GE2).

Finally, the 2 control and experimental groups were subjected to shear forces in the Ultradent ULTRATESTER machine in order to measure the adhesive bond strength between orthodontic resin and acrylic surface.

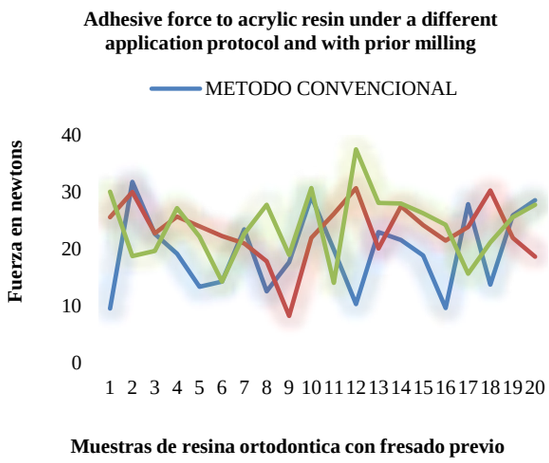
ISSN-On line: 2414-8849

Results

According to the results obtained in the inferential statistical analysis (ANOVA), the application protocol that showed the highest adhesive strength between orthodontic resin and acrylic surfaces was plastic conditioning (Reliance®) with an average of 25.18N without prior milling, followed of the conventional protocol with an average of 23.86 N and for the Silanized protocol an average of 16. 11 N showing the lowest adhesive force.



Graphic 1 Comparativo de la fuerza adhesiva a resina acrilica bajo protocolo de aplicación distinto sin fresado previo, observando mejores valores para el protocolo Reliance, seguido del protocolo convencional



Graphic 2 Comparison of the adhesive force to acrylic resin under a different application protocol with previous milling, observing better values for the Reliance protocol, followed by the Silanized protocol

Adhesive		
HSD Tukey[a]		
PRIOR PROTOCOL_WITH_MILLING	N	Subset for alpha = 0.05 1
conventional protocol	20	19.6850
Silanized protocol	20	23.2350
Reliance protocol	20	24.0550
S.I.G.		.066
The means for the groups in the homogeneous subsets are displayed.		
a. Use the sample size of the harmonic mean = 20,000.		

Table 1 Ti Diferencia entre grupos, siendo el protocolo convencional el que presenta menor rendimiento a la fuerza de adhesión

Discussion

The use of a self-etching adhesion system, even after internal whitening, presents acceptable FRZ values in the adhesion of brackets in orthodontics. M. Lobato Carreño, et a. 2015.

Conclusions

When a comparison is made between the protocol for prior grinding of acrylic surfaces with a fine diamond bur and the protocol without prior grinding, no statistically significant differences were found; therefore, this step could be omitted in clinical practice.

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ISSN-On line: 2414-8849

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Nombre de Autor (es) Guadalupe Rosalía Capetillo Hernández, Evelyn Guadalupe Torres Capetillo, Laura Roech Ramos, Flora Moreno Marín

ISSN-On line: 2414-8849

Article **ECORFAN Journal Republic of Guatemala**
June 2020 Vol.6 No.10 6-11

Use of cell phones in the transmission of preventive messages about COVID-19 to pregnant women in Yucatan, Mexico. Preliminary data

Uso de celulares en la transmisión de mensajes preventivos sobre COVID-19 a mujeres embarazadas de Yucatán, México. Datos preliminares

RODRÍGUEZ-ANGULO, Elsa†*, ROSADO-ALCOCER, Ligia, CABALLERO-CANUL Ricardo and GÓMEZ-CASTILLO, José

Universidad Autónoma de Yucatán, Centro de Investigaciones Regionales "Dr. Hideyo Noguchi". Av. Itzaes, Centro, 97000 Mérida Yucatán, México.

ID 1st Author: *Elsa, Rodríguez-Angulo* / **ORC ID**: 0000-0001-5959-1341, **Researcher ID Thomson**: S-4625-2018, **CVU CONACYT ID**: 111408

ID 1st Coauthor: *Ligia, Rosado-Alcocer* / **ORC ID**: 0000-0002-1806-9802, **Researcher ID Thomson**: ABE-2804-2020**, CVU CONACYT ID**: 290817

ID 2nd Coauthor: *Ricardo, Caballero-Canul* / **ORC ID**: 0000-0002-5813-5915

ID 3rd Coauthor: *José, Gómez-Castillo* / **ORC ID**: 0000-0001-7451-6454

DOI: 10.35429/EJRG.2020.10.6.6.11 Received March 10, 2020; Accepted June 30, 2020

Abstract

Objective. Present a strategy to rescue pregnant women from the pandemic through the use of mobile technology, to explore their health status and provide preventive information to limit damage. Methodology. Descriptive, cross-sectional study. Pregnant women from two municipalities of Yucatan participated. Based on national guidelines and direct questions to a sample of pregnant women, infographics were prepared on the main warning signs and most common questions about COVID-19, respectively. The infographics were sent to each pregnant woman's cell phone. Descriptive statistics were used and tables, graphs and figures were prepared to present the results. Contribution. 330 pregnant women were identified, of which 50 (15.1%) have already received infographics. The main doubts of a sample of 13 (3.9%) pregnant women about COVID-19 were: if something can happen to their baby if they get COVID-19, 13 (100%); if you can give COVID-19 to your baby in the hospital, 12 (92.3%); what measures to take and how to prevent COVID-19, 12 (92.3%); risks in childbirth if you get COVID-19, 7 (53.8%). It is important to continue with preventive information through digital means to improve the knowledge of pregnant women and prevent the risk of contagion. This study contributes to reduce the maternal mortality.

Cell phone, Pregnancy, COVID-19

Resumen

Objetivo. Presentar una estrategia de rescate de embarazadas ante la pandemia a través del uso de tecnología móvil, para explorar su estado de salud y proporcionar información preventiva para limitar daños. Metodología. Estudio descriptivo, transversal. Participaron embarazadas de dos municipios de Yucatán. Basados en lineamientos nacionales y preguntas directas a una muestra de embarazadas, se elaboraron infografías sobre principales signos de alarma y preguntas más comunes sobre COVID-19, respectivamente. Las infografías fueron enviadas al celular de cada embarazada. Se utilizó estadística descriptiva y se elaboraron tablas, gráficos y figuras para presentar los resultados. Contribución. Se identificaron 330 embarazadas, de las cuales 50 (15.1%) ya recibieron infografías. Las principales dudas de una muestras de 13(3.9%) embarazadas sobre COVID-19 fueron: si le puede pasar algo a su bebé si le da COVID-19, 13 (100 %); si le puede dar COVID-19 a su bebé en el hospital, 12 (92.3%); qué medidas tomar y cómo prevenir el COVID-19, 12 (92.3 %); riesgos en el parto si les da COVID-19, 7 (53.8%). Es importante continuar con la información preventiva a través de medios digitales para mejorar los conocimientos de las embarazadas y prevenir el riesgo de contagio. Este studio contribuye a reducer la mortalidad maternal.

Teléfono celular, Embarazo, COVID-19

Citation: RODRÍGUEZ-ANGULO, Elsa, ROSADO-ALCOCER, Ligia, CABALLERO-CANUL Ricardo and GÓMEZ-CASTILLO, José. Use of cell phones in the transmission of preventive messages about COVID-19 to pregnant women in Yucatan, Mexico. Preliminary data. ECORFAN Journal-Republic of Guatemala. 2020, 6-10: 6-11

* Correspondence to Author (email: rangulo@correo.uady.mx)
† Researcher contributing first author.

Introduction

Access to mobile technology has increased substantially in recent years as has access to the Internet, with the cell phone being an appropriate channel or device for the communication-personalization model for the purpose of transmitting health messages. (Moller, 2020; Sandberg, Spears, Nguyen, Talton, Quandt, Chen, et al; 2016) The National Institute of Statistics and Geography (INEGI), in collaboration with the Ministry of Communications and Transport (SCT) and the Federal Institute of Telecommunications (IFT), published the National Survey on the Availability and Use of Information Technologies in Homes (ENDUTIH; 2019); where it is reported that there are 80 in Mexico. 6 million Internet users, representing 70.1% of the population aged six years or more. This figure reveals an increase of 4.3 percentage points over that registered in 2018 (65.8%); between 2017 and 2019, users in the urban area went from 71.2% to 76.6%, while in the rural area the increase was from 39.2% to 47.7%. The main activities of Internet users in 2019 corresponded to entertainment (91.5%), obtaining information (90.7%) and communicating (90.6%). (INEGI; 2019).

For this reason, Information and Communication Technologies (ICT) is an opportunity to improve health-related processes, where the World Health Organization defines e-Health as "the cost-effective and safe use of information and communication technologies to support health and health-related fields, including health care services, health surveillance, health information and education, knowledge and research in health". (WHO, 2005) However, this concept remains controversial and several definitions have been presented.

Cell phones and other wireless devices have the potential to disrupt traditional health care delivery by allowing consumers to interact with health information, co-management conditions, and gain support for health challenges. (Brown; 2019) This transformation, known as mobile health (mHealth), is based on the near ubiquitous presence and functionality of mobile devices, which puts health promotion initiatives in the hands of consumers.

