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Eating habits and physical activity in confined adults by COVID-19 in the Zacatecana community

Hábitos alimentarios y actividad física en adultos confinados por COVID-19 en comunidad Zacatecana

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Abstract

The confinement by COVID-19 drastically changed the daily life of people around the world, the objective of this work was to determine changes in the way of eating and doing physical activity before and during the confinement by COVID-19 in young adults. from the community of Tacoaleche, Zacatecas; for this work an instrument was used, which was disseminated through the electronic platforms of WhatsApp and Facebook, for four weeks. 71 forms were collected, of which 52.1% were women and 47.9% men, 91.5 of the respondents are in the age range between 21 and 35 years, the eating habits of the participants presented changes since the consumption of fruits, vegetables, as well as the number of meals per day. In conclusion, it can be mentioned that there is a relationship between eating habits and physical activity, but this work showed that participants who have adequate eating habits have low physical activity.

Eating habits, Physical activity, Young adult

Resumen

El confinamiento por COVID-19 modificó drásticamente el día a día de las personas en todo el mundo, el objetivo de este trabajo fue determinar cambios en la forma de alimentarse y de realizar actividad física antes y durante el confinamiento por COVID-19 en adultos jóvenes de la comunidad de Tacoaleche, Zacatecas, para este trabajo se utilizó un instrumento, el cual se difundió a través de las plataformas electrónicas de WhatsApp y Facebook, durante cuatro semanas. Se recolectaron 71 formularios de los cuales el 52.1% fueron mujeres y el 47.9% hombres, el 91.5 de los encuestados están en el rango de edad de entre 21 y 35 años, los hábitos alimentarios de los participantes presentaron cambios ya que aumentó el consumo de frutas, verduras, así como el número de comidas al día. Como conclusión se puede mencionar que existe relación entre los hábitos alimentarios y la actividad física, pero este trabajo evidenció que los participantes que tienen hábitos de alimentación adecuados poseen baja actividad física.

Hábitos alimentarios, Actividad física, Adulto joven

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Introduction

The SARS-CoV-2 virus causes COVID-19 disease, which brought changes worldwide. On 1 December 2019 the first patient with COVID-19 infection was confirmed by clinical analysis and in January 2020 the first death from this virus was reported (Huang et al., 2020), on 11 March 2020 this disease was considered a pandemic due to the number of reported cases and the number of countries involved. This led to a mandatory isolation considering schools, jobs, family, sports and friends (World Health Organization (WHO), 2020).

By being isolated, many things came to a standstill, which allowed the population to adapt to this new reality. There are authors who mention that the fear of the unknown and uncertainty led to the development of mental illnesses, presenting stress disorders, anxiety, depression, somatisation and changes in behaviour such as an increase in drug addiction, changes in diet and very significant economic losses (Ozamiz-Etxebarria et al., 2020).

By analysing issues of this type, it is possible to propose timely strategies to address the difficulties that have arisen since the confinement, which may allow the creation of new lines of research, as they face new health problems, which although they already existed, this social historical fact was the trigger for their increase. For this reason, this type of document helps to support the different strategies that have been implemented in a practical way in the face of a wide range of social problems in terms of health.

New lines of research may emerge from this research, perhaps including more participants, adding new data collection instruments, and so on. In the same way that this research can serve as a basis for generating new hypotheses, all population groups require attention and study, as new and relevant information is needed to generate and implement actions that improve the quality of life of the population; when studying a phenomenon, it is more useful to section and attend to one area at a time, otherwise the information may not be reliable.

Eating habits

Eating habits are considered to be a set of customs that determine the behaviour of men and women in relation to the food they eat (see Figure 1). For a habit to be formed, the individual has to learn from his or her experiences from childhood to adulthood, which can be observed not only in what he or she eats but also in the way he or she selects food and the way he or she prepares it for consumption (Fernández-Castillo, 2019).

