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Correlation analysis of nutritive food and use of specialized educative strategies educative yielding evaluated in an early-age educational institution of Tijuana, Mexico

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Abstract

The integral development of initial stage infants (ISI) depends on various factors, being the two of the most important aspects the nutritive food and body mass index (height and weight), which generates the healthy life of ISI evaluated in this investigation, and correlated with his educative yielding in early-age educational institution located in the Tijuana city. The age of infants analyzed were from 0 to 36 months, being 10 infants of this age, and observed that with a good nutritive diet, which was obtained the body mass index (BMI), and an efficient educative yielding, and showed a correlation rate of 0.82, indicating that these relevant factors mentioned above, were very important in the integral development of infants of this age and his educative yielding. In this scientific study was applied specialized strategies as dynamic and visual actions in school and in house of infants supported by his fathers, obtaining good results in the teaching-learning process (TLP), obtained of the statistical correlation in this important investigation.

1. Introduction

A healthy and nutritious diet in early-stage infants is a relevant indicator for their integral development, where they can make their activities efficiently, healthy life with a BMI adequality, good discipline, actions of imagination and creativity, and infants who can adapt easily and quickly in this complex society that exists today. This is an interesting aspect in this investigative analysis that it supports to parents of infants of this age, mainly those who are young and do not know the fundamental aspects of the importance of their early-stage children eating in a healthy and nutritious way. To determine the process of adequate integral development of boys and girls in this initial stage, various statistical parameters can be evaluated, which support observing the behavior of the factors that are evaluated in this investigative analysis of what healthy and nutritious eating is. The following section explains the basic statistical parameters, what was mentioned above is represented in figure 1.

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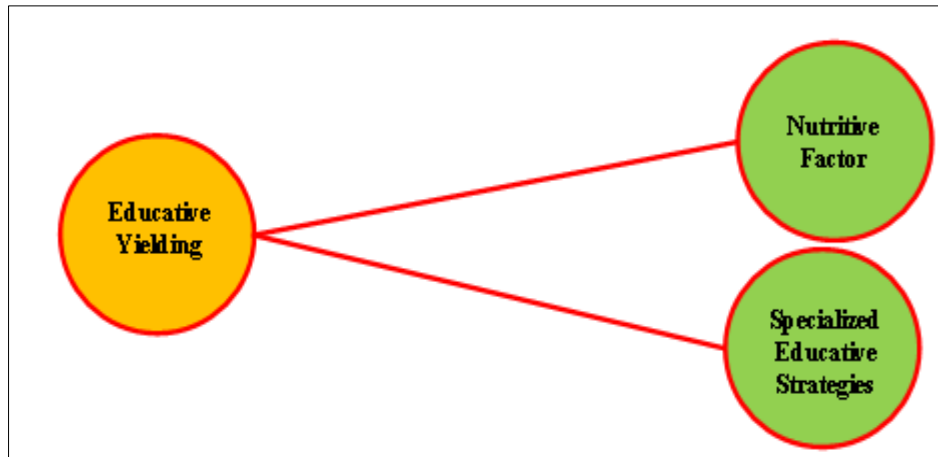
Source. Analysis of investigation

Figure 1 Main factors of the educative yielding of infantes of early-age

1.1. Nutritive factor

Is very important in the development of any person, which supports to generates a integral development of persons, specially of infants of early-age, where was evaluated the body mass index with the two main aspects: heigh and weight. This can be a measurement index of the integral development of any person. The general nutrition evaluation process includes indicators that generate levels with which the health status of all people who undergo nutrition analysis can be determined (CNSIA 2012). With this evaluation, you can obtain information on low or high levels of the nutrients necessary for the optimal functioning of the human body system, which has the purpose of evaluating the different stages of life of each person and verifying whether their integral development is taking place. optimally. This analysis must be carried out periodically, where nutritional values are obtained that are compared with the optimal parameters, and based on these values obtained, health care is promoted with some types of nutritional treatments. One of the important aspects of nutritional evaluation in early-stage infants is the adequate development of the brain where this vital organ of boys and girls of this stage must contain the necessary nutrients with the percentage levels required for comprehensive development. of early-stage infants (Eleana Pearl, 2018). The nutrition process that influences the brain system analyzes the basic functions of neurotransmission and neurogenesis, being relevant aspects in the comprehensive development of early-stage boys and girls, which can evaluate whether there is any risk to the health of early-stage infants. initial (MSP, 2007). This evaluation is part of monitoring the nutritional aspect of infants at this stage, and promoting nutritional methods that help avoid any health symptoms such as anemia, diabetes, allergies to certain types of foods or the rejection of different foods that occurs. frequently throughout Mexican society (SSM, 2020).