In addition, mHealth can expand equitable access to health to underserved populations (Hobson; 2019), such as the 17.27% of the population that is not entitled to health services in our country. (CONEVAL; 2015)

Due to the situation of the COVID-19 pandemic that since March of this year has confined the population at home, pregnant women in both rural and urban areas have stopped going to their prenatal control, increasing their degree of vulnerability and risk, and a solution to this problem for medical care is the use of mobile health where patients can be monitored, provide personal digital assistance and transmit preventive messages. This tool can help health services to provide care to patients remotely, save the cost of travel for patients and their families, and assist clinics in providing personalized care to reduce the patient load. (Cusack; 2008) (Ryu; 2012).

According to data published by INEGI 2010, the state of Yucatan has 1,955,577 inhabitants, of which 79.48% (1,554,422 people) have a cell phone and 1,400,366 have internet. (INEGI; 2019). Likewise, in this entity there are Mayan communities where there are high-risk pregnancies that put the life of the mother and the fetus at risk (Angulo, Cervantes, Pech y Vergara, 2007), and that the use of mobile health can help to provide information and timely attention to pregnant women. For this reason, the objective of the study is to present a strategy for rescuing pregnant women from the pandemic through the use of mobile technology, to explore their health status, and to provide preventive information to limit damage.

Material and Methods

Descriptive, cross-sectional study. Pregnant women from two municipalities in the rural area of Yucatan participated. Based on national guidelines and direct questions to a sample of pregnant women, infographics were prepared on the main warning signs and most common questions about COVID-19, respectively; as well as flowcharts of what to do if the pregnant woman becomes ill. The infographs were sent to each pregnant woman's cell phone. Descriptive statistics were used and tables, graphs and figures were elaborated to present the results.

ISSN-On line: 2414-8849

RODRÍGUEZ-ANGULO, Elsa, ROSADO-ALCOCER, Ligia, CABALLERO-CANUL Ricardo and GÓMEZ-CASTILLO, José. Use of cell phones in the transmission of preventive messages about COVID-19 to pregnant women in Yucatan, Mexico. Preliminary data. ECORFAN Journal-Republic of Guatemala. 2020

Through simple random sampling (Statcalc Epi Info Program), with a confidence level of 80% and an expected proportion of 98%, the sample size was calculated with confidence limits of 5%, and a sample of 11 pregnant women to be surveyed was obtained. Taking into account a 15% loss of information, the sample was increased by 15%, with a total of 13 pregnant women. With prior informed consent, and keeping a healthy distance, use of mask and mouthpiece, pregnant women from the outpatient clinic were invited to answer a questionnaire with questions about what they would like to know about COVID-19, about their knowledge of the warning signs, care of the pregnant woman and how to prevent the spread of the disease; each participant was asked for her cell phone number and the number of other pregnant women registered was obtained from their pregnancy control card.

Three doctors and a community nurse participated as surveyors, who were trained for this activity. The norms and guidelines established at a national level on Pregnancy and COVID-19 (Government of Mexico; 2020) were analyzed and based on the participants' answers, materials were elaborated to disseminate the type of infographics and videos, preserving cultural features in the language and drawings. Before the distribution of the infographics, a presentation infographic was designed and a notice was given that they would receive digital material in their cell phones and to have the authorization to use their number to make the shipments.

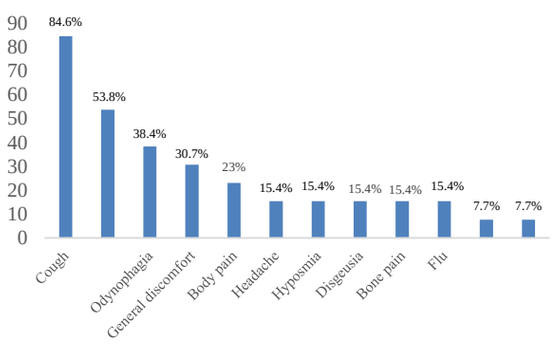
Results

330 pregnant women were identified in the databases of the participating Health Centers. The age range was 14-40 years, with a mean age of 25.7 years. The main questions about COVID-19, from a sample of 13 (3.9%) pregnant women were: if something can happen to their baby if they get COVID-19, 13 (100%); if they can give COVID-19 to their baby in the hospital, 12 (92.3%); what measures to take and how to prevent COVID-19, 12 (92.3%); risks in labor if they get COVID-19, 7 (53.8%) (Table 1). Regarding knowledge of the warning signs for the disease, 13(100.0%) pregnant women responded at least, the best known being cough in 11 (84.6%) of them (Chart 1).

Regarding where to go if they get sick, 9 (69.2%) responded that they should go to the health center and 4 (31.8%) to the community hospital. Regarding the care of pregnant women suspected or positive for COVID-19, most (69.2%) reported that they should stay home and isolate themselves (Graph 2); and about how to prevent infection, using mouth guards, hand washing and use of antibacterial gel were the main responses, in 8(61.5%), 7(53.85) and 6(46.1%) of pregnant women, respectively (Table 3). Fifty infographs were distributed via cell phone to the mothers (Fig.1).

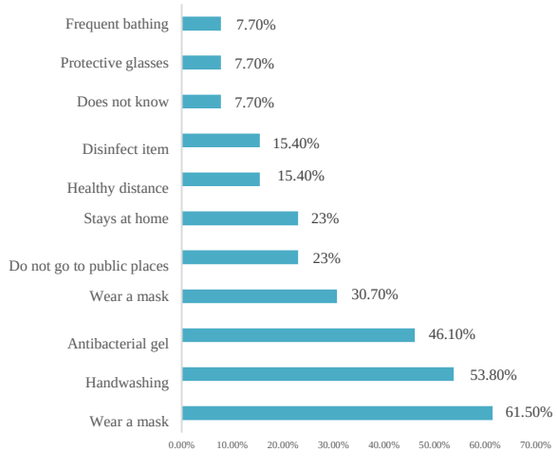
Question	Answers	Number n=13	%
What would you like to know about COVID-19?	If something can happen to my baby	13	100
	If you can give my baby Covid in the hospital	12	92.3
	What to do and how to prevent Covid-19	12	92.3
	Risks in childbirth if I get covid-19	7	53.8
What care should a pregnant woman with a suspected or positive COVID-19 have?	Staying home, isolation	9	69.2
	Does not know	4	30.7
	Go to Health Center	2	15.4
	Hand washing, frequent bathing	1	7.7
	Do not self-medicate	1	7.7

Table 1 Main doubts of pregnant women regarding COVID-19. n=13



Graphic 1 Main signs and symptoms of COVID-19 known by pregnant women. n=13

ISSN-On line: 2414-8849



Graphic 2 Main responses of pregnant women to prevent the spread of VIDOC-19. n=13

Figure 1 Infographics

Acknowledgements

To the National Council of Science and Technology of Mexico (CONACyT) for funding this study.

Conclusions

The Coronavirus pandemic that produces the COVID-19 disease produced a change in behavior in people around the world, which implied adapting to new ways of acting and proceeding in the face of the demands and restrictions that the new way of life implies in communities. (Abuabara, 2020; Morgante, Canal, Ojeda, Frávega, Blanco, Guzzo et al. 2020). There was also a need to review and update the Clinical Practice Guidelines for the care of severe cases (COVID-19, 2020). Maintaining a healthy distance, staying at home as long as possible and only leaving it for essentials, with the use of face masks and eye protection and frequent hand washing and use of antibacterial gel, are sanitary measures to follow and that day by day they must be present in our mind so as not to relax care and avoid contagion. In this study, the main questions and doubts faced by the pandemic were obtained, one of the vulnerable groups such as pregnant women;

Some are the concern of knowing what will happen to them if during pregnancy they get sick with COVID-19, what will happen to their baby and if it could be infected in the hospital at birth. It was also observed that the signs and symptoms of the disease are known to the population; This may be due to the fact that the information has been and is still widely disseminated by the mass media, to which the majority have access. Although there are studies that report that cough in pregnant women occurs in 57.1% of cases, (Castro; 2020) the women in our study recognized this sign as the main manifestation in a higher percentage (84.6%).

Also on the care necessary to prevent contagion are in the minds of pregnant women, especially the use of face masks (61.5%), which although at the beginning of the epidemic in Mexico its use as a protector of the SARS-COV2 virus was controversial, currently there is evidence supporting its use as a preventive measure (Esposito; 2020), but efforts must be redoubled and its use still insisted on in this population. We do not know how the infographics distributed via cell phone will impact and if they will help pregnant women to increase their knowledge of the disease, what to do if they get sick and how to prevent infections.

ISSN-On line: 2414-8849

This will be a challenge that we will have to face in subsequent studies to evaluate the impact of the use of technology in actions to protect the health of pregnant women against COVID-19. In other countries, the attention of the health authorities towards helping and protecting this vulnerable group has become evident, with the implementation of plans and programs that meet the local needs of pregnant women during pregnancy, childbirth and the puerperium and those of the newborn. born, faced with contingency (Changizi; 2020, Claudio; 2020, Bombini; 2020).

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ISSN-On line: 2414-8849

Article **ECORFAN Journal Republic of Guatemala**
June 2020 Vol.6 No.10 12-23

The role of probiotics in times of the COVID-19 pandemic

El papel de los probióticos en tiempos de la pandemia COVID-19

LARA-LÓPEZ, Ivonne Montserrat†, SANTIESTEBAN-LOPEZ, Norma Angélica*, CERÓN-CARRILLO, Teresa Gladys and MORALES-PAREDES, Yesbek Rocío

Universidad de Guadalajara. Centro Universitario de Ciencias Exactas e Ingenierías. Jalisco, México.