Figure 1 Good eating habits
Source: Tejada, 2022

Eating habits are acquired from paediatric stages, in the bosom of the family we learn to select food: taste, smell, colour, presentation, preparation, quantity, schedules, food availability, traditions of the family and socio-cultural environment, which is why it is a priority to educate in the good choice of nutritious food, as these will favour correct development and growth, as well as becoming permanent habits as age progresses (Méndez-Mera, 2019).

Physical activity

According to the World Health Organisation (WHO), physical activity is considered any bodily movement of skeletal muscles that involves energy consumption, even when only moving from one place to another and with little calorie expenditure, the healthy recommendation for a daily practice is 30 to 60 minutes at different intensity, which in adulthood can contribute to improve health and prevent health risks (Duque-Fernández, Ornelas-Contreras & Benavides-Pando, 2020).

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Physical activity as well as eating habits should be modified gradually, in order to avoid complications and meet the needs of each person; the world we live in today goes hand in hand with a sedentary lifestyle and the accelerated-evolutionary increase in technology, which allows ease of daily life, accompanied by an inadequate diet in terms of meal times, preparation and large amounts of fats and carbohydrates in the diet (Ramón et al., 2012).

It is very difficult to establish fixed guidelines for a population where living habits, needs, conditions, tastes and objectives that can be achieved are very varied. For this reason, it is not possible to speak of single habits and diets that fit the entire population; however, it is necessary that all nutritional needs are covered, that it allows for ideal weight control and that, as far as possible, it is attractive to each person without sacrificing sensory aspects. It is necessary, in short, that the diet is balanced and contains all the necessary nutrients according to the populations or cultures that people eat (Romanos, 2022).

COVID-19

The SARS-CoV-2 virus is the cause of COVID-19, which has a round and oval polymorphic shape, with a diameter of 60 to 140 nm. The virus and the disease were already known before the outbreak in Wuhan, which triggered the pandemic (Abreu, Tejeda & Guach, 2020).

The virus produces flu-like symptoms such as fever, cough, dyspnoea, myalgia and fatigue, including loss of smell and taste. In severe cases it is characterised by pneumonia, acute respiratory distress syndrome, sepsis and septic shock leading to death in 3% of those infected, although the mortality rate is at 4.48% and rising (United Nations (UN), 2020).

COVID-19 first appeared on 1 December 2019 in Wuhan city, capital of Hubei province in central China, the first people identified were workers in a seafood market in southern Wuhan, the number of cases increased rapidly in the rest of Hubei and spread to other territories (Brito, 2020).

There are articles that mention the importance of nutrition during the presence of COVID-19, some address nutritional therapy to increase the immune system defences and the body defends itself when in the presence of SARS-CoV-2 virus (Santana, 2020), also mentioning that sources of vitamins and minerals (micronutrients) as well as protein are essential to strengthen the immune system, The intake of three servings of fruit and two servings of vegetables, depending on the seasonality of these and the diversity in the consumption of foods of animal or dairy origin, as well as cereals and legumes, ensures the daily nutrients required by each person (Méndez, Padilla & Lanza, 2020).

In terms of food quality, variety in the consumption of different food groups per day is recommended, and if possible at each meal time, to allow for nutritional balance. Of the food groups, the importance of cereals, such as oat flakes, potatoes, sweet potatoes, tortillas, corn, bread, pasta and rice, and legumes, such as beans, lentils, chickpeas and broad beans, is emphasised, as they provide energy to the body, and in addition to being part of the food culture in the country, they have the advantage of not requiring refrigeration; it is desirable to choose whole grains and cooked or stewed legumes to increase their bioavailability.

Another food group that should be present in the diet is milk and its derivatives, as they are an excellent source of protein, calcium, vitamin D and phosphorus, and in terms of quality, it is recommended to avoid selecting artificial varieties that contain a high sugar content, as well as fatty versions, such as whole milk. Another food group that is also necessary for the entire population is food of animal origin for its protein and iron content, which is more bioavailable, but in order to improve the quality of the diet, it is recommended to preferably consume white meat two to three times a week, red meat or pork only once a week, fish and eggs three to four times a week, and it is suggested to avoid the consumption of sausages and fatty meats of any animal (Méndez, Padilla & Lanza, 2020).