1.2. Evaluation of feeding

In Mexican society in the last 20 years, it has been observed that the general population has been consuming foods of low nutritional level, due to the accelerated pace of life, where the mother and father work and do not have the opportunity to prepare food. nutritious at home, so they consume food outside the home (ElaEst, 2022). This type of food is considered junk food, with high levels of cholesterol and fat, which can cause certain health symptoms such as anemia, diabetes and obesity, mainly, which can cause heart problems and therefore tragic events such as death on occasions. Work stress generated in activities of various types of industries and essentially commercial ones, combined with the economic, health and family problems that arise in Mexican society (SSM, 2020). In the community where I live, according to the health sector, there have been some cases of early-stage infants (0 to 3 years old), with symptoms of anemia, diabetes, overweight and childhood obesity; that some types of events have caused some complications with the heart and have led to receiving medical attention as emergencies. The health sector has nutrition and health programs at the national level that have reduced the occurrence of pathologies such as anemia, diabetes, childhood overweight and obesity, supporting the society of my community to have less worries or personal stress (SCM, 2022). According to nutrition specialists, the consumption of foods with the necessary nutrients based on ages, and especially infants of initial age, who must receive the contribution of vitamins, carbohydrates, lipids, minerals, proteins and the necessary amount of water; that encourages their optimal comprehensive development, and they can express their skills, abilities and generate appropriate behavior with efficient conduct. The intake of foods with adequate nutrients that generate the aforementioned factors such as vitamins, carbohydrates, lipids, minerals, proteins and the necessary amount of water; It greatly supports adequate muscle development, generation of new tissues, as well as energy generation that helps the muscular, cerebral, cardiovascular, gastrointestinal and renal systems; essentially (ElaEst,

2022). The inadequate supply of vitamins, carbohydrates, lipids, minerals, proteins and the necessary amount of water; It can cause poor integral development, possibly causing some type of mental retardation or poor formation of some type of upper or lower extremity, or a certain type of organ that could be a relevant part of the integral development of early-stage infants. Adequate nutrition that generates an efficient concentration of nutrients required by early-stage infants is very useful for the functions of important systems of the human body such as the muscular, cerebral, cardiovascular, gastrointestinal and renal systems; essentially. The ineffective generation of nutrients due to inadequate nutrition in current times, where both the mother and the father work and do not have enough time to generate nutritious food at home, can be the cause that boys and girls in the initial stage suffer. from some condition such as anemia, diabetes, overweight and obesity; cause various health symptoms in infants of this stage and can be the source of symptoms in later stages of their life, and who have a life with health difficulties or die before the life expectancy of a Mexican, which is 70 years, and can occur in the stages of adolescence or adulthood; or live with some condition forever. In the community where I live, cases of the aforementioned health symptoms have been observed, due to the consumption mainly of junk food, which includes sodas and fried foods, widely consumed by infants in the initial stage, because they throw tantrums and parents consider it inappropriate. easy way, buy them junk food because you don't want to make nutritious foods at home or because you think that this type of food will help your early-stage children stop throwing tantrums. The programs of the Mexican government at the federal level have generated great benefits for the reduction of the aforementioned health symptoms for boys and girls in the initial stage, taking them to all the communities of the country, with nutrition and health specialists, and the methods adequate nutritional advice.

1.3. Specialized educative strategies

Body games are interactive activities carried out between adults and early-stage children, with the main objective of stimulating psychomotor, linguistic, cognitive and social actions in early-stage infants (Garaigorrdobil, 2011). This has helped to develop and improve the skills, abilities and behavior of children from 0 to 3 years old mainly, so that they can interact today in a complex society. In that period of their life, which is when they begin their process of coexistence with their parents, relatives, people who care for them and teachers in educational institutions (Government of Mexico, 2017).