ID 1st Author: *Ivonne Montserrat, Lara-López*

ID 1st Couthor: *Norma Angélica, Santiesteban-López* / **ORC ID:** 0000-0001-7700-4139, **CVU CONACYT ID:** 240825

ID 2nd Coauthor: *Teresa Gladys, Cerón-Carrillo* / **ORC ID:** 0000-0002-3492-379X, **CVU CONACYT ID:** 211348

ID 3rd Coauthor: *Yerbek Rocío, Morales-Paredes* / **ORC ID:** 0000-0003-1740-2682, **CVU CONACYT ID:** 296456

DOI: 10.35429/EJRG.2020.10.6.12.23 Received March 10, 2020; Accepted June 30, 2020

Abstract

In December 2019, cases of a life-threatening pneumonia-producing disease were reported in Wuhan, China (COVID-19). There is not yet a vaccine or scientifically proven treatment at the moment. WHO recommends: washing hands, covering nose and mouth, correct cooking of food, avoiding close contact with anyone. Nowadays, individuals are interested in consuming foods that, apart from their nutritional value, additionally benefit as preventing diseases, that is why the consumption of probiotics originates a marked interest in Lactic Acid Bacteria (LAB) and their metabolites. Since when ingested, changes occur in the intestinal microflora and have a positive impact on the health status of the consumer. The intestine plays a very important role that has an impact on our tolerance and defense mechanism against diseases, concluding with the fact that by maintaining a better balance in our intestinal microbiota, our entire immune system will be strengthened, thus avoiding contagion by the current virus. It closed with a pilot survey in which it is inferred that most people are willing to consume probiotics to increase their defenses.

COVID-19, Probiotics, Immune system

Resumen

En diciembre del año 2019, se informó de casos de una enfermedad productora de neumonía potencialmente mortal en Wuhan, China (COVID-19). No existe aún vacuna ni tratamiento científicamente probado por el momento. La OMS recomienda: lavarse las manos cubrirse nariz y boca, cocción correcta de alimentos, evitar el contacto cercano con cualquier persona. Hoy en día, los individuos están interesados en consumir alimentos que, aparte de su valor nutricional, beneficien adicionalmente como prevenir enfermedades, es por eso que el consumo de probióticos origina un marcado interés por las Bacterias Ácido Lácticas (BAL) y sus metabolitos. Ya que al ingerirse ocurren cambios en la microflora intestinal y repercuten positivamente en el estado de salud del consumidor. El intestino desempeña un papel muy importante que tiene impacto en nuestro mecanismo de tolerancia y defensa ante enfermedades, concluyendo con el hecho de que manteniendo un mejor balance en nuestra microbiota intestinal, todo nuestro sistema inmunológico se verá fortalecido, evitando así el contagio por el actual virus. Se cerró con una encuesta piloto en la cual se infiere que la mayoría de las personas están dispuestas a consumir probióticos para aumentar sus defensas.

COVID-19, Probióticos, Sistema Inmunológico

Citation: LARA-LÓPEZ, Ivonne Montserrat, SANTIESTEBAN-LOPEZ, Norma Angélica, CERÓN-CARRILLO, Teresa Gladys and MORALES-PAREDES, Yesbek Rocío. The role of probiotics in times of the COVID-19 pandemic. ECORFAN Journal-Republic of Guatemala. 2020, 6-10: 12-23

* Correspondence to Author (email: asantiesteban2@hotmail.com)
† Researcher contributing first author.

Introduction

In December 2019, a rapidly spreading pneumonia represented a global threat, which emerged and was known as COVID-19 (an acronym for coronavirus disease 2019) and emerged in Wuhan, China. So far, this has been the third zoonotic coronavirus outbreak in the past twenty years, allowing for person-to-person transmission and raising concerns about global health (Xie & Quiong, 2020). Prevention measures include constant hand washing, use of face masks, and avoiding contact between people (Palacios-Cruz, 2020). Each of the measures must be adopted and put into practice by the population every day, which is also in charge of not only keeping this information, but also that each individual seeks prevention and control alternatives for the disease in question.

The main objective is to strengthen the immune system and although the disease (Covid-19) appears to be asymptomatic or paucisymptomatic in most cases, we do not have effective therapeutic resources to combat it, so we are constantly searching for alternatives. for example the use of probiotics in the human diet; There is no evidence that probiotics can help prevent, but there is a study that found that some probiotics reduce the incidence of common respiratory infections in children and the elderly (Lenoir-Wijnkoop et al. 2019). Therefore, even without scientific evidence, we can consider and discuss the possible benefits of probiotics in situations like the current one.

Coronavirus (COVID-19).

In December 2019, a rapidly spreading pneumonia represented a global threat, which emerged and was known as COVID-19 (an acronym for coronavirus disease 2019) and emerged in Wuhan, China. So far, this has been the third zoonotic coronavirus outbreak in the past twenty years, allowing for person-to-person transmission and raising concerns about global health. As of March 11, 2020, there were 80,955 confirmed cases and 3,162 deaths in China, as well as 37,364 confirmed cases and 1,130 deaths worldwide (Xie & Quiong, 2020). Of course, the information has been spreading and in a matter of days the pertinent measures were taken to subject the populations to a quarantine period, in order to avoid the spread of the virus.

Coronaviruses are a large family of viruses of positive sense single-stranded RNA genetic material, they have envelopes, they are highly diverse (Figure 1A) and are called “coronaviruses” due to the corona shape they present in their structure. These viruses are grouped into four genera: Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus. In the last seventeen years, two of the group of Betacoronaviruses have been of great interest to the scientific community and to world health: the cause of severe acute respiratory syndrome (known as SARS-CoV) and the cause of the Middle East respiratory syndrome (known as MERS-CoV). Both SARS-CoV2 and MERS-CoV2 are known to be of zoonotic origin (Cortés. 2020), which means a zoonosis; known as any disease that can be transmitted from animals to humans.

The word is of Greek origin, zoon which means animal and nosos disease. Animals that transmit zoonotic viruses are usually vertebrates, for example, bats and palm civets in the case of SARS-CoV, as are camels and dromedaries in the case of MERS-CoV (Figure 1B).

Human and avian flu, SARS-CoV and MERS-CoV were ruled out, so it was reported that the coronavirus responsible for the outbreak in Wuhan is a group 2B Betacoronavirus. With a genetic sequence at least 70% similar to SARS-CoV, the WHO named it SARS-CoV-2 (initially 2019-nCoV-2). The pathology that it produces is called coronavirus disease "COVID-19" (Cortés. 2020). The natural reservoir for SARS-CoV-2 is believed to be bats, with snakes or other animals as intermediaries.

However, the route of transmission to humans at the beginning of this event remains unclear. Bats are rare in markets in China, but they are hunted and sold directly to restaurants. The most likely current hypothesis is that an intermediate host animal has played a role in transmission. Both Chinese and external expert groups are working to try to accurately identify the animal source of this new virus (OMS. 2020).

ISSN-On line: 2414-8849

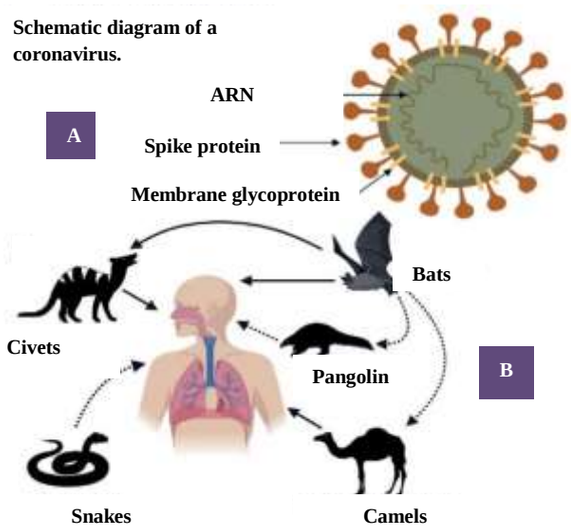

Figure 1 A: Schematic diagram of a coronavirus. B: Zoonotic transmission
Source: (Cortés, 2020)

The typical symptoms associated with this infection includes fever, asthenia and dry cough, with a acute respiratoy in the most serious patients and with alveolar damage secondary to a massive release of pro-inflammatory molecules (Alcántara-Montero, 2020). However, there is a population that does not present symptoms or these are imperceptible, the so-called asymptomatic.

The asymptomatic patient represents an important source in the spread of the virus. Identifying and monitoring asymptomatic cases is of vital importance, although this type of patient cannot present any symptoms during the detection of COVID-19, the patient's period of being transmissible lasts for three weeks.

This is the importance of considering asymptomatic people as a source of COVID-19 transmissibility and of monitoring these types of patients to avoid outbreaks and possible collapses of health services (Rojas-Zumarán et al. 2020).

The emergence of the current SARS-CoV-2 pandemic seems to have come with some surprise. However, epidemics or pandemics have been present throughout history (Figure 2).