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An important aspect of eating habits is the number of meals consumed throughout the day, as having a more controlled number of meals means that activities can be performed better without leaving such large spaces without eating, however, a greater number of meals does not mean that it is better; the nutritional quality of the food should also be observed. To improve the process of digestion and metabolism, the consumption of five meals a day is recommended: breakfast, lunch and dinner and two light meals between them (Vázquez et al., 2018); always taking care that any occasional snack or snack is always healthy and contains the food groups already mentioned, avoiding foods high in sugars and fats such as refined flour products, biscuits, sweet breads, sugary soft drinks and preparations such as fried foods due to their low nutritional value and the greater risk to health that they may present.

Methodology

A descriptive, observational, comparative study was conducted in a community called Tacoaleche in the city of Zacatecas, Zacatecas, using simple random probability sampling, including 71 young adults aged 20 to 30 years, sex indistinct, who live in the community and who signed informed consent to participate in the study.

An instrument was applied which was distributed via WhatsApp to the participants in Google Form formats, due to the social distancing that was being experienced. An informed consent form was included at the beginning of the form so that people could express their interest in participating in this study.

Ethical considerations

The present study complies with the considerations of the Nuremberg Code of 1947, which speaks of the voluntary consent of the subject, the person involved has the legal capacity to give consent, and the results obtained were carried out with the aim of being fruitful for the good of society. The study will avoid unnecessary physical or mental harm.

It also adheres to the universal declaration on bioethics and human rights, article 3 on human dignity and human rights, where human dignity, human rights and fundamental freedoms shall be fully respected. According to the General Health Law on Health Research of the United Mexican States, this study is considered safe.

Results

The objective of the study was to determine changes in eating and physical activity patterns before and during COVID-19 pandemic confinement in young adults in the community of Tacoaleche, Zacatecas. In this study, 71 completed forms were collected, of which 37 corresponded to women and 34 to men; these data allowed us to obtain the percentages shown in the table below 1.

	Frequency	Porcentage	Cumulative percentage
Female	37	52.1	52.1
Male	34	34	100.0
Total	71	71	

Table 1 Respondents to the survey to draw percentages by gender
Source: Own elaboration

Within the survey, the age of the people who participated was considered, since the interest was in the productive population, this allowed three age ranges to be considered as shown in table 2, it was found that the greatest number of people who answered the form were between 21 and 35 years old, and in this range 91.5 per cent were between 21 and 35 years old.

	Frequency	Porcentage	Cumulative percentage
Between 18 and 20 years old	5	7.0	7.0
Between 21 and 35 years old	65	91.5	98.6
Between 36 and 50 years old	1	1.4	100.0
Total	71	100.0	

Table 2 Survey respondents by age range
Source: Own elaboration

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When assessing the level of education of the participants, it was found that 59.2 per cent had completed higher education, followed by 21.1 per cent with incomplete higher education, 14.1 per cent with postgraduate studies and only 4 per cent with technical studies.

As mentioned above, two times were considered, one before the pandemic and the other during it, and different vegetables were considered in terms of the foods in the diet. When analysing the consumption of vegetables before the pandemic by COVID-19, it was found that of the six ranges considered (see figure 1), the most frequent was 2-3 times a week, with 43.7 percent, followed by 1 time a week, and the second highest was 2 to 3 times a week. 7 percent, followed by once a week, 4-6 times a week with the same percentage of 22.5 percent, and in a lower percentage more than 2 times a day, occasionally or never, and once a day.