1.4. Body games with infants of early-age

They are called interactive games, where there is an interaction between the people who develop them with the main objective of achieving the comprehensive development of boys and girls in the initial stage, to improve their abilities, capacities, skills and behavior of the infants of this stage of development. his life; and obtain as a result a good person for society (Ballesteros, 2009). Body games can be rhythmic (activities with music), or expressive; that lead to a healthy and harmonious coexistence between people, especially boys and girls from 0 to 3 years old (Ramírez, 2009a), as well as those aged 4 years (Ramírez, 2009b) and 5 years old (Ramírez, 2009c). Body games in family, social and school groups; They are of great relevance in boys and girls in the initial stage; because they can improve the way they express their feelings, moods, thoughts and emotions, in addition to developing creative ideas from that time in their life (Ramírez, 2009a). This is part of the topic of early stimulation, being one of the strategies of the teaching-learning processes in infants of this stage; which is when they are absorbing all the information they perceive and generating a replica of the actions of their parents, close relatives (cousins, uncles, and grandparents); as well as the people who take care of them, because both the father and the mother work in this modern era (Ramírez, 2009b). The fact that both parents work means that other people close to their early-stage children live with other people who are not part of the family, and sometimes, at the beginning of their lives, the infants of this stage have a type of customs, culture or actions that are appropriate and sometimes inappropriate, and may in some situation affect a child of their age with whom they begin to live. This is why the coexistence between infants at this stage of their life, where with interactive body games, they can begin socializing and thus have a healthy and harmonious coexistence with their peers of this age (Ramírez, 2009c). Sometimes, certain early-stage infants have some health symptom that makes it difficult for them to achieve socialization with other people, especially other boys and girls their age; or they cannot learn at the same pace as their other classmates in nursery, preschool or primary school phases; where I have had the opportunity to support infants at this stage of their lives. Based on these complicated situations, I have managed to support boys and girls, I have managed to improve their skills, abilities and behavior at the end of the school year, compared to the period in which they entered at the beginning of the school year (Government of Mexico, 2017).

1.5. Basic statistics parameters

In statistical analyses, some relevant basic parameters are presented that help determine whether the statistical process being carried out is adequate and efficient with the objective of achieving appropriate decision making to solve a situation or improve some relevant aspect. of some case of investigative analysis. Among the most important statistical parameters of all statistical analysis are listed below:

- Average. It is also called the average of numerical data that can be obtained by adding all the numerical data of an investigative analysis and dividing them by the total data evaluated, example 5,6,7,6,9,4,5,6,3 ,4; All the data are added, the total sum being 55, and this value is divided by the total data, which is 10, the result being the average of 5.5.
- Median. Indicates a value that consists of analyzing a quantity of numerical data from an investigative analysis, where it can be obtained in two ways: (1) when the quantity of numerical data is an even number, example: 5,6,7,6,9, 4,5,6,3,4; They are ordered from lowest to highest (3,4,4,5,5,6,6,6, 7,9), adding the two intermediate numbers of the total number evaluated, being 5 and 6 and when adding and dividing by 2, the result of 11/2 = 5.5 is obtained, this being the value of the median; and (2) when the total amount of data evaluated is odd, for example the numbers evaluated previously, there are only 9 data to analyze, ordered from least to greatest (3,4,4,5,5,6,6, 6, 7; eliminating the number 9 as the last data), the median is obtained by taking the intermediate data being 5, so that this is the result of the median.
- Fashion. It represents the numerical value of the evaluated data that is repeated the most times, in the total of evaluated data, being, for example, in the data evaluated in the two previous statistical parameters, ordered from lowest to highest (3,4,4,5,5 ,6,6,6, 7, 9), obtaining the number 6 as a result of the mode.
- Rank. It is part of the numerical data evaluated, which represents the difference between the largest number and the smallest. Evaluating the numerical data of the previous parameters, it can be seen that the range is 9-3 = 6.
- Standard deviation. Indicates the difference between each numerical value evaluated with respect to the mean and squaring each difference obtained and performing the mathematical action of the square root of the total of these differences and squared them, where the process of the difference of the value is developed. with the mean and adding the sum of these differences and dividing them by the total number of numerical data evaluated. For example, in the numerical data of the parameters evaluated above, it is obtained as follows: Standard deviation $(S) = \sqrt{[(3-5.5)2 + (4-5.5)2 + (4-5.5)2 + ((5-5.5)2 + (5-5.5)2 + (6-5.5)2 + (6-5.5)2 +((6-5.5)2 + (7-5.5)2 + (9-5.5)2]} = \sqrt{(26.5/10)} = \sqrt{(2.65)} = 1.63$, the total result being the standard deviation.
- Variance. It represents the square of the standard deviation, being in the example of the numerical data evaluated in the previous statistical parameters, simply squaring the value of the standard deviation, obtained with 1.63, as a result of the variance of 2.65.