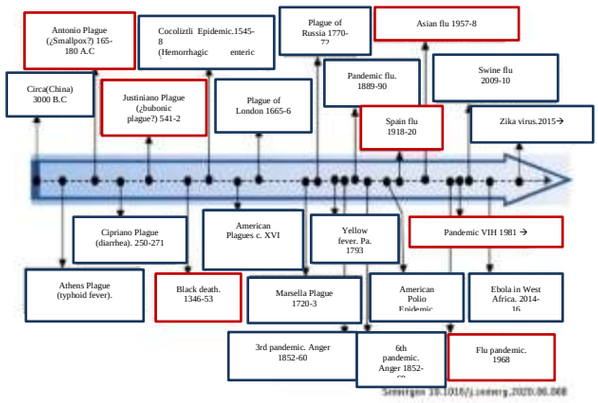

Figure 2 Timeline of pandemics throughout history
Source: (Serrano-Cumplido et al. 2020)

Characteristics of the disease

It is true that around the world, emerging and re-emerging infectious diseases are challenges we face. This time, the new type of Coronavirus (2019-nCoV), which are capable of causing respiratory, enteric, liver and neurological diseases. So far, six known species of this viral group are known to make humans sick. Four of these (229E, OC43, NL63, and HKU1) cause common flu symptoms in immunocompetent people, and two species of current interest (SARS-CoV and MERS-CoV) cause severe acute respiratory syndrome and represent high mortality rates.

Complete analyzes of the virus genome were carried out with bronchoalveolar lavage, whole genome sequencing, PCR test and culture in hospitalized patients in Wuhan, China; Likewise, thanks to these studies, the infection by 2019-nCoV was confirmed. Based on the infected patients, the pertinent information was collected, they manifested with significant signs and symptoms: fever (98%), dry cough (76%), dyspnea (55%), myalgia or fatigue (44%) and lymphopenia (63%) (Silva Belasco & Dezoti da Fonseca, 2020).

It can be rescued with this context that respiratory secretions would be the main means of contagion and spread of the virus. This disease is characterized by being of low lethality, around 3% but with high transmissibility, although with a low lethality of around 3%, the transmissibility is high (Palacios-Cruz et al. 2020). Regarding the susceptibility of contagion, the new coronavirus can infect any person or individual can have mild to severe symptoms.

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Although the elderly, asthmatics, diabetics and people with heart disease are more vulnerable and can become seriously ill with the virus, thus reporting a mortality rate> 8% in people older than 70 years.

Clinical tests

Laboratory diagnosis is among the top priorities to facilitate public health interventions in patients. When it comes to an acute respiratory infection, RT-PCR is commonly used to identify viruses that are causing respiratory secretions. The test to detect the viral envelope gene sequence has been effectively implemented, however, the diagnostic algorithm uses other sequences of the viral genome to confirm positivity for 2019-nCoV by detecting sequences of the viral RNA polymerase gene and the Nucleoprotein.

Other samples to collect are:

- Extraction of RNA from clinical samples with the MagNA Pure 96 System.
- Respiratory material (nasopharyngeal and oropharyngeal swab in outpatients and sputum [if present] and / or endotracheal aspirate or bronchoalveolar lavage in patients with severe respiratory disease).
- Serum for serological tests, acute sample and convalescent sample (additional to respiratory materials) (Palacios-Cruz, 2020).

Prevention measures

The WHO dictates standard recommendations to prevent the spread of infection include: washing hands regularly, especially after contact with sick people or their environment, covering the mouth and nose when coughing and sneezing, correct cooking of foods such as meat and eggs, avoid close contact with anyone showing symptoms of respiratory illness (coughing and sneezing), avoid travel to affected cities and areas, and avoid close contact with live or dead farm or wild animals. For travelers with symptoms of acute respiratory infection, they should practice cough etiquette (keep their distance, cover their mouths when coughing and sneezing with tissues or clothing, and wash their hands properly).

Those who have had contact with patient cases that have been classified as probable or confirmed of 2019-nCoV should be monitored for 14 days from the last contact they had with them without protection and should limit transfers to places outside their place of study. residence to avoid possible spread.

One of the most used preventive measures is the use of face masks. Surgical masks for the public are not 100% effective protection against airborne viruses or bacteria, since they do not have an adequate air filter and leave the eyes exposed, and although they could help reduce the risk of contracting the viruses through sneezes or coughs of others, the optimal is the use of respirators that have a specialized air filter, since they are specifically designed to protect a person against potentially dangerous particles that are in the air, for example the FFP masks (Palacios-Cruz, 2020).

Each of the measures must be adopted and put into practice by the population every day, which is also in charge of not only keeping this information, but also that each individual seeks prevention and control alternatives for the disease in question.

The main objective is to strengthen the immune system and as the years go by, the pharmaceutical industries have worked hard in the research, formulation and experimentation of drugs capable of promoting a good result in the improvement of public health, as well as vaccines. , supplements, tablets, syrups, etc. and although the disease (Covid-19) appears to be asymptomatic or paucisymptomatic In most cases, we do not have effective therapeutic resources to combat it, so we are constantly searching for alternatives, for example the use of probiotics in the human diet;

There is no evidence that probiotics can help prevent, but there is a study that found that some probiotics reduce the incidence of common respiratory infections in children and the elderly (Lenoir-Wijnkoop et al. 2019), they also prevent infectious diarrhea in areas endemic, and prevent and shorten the duration of rotavirus diarrhea, also reducing fecal shedding and virus shedding (Guarner,. 2020). Therefore, even without scientific evidence, we can consider and discuss the possible benefits of probiotics in situations like the current one.

ISSN-On line: 2414-8849

Probiotics

Over a hundred years ago, Elie Metchnikoff, a Russian Nobel Prize-winning scientist, posited that LABs were beneficial to health, and had the ability to promote longevity. He then suggested that the gut microbiota could be enhanced by "gut autointoxication" and thus the resulting aging could be suppressed by modifying it and replacing proteolytic microbes, which produce toxic substances with useful microbes. He designed a diet with milk fermented with a bacteria that he named "Bulgarian Bacillus." This concept continued to evolve.

Often times, intestinal tract disorders were treated with viable non-pathogenic bacteria to modify or replace the intestinal microbiota. In 1917, German scientist Alfred Nissle isolated a non-pathogenic strain of Escherichia coli from the feces of a World War I soldier. That strain turned out to be Escherichia coli strain Nissle 1917, and it is one of the few examples of a probiotic that is not BAL. Henry Tissier (from the Pasteur Institute) isolated a Bifidobacterium from a breastfed infant for the purpose of administering it to infants suffering from diarrhea. His hypothesis was that this germ would displace the proteolytic bacteria that cause diarrhea. In Japan, Dr. Minoru Shirota isolated the Shirota strain of Lactobacillus casei to deal with outbreaks of diarrhea.

There is a probiotic product with this strain that has been in the market since 1935. These were the first predecessors in a scientific field that has flourished throughout history. Today, there are endless articles and essays on probiotics. Accumulating evidence supports the view that benefits are measurable across many parameters (Gastroenterology, 2017). Throughout the investigations, it has been tried to modulate the intestinal microbiota for the benefit of the host, so probiotics have been used, which must meet certain characteristics such as safety, that they stay alive and colonize the intestine, among others.

There are different products from the food and pharmaceutical industries that contain probiotics in their composition: oral rehydration solutions, infant formulas and food. Many of them do not contain only one strain, but are combinations of several species of microorganisms, there are even some also associated with vitamins and prebiotic substances.

LABs have been present in our diet for centuries since they are found in fermented milk products such as yogurt, jocoque, matured cheeses, meat products and even in some vegetables (Figure 3).

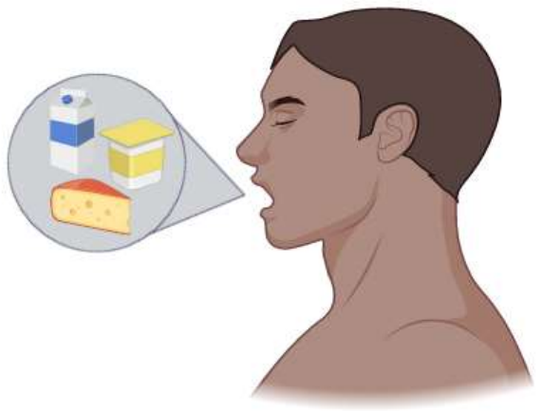

Figure 3 Intake of foods containing probiotics
Source: Own elaboration with data from: https://biorender.com/

Probiotics are living microorganisms that, when ingested in adequate amounts, exert a positive influence on the health or physiology of the host. The term "probiotic", etymologically, comes from the Greek "pro bios" (for life). The most frequent way of consuming probiotics is through dairy foods that contain intestinal species of lactobacilli and bifidobacteria, due to the beneficial effects in addition to the nutritional ones, these foods are considered in the group of functional foods.

Once the probiotics are ingested, changes occur in the intestinal microflora that have a positive impact on the consumer's state of health. It is important to highlight that the intestinal flora (Figure 4) is an interactive community of organisms with specific functions to maintain the state of health.

This function is the sum resulting from the different combined activities of the organisms that make it up, such as the fermentation of non-digestible substrates of the diet and the mucus produced by the epithelium with the production of short-chain fatty acids (acetate, propionate and butyrate) favoring the recovery and absorption of calcium, iron and magnesium, in the regulation of glucose metabolism reducing postprandial glycemia, as well as the synthesis of vitamin K and those of group B.

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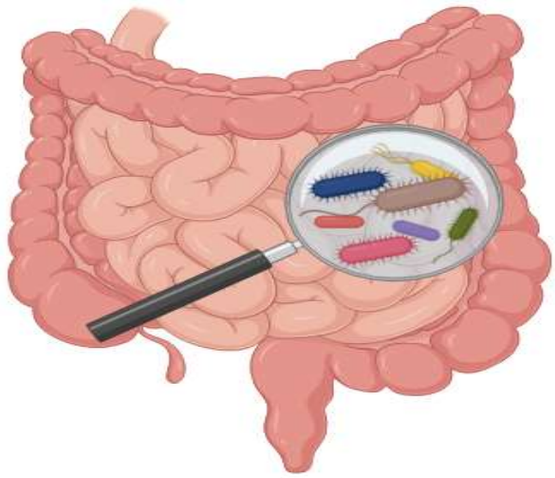

Figure 4 Illustration of the intestinal microbiota
Source: Own elaboration with data from: https://biorender.com/

Some benefits include improvement in infectious diseases, chronic intestinal diseases such as ulcerative colitis, immunomodulation, cardiovascular diseases, non-insulin-dependent diabetes mellitus, obesity, osteoporosis, and even cancer.