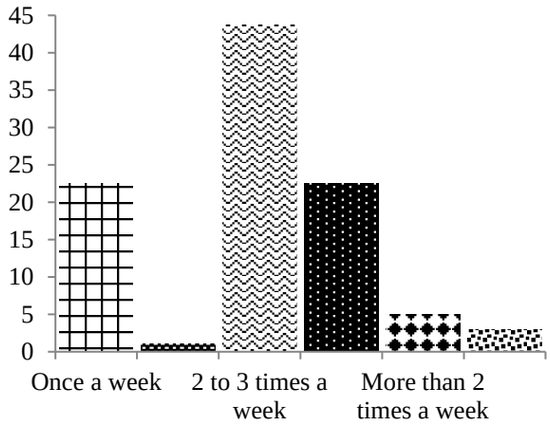

Figure 1 Pre-pandemic vegetable consumption by COVID-19
Source: Own elaboration

During the pandemic, vegetable intake behaved in a similar way to before the pandemic, since, as shown in figure 2, the highest frequency of results was also found in the range of 2-3 times a week, but with a slight decrease of 1.4 compared to before the pandemic. The same happened for the range of 1 time a week and 4-6 times a week, which showed a decrease of 8.5 and 10.5 respectively (see figure 2).

On the other hand, when evaluating the frequency of fruit consumption, a similar behaviour to that of vegetable intake was observed, but here followed by 2-3 times a week, followed by 4-6 times a week, then more than 2 times a day, followed by 1 time a week, 1 time a day and finally occasional or never (see table 3).

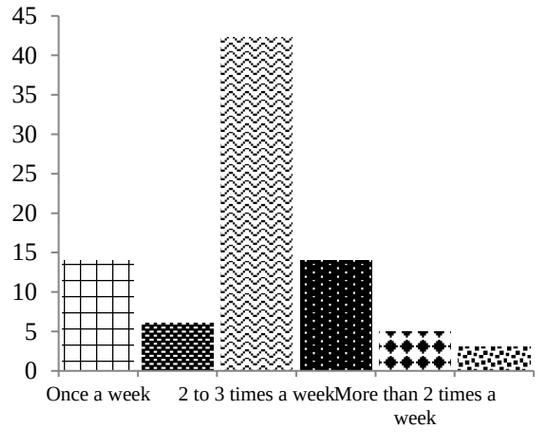

Figure 2 Vegetable consumption during a COVID-19 pandemic
Source: Own elaboration

	Frecuency	Porcentage	Cumulative percentage
1 time a week	3	4.2	4.2
1 time per day	3	4.2	8.5
2-3 times a week	28	39.4	47.9
4-6 times a week	25	35.2	83.1
More than 2 times a day	10	14.1	97.2
Occasionally or never	2	2.8	100.0
Total	71	100.0	

Table 3 Pre-pandemic frequency of consumption for fruits by COVID-19
Source: Own elaboration

The same behaviour was present when evaluated during the pandemic. Table 4 shows that the two ranges of 2-3 times a week and 4-6 times a week were those with the highest frequency, but only with a difference of 1, it was found that in the range of 4-6 times a week there was more frequency than in the range of 2-3 times a week.

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	Frecuency	Porcentage	Cumulative percentage
1 time a week	6	8.5	8.5
1 time per day	6	8.5	16.9
2-3 times a week	24	33.8	50.7
4-6 times a week	25	35.2	85.9
More than 2 times a day	8	11.3	97.2
Occasionally or never	2	2.8	100.0
Total	71	100.0	

Table 3 Frequency of consumption for fruits during the COVID-19 pandemic
Source: Own elaboration

Milk consumption before the pandemic, according to the data obtained, was above 40 per cent, in the range of 2-3 times per week, and during the pandemic there was a slight increase in the range of 4-6 times per week. Consumption of pulses before the pandemic increased from 31 participants in the range of 2-3 times per week to 40 people consuming 2-3 times per week, with a clear increase in consumption during the pandemic period.

Fish consumption before and during the pandemic had no noticeable changes, with the most notable being occasional or never consumption in both cases, snack intake before the pandemic was in the range of 2-3 times per day (40 people), followed by 4-6 times per week (13 people), whereas during the pandemic period consumption was reduced to 1 time per week (16 participants).