2. Methodology

An investigative analysis was carried out with ten infants of the initial stage, where a statistical analysis was made, considering the following factors, where was made a permission was requested from the parents of the evaluated infants from the educational institution, where the research was carried out.:

- Preparation of a frequency table of the age variable of evaluated initial stage infants.
- Preparation of a frequency table and a graph of the sex variable of the evaluated initial stage infants.
- Evaluation of mean, mode and median of the age variable of evaluated initial stage infants.
- Analysis of range, standard deviation and variance of the weight variable of evaluated initial stage infants.

3. Results and discussion

With this investigative analysis, relevant information on the development of the evaluated initial stage infants was obtained, where important numerical data was observed and provided to the parents of the evaluated initial stage boys and girls. The information obtained is observed in the following sections.

3.1. Preparation of frequency table of the age of early-stage infants

In this section of the investigative analysis, an evaluation was prepared with the preparation of a frequency table of the age variable, which is shown below in Table 1.

Table 1 shows the numerical and percentage levels of the age of the initial stage infants evaluated in the early-age educational institution evaluated, observing in the absolute frequency the age in months of the initial stage infants in the nursery, later in the next column , the accumulated absolute frequency is illustrated, indicating in the first section of that column, the numerical value of the first infant of the initial stage is presented and subsequently the accumulated numerical values are shown in each section that includes the analysis of the child's age (a) of the initial stage evaluated and the previous initial stage infant and so on until the end. After analyzing the absolute frequency, the relative frequency is observed, which indicates the numerical value of the age of each initial stage infant evaluated divided by the total value, which in this case was 180 and multiplied by 100%. In each section of this column, the percentage value

of each initial stage infant is indicated and in the last column, the cumulative relative frequency is presented, represented by the cumulative sum of each percentage level of the relative frequency of the age of each infant of initial stage, and obtain at the end of this column the percentage level of 100%, indicating an efficient statistical analysis of this type of evaluation with the frequency table. In this part of the investigative analysis, the sex factor was presented to be able to link it with the weight of each initial stage infant evaluated.

Table 1 Age analysis of early-stage infants evaluated in an early-age educational institution of Tijuana (2023)

Infants of Early-age	Sex	Age, AF, Months	Age-AAF- Months	Age-RF- Months, %	Age-RAF-Months, %
1	Niño	14	14	7.8	7.8
2	Niña	16	30	8.9	16.7
3	Niña	12	42	6.7	23.4
4	Niño	17	59	9.4	32.8
5	Niña	21	80	11.7	44.5
6	Niña	24	104	13.3	57.8
7	Niño	20	124	11.1	68.9
8	Niña	24	148	13.3	82.2
9	Niña	18	166	10.0	92.2
10	Niño	14	180	7.8	100.0
Total		180		100.0	

AF. Absolute Frequency, AAF. Absolute Accumulated Frequency, RF. Relative Frequency, RAF. Relative Accumulated Frequency

3.2. Preparation of frequency table of the sex of infants in the initial stage

In this part of the investigative analysis, an analysis was carried out with the preparation of a frequency table of the variable sex, which is shown below in table 2, based on table 1 above, where the factors of sex and age are shown.

Table 2 Sex analysis of early-stage infants evaluated in early-age educational institution of Tijuana (2023)

Sex	Sex-AF	Sex-AAF,	Sex-RF, %	Sex-RAF, %
Boy	4	4	40.0	40.0
Girl	6	10	60.0	100.0
Total	10		100.0	

AF. Absolute Frequency, AAF. Absolute Accumulated Frequency, RF. Relative Frequency, RAF. Relative Accumulated Frequency