These effects may be due directly or indirectly to the regulation of the intestinal microflora or the immune response. Among the probiotic bacteria most used for human consumption are the so-called LABs, which include the following*: Lactobacillus acidophilus, L. plantarum, L. casei, L. casei spp rhamnosus, L. delbrueckii spp bulgaricus, L. fermentum, L. reuteri, Lactococcus lactis spp lactis, Lactococcus lactis spp. cremoris, Bifidobacterium bifidum, B. infantis, B. adolecentis, B. longum, B. breve, Enterococcus faecalis, Enterococcus faecium,* among others.

One way of acting of probiotics to achieve a good state of health of the individual is through the resistance granted against the invasion of pathogenic microorganisms, which is achieved through the generation of antimicrobial substances such as lactic acid and other short chain acids , metabolites such as hydrogen peroxide and diacetyl (González-Martínez, et al. 2003). The main molecules that are a product of the metabolic activity of BAL bacteria are: ethanol, lactate, acetate, folic acid, pyruvate, succinate, which can be metabolized to produce short-chain fatty acids SCFA.

For example, *Lactobacillus gasseri* culture supernatants have been found to inhibit the growth of *Escherichia coli, Bacillus cereus,* and *Pseudomona aeruginosa,* an important microbiota that is harmful to humans (Medina-Torres, 2014).

Mechanism of action of probiotics

Upon entering our body, probiotics are free to exert actions, which include induction at a pH lower than 4, inhibition of the growth of pathogenic bacteria, production of lactic acid, decrease in intestinal permeability, increase in lactase activity, competitive effect. in other pathogenic bacteria, effects on immunity. The clinical utility of probiotics is different in each case and depends on the strain and the administered dose. Lactobacilli and bifidobacteria can secrete natural antibiotics with a broad spectrum of activity, such as lactokines, helveticins, curvacins, nicines, and bifidocins, and studies have shown their action on the immune system (Rondon, *et. al* 2015). Lactobacilli and bifidobacteria are Gram positive, whereas bifidobacteria are anaerobic and are microaerophilic. Currently there are some clinical studies in humans that support its usefulness as adjuvants in the medical treatment of various diseases (Figure 5).

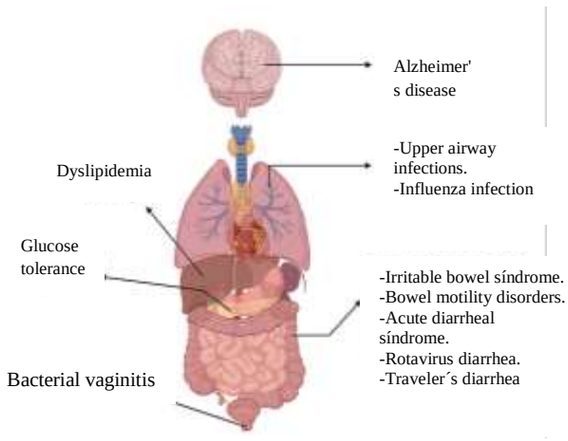

Figure 5 Diseases in which probiotics have a beneficial effect. Source: Adapted from (Ortíz, 2018)
Own elaboration with data from https://biorender.com/

There is extensive tissue that covers the surface of the digestive system and forms the first immune barrier, which defends and maintains the homeostasis of the internal environment. This barrier is composed of mucus and an underlying epithelium.

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Below this barrier we find epithelial and dendritic cells and intra-epithelial lymphocytes, located between the enterocytes. This barrier is capable of distinguishing between own and innocuous antigens and pathogens, developing an immune response against them if necessary. By virtue of an adequate distinction between pathogens and self antigens, an optimal balance between immunity and tolerance will take place, so that food allergies and / or exacerbated inflammatory responses do not develop.

This immune system is known as mucosa-associated lymphoid tissue. This tissue that lines the intestine, is distinguished in turn into follicular aggregates called Peyer's patches, and isolated lymphoid follicles, the latter being the ones that are mostly covering the large intestine (Trillo-Osuna, 2018).

Our microbiota performs two main types of functions: digestive and protective, guided by a series of mechanisms. For example, the digestive function is performed by generating essential nutrients such as vitamins and some amino acids or facilitating the use of indigestible nutrients, such as certain sugars. And on a defensive level, both microbiota bacteria and probiotics can interact with the three protective lines available to the body at the intestinal level: the first or microbiological line, the second or barrier line, and the third or immune line (Pérez-Cano, 2016). In addition, microbiota bacteria and some groups of probiotics can produce antimicrobial compounds providing an environment not suitable for pathogens. They generate a multitude of substances with antibiotic capacity such as bacteriocins, hydrogen peroxide or organic acids.

Bacteriocins

Bacteriocins are protein toxins synthesized by bacteria. There are numerous bacteriocins produced by LABs and each one has particular inhibition spectra, this characteristic is exploited in the food industry to use them in various ways. They have antimicrobial activity even in pathogenic bacteria, with great potential for the food industry since they can be used as pure biological preservatives that at one point could even replace chemical preservatives since they have the advantage of being proteins that, when biodegraded, do not form secondary compounds.

Given the importance that probiotics are currently taking as functional foods and in particular the bacteriocins they produce, it is interesting to recognize some characteristics of these substances and their antimicrobial properties (González-Martínez, 2003). Among the bacteriocins produced by lactic acid bacteria, 2 groups can be distinguished: The first are those that are active against related strains or species (lactococins A, B, M and G, lactacin B and helveticin J, among others) and the The second consists of those that inhibit a much broader group of microorganisms, including those that include pathogens and food modifiers (Jaramillo-Giraldo, 2010). Advances in the study of antimicrobial efficacy and spectrum of action in the area of LAB bacteriocins are attractive in a world in which antimicrobial resistance constitutes a global problem of great relevance to public health.

Role of probiotics in the immune system

It has been said that the stomach is like “our second brain”, the reality is not very far from the concept since abundant complex reactions are carried out in this system, it commands activities with specific objectives, both of our diet, as well as regulation of other issues, therefore, the intestine plays a very important role that has an impact on our tolerance and defense mechanism against diseases and memory maintenance of the immune response in the body.

Consequently, it is established that probiotics are not only limited to the intestinal flora but that they can also modulate the systemic immune response, showing beneficial effects in infectious diseases (example: salmonellosis and pneumococcal lung infections), as well as in allergies and asthma . Dr. Cani (2015) states: “Probiotics or prebiotics can be ingested to improve the development of some diseases or even to stimulate the immune system. Our daily life brings us great levels of stress and we can never be sure when we are going to get sick. Therefore, the possibility of reducing or preventing symptoms by taking probiotics and prebiotics is very attractive to me”.

The World Health Organization (WHO) has decreed that the effects of probiotics are specific according to the type of bacteria and not all probiotics are the same, nor do they have the same benefits on the body.

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For this reason, it is not possible to generalize in their functions and must be analyzed strain by strain. The microorganisms of the microbiota constitute a protective barrier in the mucosa of individuals since they confer a first line of defense against pathogens: the microbiological barrier. This barrier of microorganisms generates the well-known mechanism of microbial antagonism (Figure 6), that is, it prevents the settlement of microorganisms external to our system, which can be pathogenic and can act on our mucous membranes.

On the one hand, the microbiota and certain probiotics establish a relationship of direct competition with pathogens for the areas of attachment to the surface of the mucosa: if the microbiota occupies the intestinal space, interaction by other microorganisms is prevented. And, if the probiotics or the microbiota consume the nutrients, they will no longer be available for the use of pathogenic microorganisms and thus be able to stop their development and activity.

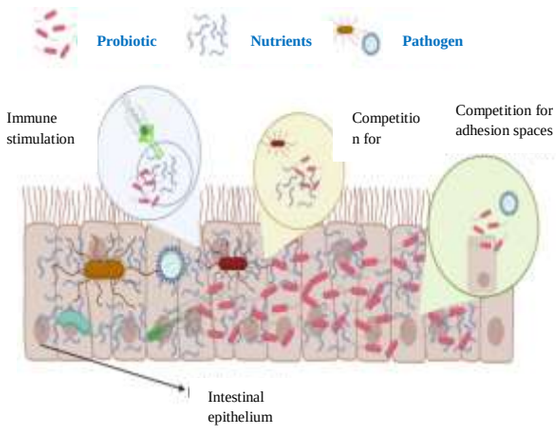

Figure 6 Microbial antagonism of probiotics and pathogens in the intestinal epithelium
Source: Adapted from (News, 2015). Own elaboration with data from https://biorender.com/

There are studies that affirm the fact that certain probiotics can improve the answer to the vaccine against influenza; with revised experimentation and meta-analysis, it was concluded that, when administered by the digestive route, they improved seroconversion and seroprotection in vaccinated adult patients. That is, the protection obtained by the vaccine was verified, and they showed significant improvements against the H1N1 strain.