Soda intake before the pandemic reported a majority consumption of 2-3 times per week with a total of 30 people, but during the pandemic, intake was somewhat reduced, with occasional or never consumption being the most noticeable with a total of 26 people, followed by 17 people consuming once a week. Fried foods had a small but noticeable change in consumption before and after. From 2-3 times a week consumption was reported by 33 people, in the pandemic period consumption of more than twice a day was reduced from 1 to zero and likewise once a day.

Another aspect analysed was the consumption of food at different times at breakfast, lunch and dinner, noting that breakfast intake reported both before and during the pandemic that the majority ate breakfast with a total of 35 participants before and 38 during the pandemic. In the range of food consumption at "lunch time" before the pandemic the most notable report was daily with 25 people, moving to the pandemic period there was a slight increase with a total of 30 people, observing the same behaviour for dinner time.

If we analyse how the number of meals consumed by the participants behaved before the pandemic, we can highlight the consumption of 3 meals a day in a total of 42 participants, while during the pandemic period this was modified, with an increase in the consumption of 5 meals a day from 11 people before the pandemic to 21 people during the pandemic.

Another aspect to consider was the form of food preparation before and during the pandemic, here the form of stews predominated, with a total of 49 and 45 respectively, with a slight increase during the pandemic in the range of the cooked form from 11 to 15 respectively.

Fruit intake before the pandemic increased to 29 people, followed by 27 people consuming biscuits, sweets or fried foods. During the pandemic period, fruit consumption decreased, with a total of 16 people consuming none at all.

Food consumption outside the home before the pandemic was highlighted at a frequency of 1-2 times a week with a total of 37 people. During the pandemic it decreased slightly to 32 people. Food choice was reported mostly by taste with a total of 45 people choosing their food by taste followed by nutritional content with 26 participants. During the pandemic the changes were very noticeable, with food choice by nutritional content increasing greatly with 26 people, also increasing choice by cost with 19 people.

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Food choice by nutritional content before the pandemic was "almost never" with a total of 33 people. However, when reaching the pandemic stage, the choice of "almost always" increased from 12 to 17 people and an increase from 0 to 4 people who always check nutritional content.

Regarding physical activity, the following graph shows the physical activity performed during 7 days after the date of application of the questionnaire, with the result that the majority of survey participants did not perform intense activities (such as lifting heavy weights, digging, aerobic exercise or fast cycling), being 24 people, followed by 5 who did perform intense activities (figure 3).

When analysing the duration of time people spend doing intense physical activity according to figure 3, the majority of people who exercise do it for 60 minutes, followed by those who do it for 120 minutes.

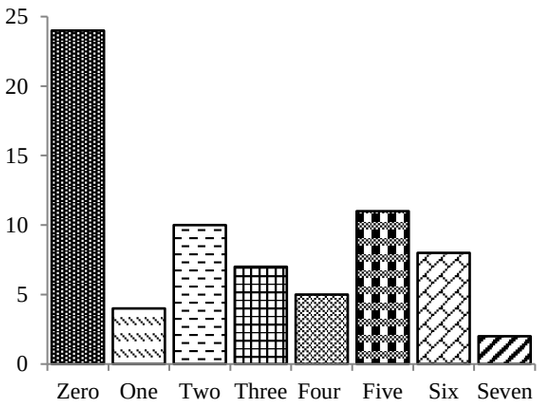

Figure 3 Intense physical activity performed
Source: Own elaboration

However, regarding the participants who performed moderate physical activity (e.g., carrying light weights, cycling at regular speed or playing doubles tennis), most of the respondents did not perform any physical activity, and the small percentage who did perform physical activity did so two to five times a week, predominantly for 20 minutes and one hour respectively (Figures 3 and 4).

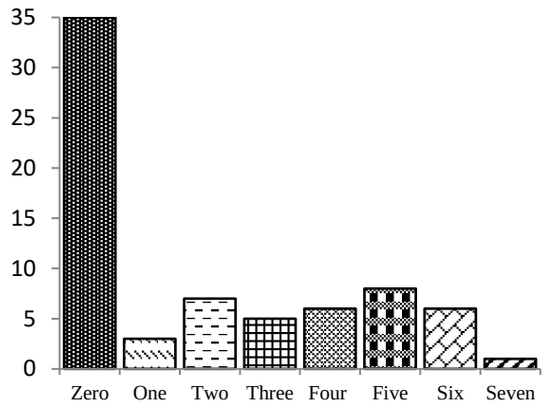

Figure 4 Moderate physical activity
Source: Own elaboration

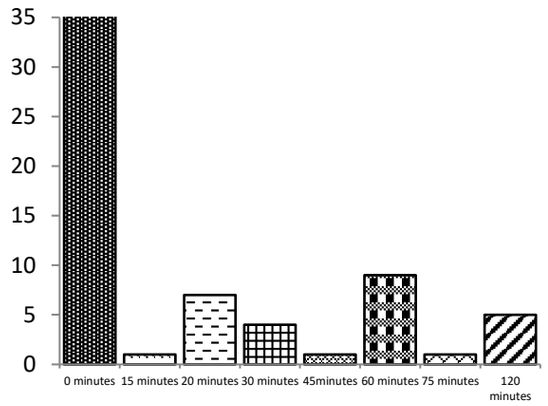

Figure 5 Time spent in moderate physical activity
Source: Own elaboration

Discussion

Of the 71 young adults who answered the form, the majority were women. This coincides with the authors De Garay & del Valle-Muñoz (2012), in their article entitled "A look at the presence of women in higher education in Mexico, in the 1999-2000 school year", where they mention that when carrying out surveys on social networks, women are the ones who respond most to them.

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Taking into account the most notable results and observing the studied population in detail, it is evident that the large number of young adults have acceptable eating habits, since their daily food intake is within the range of 3-4 meals a day, considering this amount adequate or normal, and the frequency of food consumption good, all this is contrasted by the level of physical activity that the population has, being a low level of physical activity, having a very similar result to the study of Gonzales & January (2021), in which the population studied were university students in the city of Lima, Peru. In this study, the results were in a population with adequate eating habits but low physical activity. This similarity of results could be due to the fact that the population has a similar level of education and age, as well as a similar lifestyle.

According to the results obtained in the consumption of fruit and vegetables there was a slight increase in both. Vegetable consumption increased from 0 in once a day consumption before the pandemic to 7 participants in once a day consumption. Fruit consumption increased in consumption from 4-6 times a day with a total of 25 participants before to 30 people during the pandemic. These results are very similar to the study by Apolinario Zumaeta (2020), in his study carried out in Lima, Peru, where there was an increase in the consumption of fruit and vegetables, from 4% to 8.7% in vegetables and fruit from 10% to 13.3%, a slight increase, which could be due to the pandemic situation that was experienced by having more time at home, with accessibility to food and increasing their consumption and having a more conscious choice of food.

The consumption of fried food according to the results obtained, the population showed a consumption of food between meals before the pandemic of a total of respondents 71 of them 29 responded that the majority consumption was of fruit and 28 of them of biscuits and / or snacks (sweet fried food), By the time of the pandemic the consumption of biscuits and snacks was reduced to a total of 21, however the consumption of fruit between meals was slightly increased to 3, these results are similar to the study of Apolinario Zumaeta, in which the consumption of biscuits and or snacks before the pandemic was 25. 3%, during the pandemic there was a reduction to 16.7 and of fruit from 42% to 60.7%, again taking the idea that because of the situation faced by the pandemic there was a more conscious choice when choosing food, as it was a health crisis there was too much information about general care including food and as a result a slightly healthier food and chosen in more serious ways (Apolinario, 2020).