The effective probiotic bacteria in the study were different strains of *L. fermentum, L. casei, L. casei Shirota, L. paracasei, L. rhamnosus GG, L. plantarum, B. longum and B. animalis* (Lei et al. 2017).

The mechanisms by which these microorganisms exert their immune effect is the favorable induction of activity in phagocytes and NK cells, in addition to the secretion of IgA in mucosa. Furthermore, the peptidoglycan components of probiotic bacteria and their metabolites, short chain fatty acids, act on the epithelium and the intestinal microbiota, modulating the immune response. Increasing mucosal IgA secretion is important in preventing influenza virus infection. In another review, it is highlighted that the effect of probiotics was effective, although modest; This was carried out for children and adults, in two meta-analyzes the effect of its oral administration on infections of the upper respiratory system was investigated and they concluded that they confer benefits in terms of prevention and duration of the disease.

In this case, preparations of different strains were used, but an effect was specifically reviewed in *Lactobacillus* and *Bifidobacterium.* This review provides evidence that probiotics reduce the duration of illness in otherwise healthy children and adults. (King et al. 2014). Therefore, it is important to emphasize that the use of LABs could support infections caused by SARS-CoV. One more experiment is that probiotics were applied in rodents by different administration routes, this has allowed to discover additional benefits. A strain of *L. rhamnosus* was given sublingually and this conferred protection against influenza virus infection, achieving an anti-inflammatory effect (Barahona-Garrido, 2020).

Pilot survey

According to the bibliographic review described above, it was decided to carry out a pilot survey to obtain a broader and more accurate picture of the opinion of people interested in the benefits that probiotics provide, for this particular case, to strengthen the immune system and in this way prevent the spread of COVID-19 disease, as well as other infections.

The survey was carried out in a Google form, and distributed to a total of 62 people between 15 and 53 years old.

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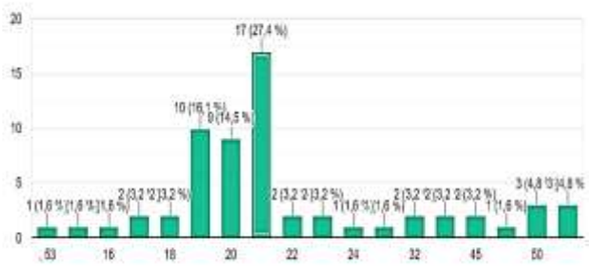
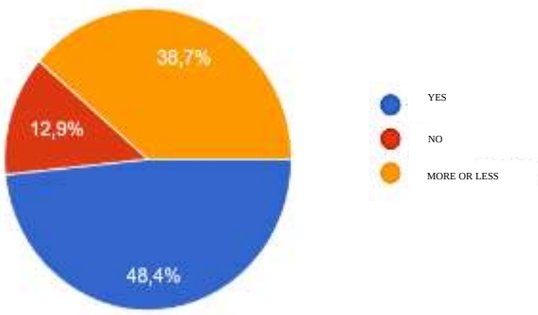
Now, the questions with their corresponding answers are displayed:

How old are you?



Graph 1
Source: Own Elaboration

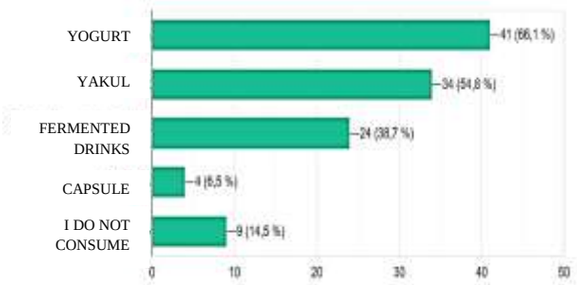
Do you know the benefits of probiotics?



Graph 2
Source: Own Elaboration

We note that of the 62 people surveyed, 48% answered yes, and 39% answered more or less, the rest said no.

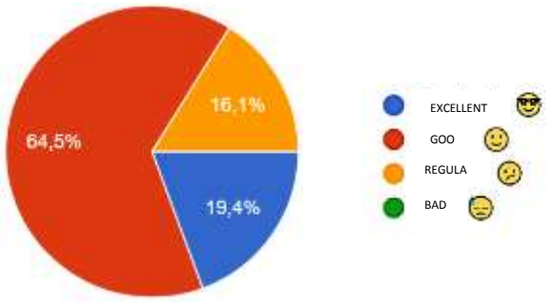
In what presentation do you consume them?



Graph 3
Source: Own Elaboration

It is reflected that yogurt and Yakult are the most consumed beverages of those surveyed.

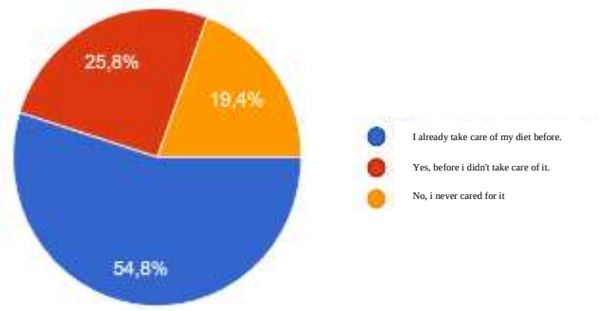
How would you rate your immune system?



Graph 4
Source: Own Elaboration

More than half, 64.5% rate their defenses as good, 19.4% think it is excellent, while 16% rate it as fair.

From this pandemic, did you start to take better care of your diet?



Graph 5
Source: Own Elaboration

We observed that 34 of the 62 surveyed people took care of the way they eat, 12 of them do not take care of it so far and 16 started with good habits.

If your previous answer is affirmative, what food measures do you implement in your daily diet?

Some of the answers:

- Low-fat foods
- I increased the consumption of vegetables
- Fruits and vegetables at all meals, reduced sugars
- Minimal in fat and sugar
- Eat balanced and reduce sugars and saturated fats
- Low carbohydrate intake

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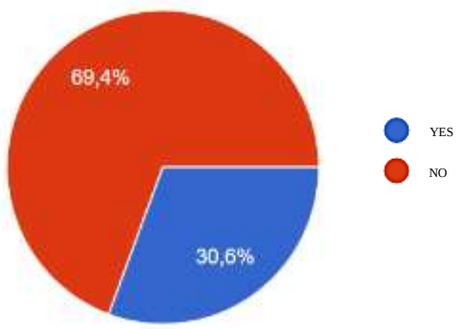
- Drink more water and eat less
- Consumption of the 3 macronutrients in a proportional way
- Fresh foods low in fat and sugars
- More fiber and protein
- 3 full meals and 2 fruit or seed snacks, no soft drinks or juices, no fried foods, spinach every day
- I take vitamin B12
- A balanced diet
- Eat more vegetables and fruits, lower sugars and salt
- I try not to eat highly processed foods, or add salt or sugar to food
- Lots of fruits and vegetables
- Water intake and balance in food groups

Various responses were shared about their eating habits.

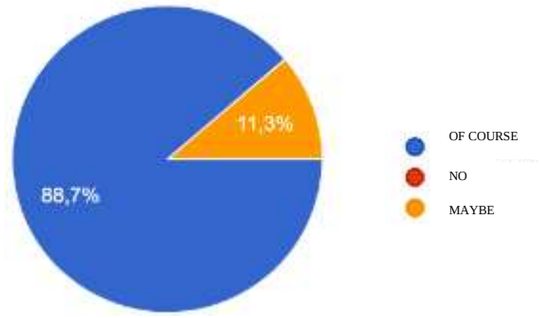
Do you consume any type of vitamins or another type of drug to strengthen your defenses?



Graph 6
Source: Own Elaboration

The large percentage (69.4%) of people who do not consume any vitamin or any defense-strengthening drug is observed.

If it was scientifically proven that probiotics help strengthen your immune system and thus prevent you from getting sick with COVID-19, would you consume more of them?



Graph 7
Source: Own Elaboration

It is strongly appreciated with an affirmative response from a total of 55 people of the 62 respondents and only 7 responded perhaps.

Discussion

The people surveyed were of legal age except for 4 of them, mostly young adults around 20 years old and others between 40 and 53 years old, so we see the population surveyed is very varied. Also the eating habits will be different. Almost 50% do know about the effects of probiotics, and a total of only 8 people are not aware of them.

It is known that there are various presentations where we can find probiotics, such as dairy products, fermented drinks or capsules. Most consume yogurt, yakult and various beverages, and surprisingly only 4 people consume capsules with probiotic strains and 9 of them do not consume any of the options, with this we can infer that it is a population with a very diverse microbiota each. It is also worth noting that they were questioned about their immune system, based on their experience just over 60% rated it as "good".

As a result of this pandemic, a sale of health care products has been unleashed, in addition to healthy eating habits have been acquired, and in response to this, 55% responded that they had already taken care of their habits before, 26% They adopted habits from what happened and 19% do not have the culture of it. After that, some people commented about their habits, among them the consumption of fruits, vegetables, fibers, the limitation of high carbohydrate and lipid intake, also the intake of more water.

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To reinforce this, the consumption of vitamins and minerals or prebiotics is expected, to increase defenses and complement healthy eating habits, but this was not reflected, since 70% do not take any type of drug or vitamin for this. Finally, without having proven results to date, the majority (89%) of the respondents expressed that they would be willing to consume probiotics to strengthen their immune system, leading to no more infections of COVID-19 or any other disease.