One of the questions asked was the number of meals per day, of the 71 respondents the choice of 3 meals per day stood out with a total of 42 participants, followed by 2 meals per day with a total of 13 participants and 11 participants more than 5 meals per day. In contrast to the current pandemic situation, there was a considerable increase in the consumption of more than 5 meals per day with a total of 21 participants and a slight reduction in the consumption of 3 meals per day with a total of 35 participants and a similar reduction in the consumption of 2 meals per day with a total of 11 participants. These results are quite similar to the work of Apolinario Zumaeta (2020) in the survey on the number of meals per day, the results were as follows: before the pandemic the consumption of 2 meals per day had a consumption of 17 participants, during the pandemic 16 participants, the consumption of 3 meals before the pandemic was 90, during the pandemic 88, and finally 5 meals per day before the pandemic was 5 and during the pandemic it was 12.

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As can be observed in both cases, there was a considerable increase in the consumption of 5 meals a day and the consumption of 3 meals a day remained higher, remembering that during the pandemic there was a period of quarantine or confinement to avoid outbreaks of COVID-19 disease, and with this confinement there was more free time, resulting in the consumption of a greater number of meals a day.

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Conclusions

The objective of this research was to find and identify the way in which young adults in the community of Tacoaleche, Zacatecas, eat and do physical activity before and during the COVID-19 pandemic. Once the data had been analysed and processed, it was determined that the eating habits of the population are acceptable, as the consumption of foods such as vegetables and fruit is part of the daily diet, and it was observed that the difference between before and during the pandemic was not so great, although the high consumption of this type of food was maintained during the pandemic. This leads to the conclusion that the pandemic did not have a significant impact on eating habits.

One aspect that had a positive influence on eating habits was the consumption of soft drinks, which was reduced from a total of 30 participants who consumed it 2-3 times a week before the pandemic to a total of 26 people, with the time of the pandemic having a positive influence. One point to highlight in which there were changes before and during the pandemic was in the choice of food, since during the pandemic the choice of food was based on practicality, followed by taste, and during the pandemic there were drastic changes, with the predominant choice being based on nutritional content, with a total of 14 in the period before the pandemic, suggesting that the increase in this aspect was due to the concern for an optimal state of health.

In the aspect of physical activity, we asked about activities carried out days before the pandemic and found that neither intense nor moderate activities were carried out, being a minority of those who practised activities, concluding that the population studied did not have habits of intense or moderate physical activity and remained so during the pandemic, the possible cause of this could be the lack of motivation due to a global crisis.

References

Abreu, M. R. P., Tejeda, J. J. G., & Guach, R. A. D. (2020). Características clínico-epidemiológicas de la COVID-19. Revista Habanera de Ciencias Médicas, 19(2), 1-15. https://www.medigraphic.com/cgi-bin/new/resumen.cgi?IDARTICULO=97798

Apolinario Zumaeta, R. E. (2020). Comportamiento alimentario en adultos antes y durante la pandemia por COVID 19, Lima-2020. https://repositorio.ucv.edu.pe/handle/20.500.12692/59020

Brito, A. E. (2020). COVID-19: rápida revisión general. Anales de la Academia de Ciencias de Cuba, 10(2), 828. http://revistaccuba.sld.cu/index.php/revacc/article/view/828

De Garay, A., & del Valle-Díaz-Muñoz, G. (2012). Una mirada a la presencia de las mujeres en la educación superior en México. Revista iberoamericana de educación superior, 3(6), 3-30. https://www.scielo.org.mx/scielo.php?pid=s2007-28722012000100001&script=sci_arttext

Duque-Fernández, L. M., Ornelas-Contreras, M., & Benavides-Pando, E. V. (2020). Actividad física y su relación con el envejecimiento y la capacidad funcional: una revisión de la literatura de investigación. Psicología y Salud, 30(1), 45-57. https://doi.org/10.25009/pys.v30i1.2617

ISSN: 2523-0352

Fernández Castillo B. R., (2019) Hábitos alimenticios desde la diversidad cultural en estudiantes de enfermería de la universidad nacional Jose Faustino Sanchez Carrios, Huacho 2019. http://repositorio.unjfsc.edu.pe/bitstream/handle/20.500.14067/3524/FERNANDEZ%20CASTILLO%2C%20Betsy%20Roxana.pdf?sequence=1&isAllowed=y

Gil-Hernández A. (2012) "Tratado de Nutrición: Nutrición humana en el estado de salud". Ed. Panamericana, pág. 247 - 287.