Conclusion

The efficacy of most vaccines is high, however, they are designed to generate an immune response that will protect the vaccinated person from future exposures to the disease. But individual immune systems are so different that, in some cases, the person's immune system will not generate an adequate response. As a result, you will not be protected effectively after vaccination. That said, we can see examples of studies carried out against the H1N1 influenza disease, based on the use and application of probiotics, resulting in beneficial effects.

This makes clear a panorama that it would be very useful to study these microorganisms because it has sufficient bases to justify the investigation of probiotics in the face of the COVID-19 disease, and in that way we can prevent, which is the first option. According to the survey carried out, it was found that thanks to this research project carried out in the Dolphin Summer it was possible to publicize the benefits of probiotics to increase immunity, and avoid bacterial and viral infections such as COVID 19, for what its consumption could help us not to get sick, or lessen the symptoms of the disease.

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ISSN-On line: 2414-8849

Article **ECORFAN Journal Republic of Guatemala**
June 2020 Vol.6 No.10 24-30

Quality of life related with health and academic satisfaction of university students

Calidad de vida relacionada con la salud y satisfacción académica de estudiantes universitarios

GARCÍA-GARCÍA, Jesús Alberto†*, CUFARFÁN-LÓPEZ, Julio, FARIAS-BRACAMONTES, Juan Carlos and GARCÍA-CONTRERAS, Laura Patricia

Universidad Autónoma de Coahuila-Facultad de Ciencia, Educación y Humanidades

ID 1st Author: *Jesús Alberto, García-García* / **ORC ID**: 0000-0003-1369-311X, **Researcher ID Thomson**: D-8211-2019, **CVU CONACYT ID**: 568438

ID 1st Coauthor: *Julio, Cufarfán-López* / **ORC ID**: 0000-0001-7203-8022, **CVU CONACYT ID**: 201670

ID 2nd Coauthor: *Juan Carlos, Farías-Bracamontes*

ID 3rd Coauthor: *Laura Patricia, García-Contreras*

DOI: 10.35429/EJRG.2020.6.10.24.30 Received March 10, 2020; Accepted June 08, 2020

Resumen

El objetivo de este artículo fue explorar las dimensiones de calidad de vida relacionada con la salud y la satisfacción académica de estudiantes universitarios. La metodología que se utilizó fue cuantitativa, observacional, transversal, prospectiva, descriptiva y correlacional. La recopilación de la información se realizó a través de una batería conformada por 2 escalas; a) el cuestionario SF-12 y la escala de Satisfacción Académica. La muestra se conformó por 467 estudiantes, el método de muestreo que se utilizó fue no probabilístico, mediante la estrategia de muestreo por conveniencia. Las técnicas estadísticas que se utilizaron fueron la estadística descriptiva y correlacional. La contribución del estudio radica en la evidencia empírica estadística que permite afirmar que las dimensiones de rol físico, rol emocional y vitalidad favorecen la satisfacción académica de los universitarios. Sí los estudiantes se perciben cómodos con su atmosfera escolar, disfrutan sus actividades escolares y se sienten entusiasmados con los temas de su especialización, tendrán mejor salud física y mental.

Calidad de vida relacionada con la salud, Satisfacción académica, Universitarios

Abstract

The aim of this article was to explore the dimensions of quality of life related to health and academic satisfaction of university students. The methodology used was quantitative, observational, cross-sectional, prospective, descriptive and correlational. The compilation of the information was carried out through a battery made up of two scales; a) the SF-12 questionnaire and the Academic Satisfaction scale. The sample consisted of 467 students, the sampling method that was used was non-probabilistic, through the convenience sampling strategy. The statistical techniques that were used were descriptive and correlational statistics. The contribution of the study lies in the statistical empirical evidence that allows affirming that the dimensions of physical role, emotional role and vitality favor the academic satisfaction of university students. If students feel comfortable with their school atmosphere, enjoy their school activities, and are enthusiastic about their majors, they will have better physical and mental health.

Quality of life related to health, Academic satisfaction, University students

Citation: GARCÍA-GARCÍA, Jesús Alberto, CUFARFÁN-LÓPEZ, Julio, FARIAS-BRACAMONTES, Juan Carlos and GARCÍA-CONTRERAS, Laura Patricia. Quality of life related with health and academic satisfaction of university students ECORFAN Journal-Republic of Guatemala. 2020, 6-10: 24-30

* Correspondence to Author (email: jegarciag@uadec.edu.mx)
† Researcher contributing first author.

Introduction

The study of the Quality of Life is increasingly relevant, the health crisis caused by the COVID-19, exposed the shortcomings of the health system worldwide, as well as the main diseases that caused the death of millions of people. The general population faces health problems related to different social, cultural, economic, political and educational factors. Students are a vulnerable sector of the population that faces risk situations that must be analyzed in order to achieve solutions from the school context. The central problem is that university students have little awareness of their health care and lifestyle, combined with low levels of academic satisfaction and school performance.

Health-related quality of life is shaped by dimensions such as physical function, physical role, body pain, general health, vitality, social function, emotional role, and mental health. While academic satisfaction involves the well-being and enjoyment that students perceive in carrying out experiences related to their role as students (Lent & Brown, 2008). It has been defined as the degree of congruence between students' expectations and the results obtained in the learning process (Candelas, Gurruchaga, Mejias & Flores, 2013).

The hypothesis of this study is the following: if there are high levels of health-related quality of life then students will show greater academic satisfaction.

From the review of the literature it was found that there is research oriented to evaluate the health-related quality of life in children and adolescents and few works that evaluate the relationship between HRQOL and academic satisfaction, for this reason this article presents added value for its approach and for the relevance of quantitatively analyzing the study variables.

Therefore, the objective of this article was to explore the dimensions of quality of life related to health and academic satisfaction of university students. The structure of the article is made up of the following sections: first, a review of the literature on HRQOL and school satisfaction in university population is presented, then the methodology of the study, participants, design and instruments used are explained.

Then the statistical results are presented to contrast the central hypothesis and finally the main conclusions of the study are presented.

Literature Review

The issue of quality of life related to health is relevant because of its social significance, as long as people are healthy and have welfare, social problems will decrease. In the context of the University, these have a great responsibility and social commitment, because in them the future citizens are formed, for that reason it is fundamental that the students have an education of quality and reach the greater possible academic satisfaction. In fact, the university space is recognized as a privileged setting that favors health and contributes to the development of the potential of each individual, as well as the collective that makes up the university community (Reig, Cabrero, Ferrer, & Richart, 2001). Academic satisfaction is a construct that will explain different educational variables that are relevant to the integral development of studies. And according to Vergara, Del Valle, Diaz, & Pérez, (2018) it constitutes a key aspect to explain the quality of learning.

The results obtained by Cassaretto, Martínez, & Tavera, (2020) affirm that significant differences exist between the levels of physical health and those of mental health. It was found that physical health is significantly higher than mental health. In the area of health best evaluated in the participants was physical function, which implies that students do not suffer from health problems that interfere significantly with their daily physical activities such as self-care, walking or climbing stairs. On the other hand, the weakest health dimensions are vitality and emotional role, indicating that energy and vitality are the most affected aspect of students' health, followed by limitations in their emotional health in work and other daily activities.

In addition, 32.9% of university students had a less favorable quality of life, with women being 4.4 times more likely than men. Students who rated their quality of life "moderately or less favorable" had differences in relation to those who had a favorable opinion. There was a high association of quality of life with biological, behavioral, and social problems (Pacheco, Michelena, Mora, & Miranda, 2014).

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On the other hand Terrazas & Almeida, (2020), identified the level of incidence of academic and social aspects in the quality of university life, the Bolivian Catholic University and the Del Valle Private University presented a significant relationship, that is, that academic and social aspects influenced positively in the quality of university life, the educational programs implemented by the universities, the teaching and the academic reputation are the most relevant indicators for a good university quality, on the other hand, the identification of those elements that are more outstanding for the students, allows to incorporate their opinions in the quality system.

Academic satisfaction is reported in the literature with different meanings, satisfaction with university life, student or school satisfaction. School satisfaction has been defined as a cognitive-affective evaluation of school experiences (Luna, 2012). In this way, the structure, organization, curriculum, resources, evaluation system, and even the uses and customs of the school institution can come into conflict with the expectations and goals of students, affecting their school satisfaction and, probably, their academic performance (Pascual, 2007).

Since satisfaction was a key component, it began to be incorporated into the educational context, since it was determined that student satisfaction in the school environment was an important variable in academic success (Escobar & Rodriguez, 2018).

The academic, cultural and sports activities, the relationships with teachers and classmates, the satisfaction of the students with their studies and with the quality of the teaching and the different services offered by the University, constitute the context in which an important part of the life of young university students takes place and requires to be studied, first, to know their influence or relationship with their health and quality of life and, second, to identify those aspects that require attention by the institution through policies and actions that promote a healthy environment and contribute to the welfare of the university community (Lara, Saldaña, Fernández, & Delgadillo, 2015).

The CVRS research and academic satisfaction allows us to deduce that the quality of university life is determined in a very similar way by both the satisfaction with the teaching aspects and the satisfaction with the social aspects (Blázquez, Chamizo, Cano, & Gutiérrez, 2013). Likewise, students who were more satisfied with their studies had better relationships with their classmates, valued the quality of teaching as good and very good, and used sports facilities more, had a better perception of their quality of life (Lara et al., 2015).

On the other hand, 10 variables were analyzed as predictors, and five were statistically significant, which together explain 36% of the variance in school satisfaction. The model was shaped by: I like going to school, my teachers treat me well, I feel safe at school, I am satisfied with my classmates and I am satisfied with the experience at school. These last two variables are the best predictors of school satisfaction (Alfaro et al., 2016).

In terms of the type of school (modality), it is observed that students in private and technical schools have a higher quality of school life than those who attend general, telesecondary, and indigenous schools. Students attending the latter have the lowest quality of school life (Escobar & Rodríguez, 2018).

Academic satisfaction shows a slight trend toward high levels. It was found that the greater the academic self-efficacy and the lesser the emotional burnout, the greater the academic satisfaction (Morales & Chávez, 2019).

The results show that there is a positive correlation between teacher emotional intelligence and student academic satisfaction. Likewise, it is observed that the correlation between academic satisfaction and the interpersonal component (interpersonal relationships, social responsibility and empathy) is greater with respect to the correlations with the other components (Tacca, Tacca, & Cuarez, 2020).

With respect to the students' perception of the university environment, they state that teachers work with professionalism 48.0%, teacher accessibility 44.5% (207), administrative personnel attend to students' needs 43.7%, and the university has recreational and cultural spaces 42.2%.

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In terms of their CV, it can be seen that in general, physical health has the best evaluation (76.9%) against mental health with 66.6%. It seems that the physical or organic component is better evaluated by the subjects, which corresponds to the dimension of physical functioning that has the highest and most positive evaluation of all (93.3%). While the energy or fatigue dimension is the lowest of all (58.1%) and may be affecting the perception of mental health. In addition, the dimension of emotional problems, which is related to mental health, is the one with the greatest dispersion on the entire scale, indicating that the students in this sample present great differences on an emotional level, that is, some are very good and others are very bad. As for general physical and mental health in university students, it is observed that physical health presents better indicators than mental health (Brito & Palacio, 2016).

The results indicate that the highest values were obtained in the dimensions corresponding to CSF, with the physical function dimension showing the highest score. This suggests that university students have a favorable perception of their health at the physical level. On the other hand, in relation to the differences according to sex in the dimensions of perceived physical and mental health, men obtained higher scores in the CSF and in the dimensions that make up the CSF, with the exception of the physical role dimension. On the other hand, with regard to the differences according to sex in the dimensions of perceived physical and mental health, men obtained higher scores in the CSF and in the dimensions that comprise it, with the exception of the physical role dimension. (Chau & Vilela, 2017).

Boys had higher scores in the VC indices ($p < 0.05$), except for social VC ($p = 0.830$) and school VC. In the latter, girls presented a slightly higher score ($p = 0.843$) (Lima, Martínez, Guerra, Vargas, & Lima, 2018).

An association was found between low academic performance, being an adolescent, and compromised social relations, which in the long run may compromise their HRQoL (Díaz, Martínez, & Zapata, 2017).

Methodology

Design

The type of research is quantitative, with a transversal, open, observational and descriptive design (Méndez, Namihira, Moreno & Sosa, 1990).

Participants

The selection of the sample was made in a non-probabilistic way; the strategy used was the sampling by convenience, the total of the sample was of 467 students. According to gender, 48% are women and 52% are men. The average age was 20 years. 74% of the university students do not smoke, while 24% do, 43% do not consume alcohol and 57% do, and finally 64% do exercise and 36% do not.

Instrument

The SF-12 questionnaire. Used to evaluate health-related quality of life. Composed of twelve items, whose purpose is to provide a profile of the state of health, defining a positive and negative state of physical and mental health, by means of eight dimensions : physical function, physical role, body pain, mental health, general health, vitality, social function and emotional role (Alonso, Prieto, & Anto, 2003). The reliability for the scale was 0.84.

Academic Satisfaction. This scale is composed of 7 items that inquire into the level of student satisfaction with their academic experience. Participants are asked to respond using a Likert scale with 5 answer options, where 1 represents "strongly disagree" and 5 "strongly agree" (Lent et al., 2005). The reliability of the scale was 0.90.

Procedure

The phase of the fieldwork began with a formal request sent to the principals of each school or faculty of the Universidad Autonoma de Coahuila in the Southeast unit, specifically in the municipalities of Saltillo and Arteaga. After the authorization of the principals, the participating schools were visited and the surveys were applied. Prior to the application of the surveys, general instructions were given to those in charge of the application, asking them to sign the letter of consent.

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The application took approximately 15 minutes to complete, including the time it took the survey takers to collect each survey.

Analysis of results

The analysis of the information was carried out using the statistical package for the social sciences (SPSS), first, the reliability for each scale was processed, second, the frequencies and percentages of the general data of the participants were analyzed, and finally the descriptive and chi-square statistics of each of the scales were analyzed.

1. Results

En la siguiente Table se observan las dimensiones de la calidad de vida relacionada con la salud, los puntajes más altos se presentan en la salud mental, salud general y vitalidad, mientras que las dimensiones con menor puntaje fueron el rol físico, función física y rol emocional.

Dimensions	n	Average	DE	Minimum	Maximum
Physical function	467	12.80	19.69	0	100
Social function	467	23.27	25.11	0	75
Physical role	467	8.51	15.21	0	100
Emotional Role	467	16.76	23.29	0	100
Mental Health	467	41.40	15.31	3	100
Body pain	467	16.50	20.78	0	75
General health	467	41.07	38.45	0	100
Vitality	467	40.32	37.74	0	100

Table 1 SF-12 Student Descriptions

The average scores show that college students are satisfied with their college careers, their class learning, and the topics in their field of study. And they regularly feel comfortable with the educational atmosphere, intellectual stimulation, satisfied with academic life and enjoy their class activities.

Reactive	n	Average	DE
I am satisfied with my decision to graduate from my chosen university	456	4.46	.827
I like what I have learned in my classes	458	4.30	.865
I am enthusiastic about the issues in my field of expertise	457	4.13	.845
I am comfortable with the educational atmosphere in my field of expertise	458	3.96	.927
I enjoy the level of intellectual stimulation of each subject	458	3.87	.883
Overall I am happy with my academic life	458	3.82	.949
Most of the time I am enjoying my class activities	458	3.75	.906

Table 2 Descriptive of the academic satisfaction scale

From the information in the following table, it was concluded that health-related quality of life differs according to the level of academic satisfaction reached by university students. In conclusion, there is an association between HRQoL and academic satisfaction.

			Academic Satisfaction		
			Low	High	Total
Quality of life related to health	Low	Count	21	351	372
		% within Academic Satisfaction	67.7%	83.2%	82.1%
	High	Count	10	71	81
		% within Academic Satisfaction	32.3%	16.8%	17.9%
Total		Count	31	422	453
		% within Academic Satisfaction	100.0%	100.0%	100.0%

Pearson's Chi-square, 4.68 and p≤.03.

Table 3 HRQoL Chi-square and Academic Satisfaction Level

According to the information in Table 4, it could be observed that there is an association between the HRQoL level and cigarette consumption.

			Do you smoke?		
			No	Yes	Total
Quality of life	Low	Count	288	83	371
		% within Smoking?	84.7%	74.8%	82.3%
	High	Count	52	28	80
		% within Smoking?	15.3%	25.2%	17.7%
Total		Count	340	111	451
		% within Smoking?	100.0%	100.0%	100.0%

Pearson's Chi-square, 5.65 and p≤.01.

Table 4 Chi-square of HRQoL level and smoking

Conclusions

Generally speaking, it can be concluded that university students have optimum levels of health-related quality of life, they are perceived as being in good health, with a sense of peace, happiness and calm, with energy and enthusiasm. The weakest aspects of their quality of life are found in physical function, which refers to having limitations in physical activities including bathing or dressing due to a health problem, physical role, when problems with work or other daily activities occur as a result of their physical health, and emotional role, which refers to problems with work or other normal activities due to emotional problems.

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Likewise, it was concluded that the students present high levels of school satisfaction, which are reflected in their satisfaction with their chosen career, their taste for what they learn in class, their enthusiasm for the subjects of their field of specialization, their comfort in the educational environment, their intellectual stimulation, their academic life and their enjoyment of the class activities.

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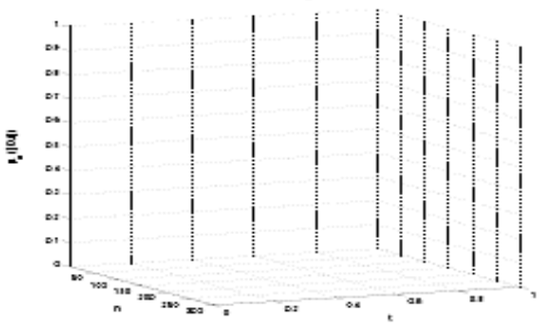

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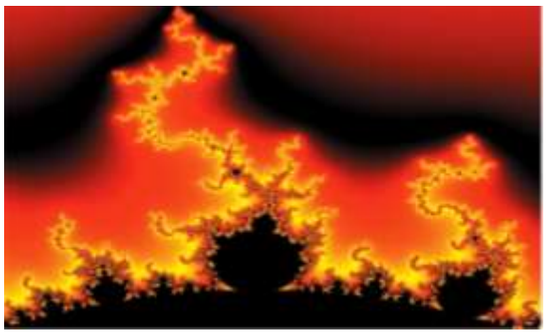

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16 Kilometro, American Highway, House Terra Alta, D7 Mixco Zona 1-Guatemala. Phones: +52 1 55 6159 2296, +52 1 55 1260 0355, +52 1 55 6034 9181; Email: contact@ecorfan.org www.ecorfan.org

ECORFAN Journal-Republic of Guatemala

2414-8849
ISSN 2414-8849
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