Gonzales Villanueva, A. A., & Enero Montalvo, C. M. (2021). Hábitos alimentarios y actividad física en estudiantes de nutrición y dietética de la Universidad María Auxiliadora que llevan clases virtuales por la COVID-19. https://repositorio.uma.edu.pe/handle/20.500.12970/483 https://www.sciencedirect.com/science/article/pii/S0140673620301835

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., & Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The lancet, 395(10223), 497-506. https://www.sciencedirect.com/science/article/pii/S0140673620301835

Mendez, D., Padilla, P., & Lanza, S. (2020). Recomendaciones alimentarias y nutricionales para la buena salud durante el COVID-19. Innovare: Revista de ciencia y tecnología, 9(1), 55-57. https://doi.org/10.5377/innovare.v9i1.9663

Organización Mundial de la Salud (OMS). (2020). Actividad física 2021, de organizacion mundial de la salud Sitio web: https://www.who.int/es/news-room/fact-sheets/detail/physical-activity

Ozamiz-Etxebarria, N., Dosil-Santamaria, M., Picaza-Gorrochategui, M., & Idoiaga-Mondragon, N. (2020). Niveles de estrés, ansiedad y depresión en la primera fase del brote del COVID-19 en una muestra recogida en el norte de España. Cadernos de Saúde Pública, 36, e00054020. https://www.scielo.br/j/csp/a/bnNQf4rdcMNpPjgfnpWPQzr/abstract/?lang=es

Ramón, J. C., Verdaguer, F. J. P., Conti, J. V., Rotger, P. A. B., & Sampol, P. P. (2012). Adolescencia, sedentarismo y sobrepeso: análisis en función devariables socio personales de los padres y del tipo de deporte practicado por los hijos. Retos. Nuevas tendencias en Educación Física, Deporte y Recreación, (21), 5-8. https://www.redalyc.org/pdf/3457/345732287001.pdf

Romanos, B. (2022). Foodtech. La gran revolución de la industria alimentaria. LID Editorial. https://books.google.es/books?hl=es&lr=&id=6GpvEAAAQBAJ&oi=fnd&pg=PT5&dq=Romanos,+B.+(2022).+Foodtech.+La+gran+revoluci%C3%B3n+de+la+industria+alimentaria.+LID+Editorial.&ots=s3bgW2m39c&sig=7edESJCmhoBUCVfw0fRui_ZaxAg#v=onepage&q=Romanos%2C%20B.%20(2022).%20Foodtech.%20La%20gran%20revoluci%C3%B3n%20de%20la%20industria%20alimentaria.%20LID%20Editorial.&f=false

Santana, M. B. P. (2020). Sobre la alimentación y la nutrición en la Covid-19. Revista Cubana de Alimentación y Nutrición, 30(1), 37. https://revalnutricion.sld.cu/index.php/rcan/article/view/992/pdf_230

Tejada S. (diciembre, 2022). Seis pasos para heredar a nuestros niños buenos hábitos alimenticios. Tomada de: https://lanoticia.com/vidasana/seis-pasos-para-heredar-a-nuestros-ninos-buenos-habitos-alimenticios/ Recuperada 19 de diciembre de 2022. 14:32 pm.

Vázquez, L.C., López, A., Martínez, A. G., Navarro, M., Espinoza, A. C. & Zepeda, A. P. (2018). Efecto de la frecuencia y horario de alimentación sobre la termogénesis inducida por la dieta en humanos, una revisión sistemática. Nutrición Hospitalaria, 35(4):962-970. https://scielo.isciii.es/pdf/nh/v35n4/1699-5198-nh-35-04-00962.pdf.

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