Table 2 represents the analysis of the sex factor in the evaluated initial stage infants, where it is observed that the table is segmented into two sections (one belonging to the boys and another to the evaluated initial stage girls). Table 2 illustrates that four boys and six girls were evaluated, who belong to the group that I live from Monday to Friday at the early-age educational institution, analyzing the absolute frequency in the first column, as well as the absolute frequency accumulated in column 2, then in column 3 the relative frequency is indicated and finally the accumulated relative frequency in column 4. This represents the sex of the initial stage infants evaluated, where, in addition, a graph of this factor was prepared with the numerical and percentage levels, shown in figure 1, where the indices by sex and total are observed. This graph illustrates in greater detail the evaluation of the sex factor of the evaluated infants.
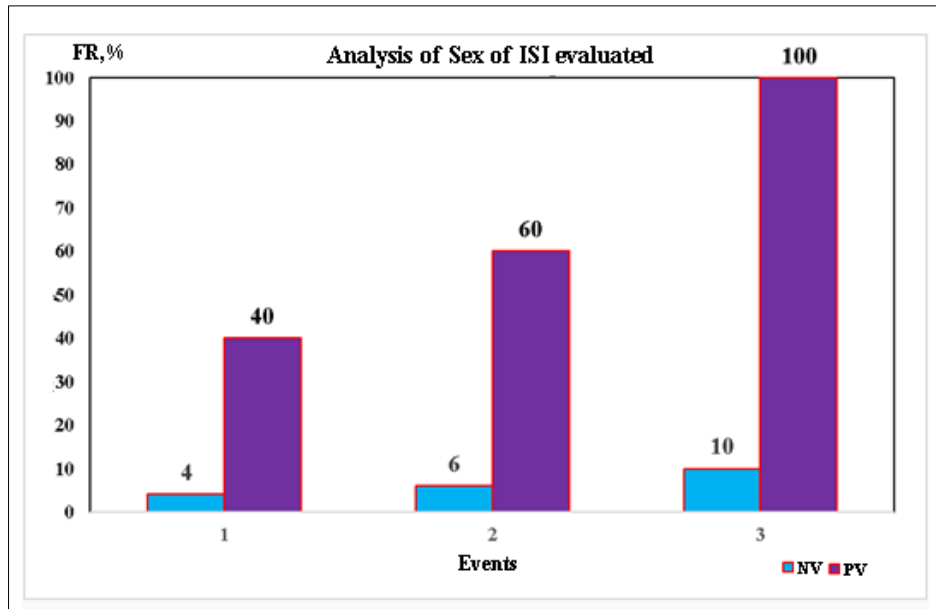
Figure 2 Sex analysis of evaluated initial stage infants

Preparation of age analysis with statistical parameters of early-stage infants

In this section of the investigative analysis, an evaluation was prepared with the preparation of a frequency table and evaluations of the age variable, where the mean, mode and median parameters of the age factor analyzed were obtained, based on Table 1.

Numerical values evaluated: 14, 16, 12, 17, 21,24, 20, 24, 18, 14.

They were ordered from least to greatest: 12, 14, 14, 16, 17, 18, 20, 21, 24, 24.

The statistical parameters were obtained from:

Average = (12+14+14+16+17+18+20+21+24+24) / 10 = 180/10 = 18.

Median = Since the data evaluated was an even number, it was obtained as follows:

The numerical data (17 and 18) were taken, added and divided by 2 and 17.5 was obtained.

Mode = Two modes were obtained (14 and 24), which are the numerical data that are most repeated.

3.3. Analysis with statistical parameters of early-stage infants

At this stage of the investigative analysis, a frequency table was prepared, shown in Table 3, and evaluations of statistical parameters of range, standard deviation and variance of the weight factor of the initial stage infants analyzed were carried out.

Table 3 represents an analysis with a frequency table of the weight factor of the evaluated infants, where the sex, age in months, absolute frequency, cumulative absolute frequency, relative frequency and cumulative relative frequency are indicated by columns, observing four infants of initial stage (a boy with 6.8 kilograms and three girls with 6.6, 7.1 and 7.5 kilograms), considered low weight, being of young parents. This was contemplated, correlating the educational performance of each initial stage infant evaluated, so a discussion was held with them, that they do not have time to attend to their initial stage children and instead of preparing healthy and nutritious, they make purchases for their early-stage children in self-service stores for products with high sugar levels (candy). This was discussed with the parents and director, to improve the feeding of these two early stage infants.

Table 3 Weight analysis of early-stage infants evaluated in CENDI of Tijuana (2023)

Infants of Early-Age	Sex	Age, Months	Weight-AF- Kg	Weight-AAF, Kg	Weight-RF-, %	Weight-RAF-, %
1	Boy	14	9.5	9.5	11.3	11.3
2	Girl	16	8.4	17.9	10.0	21.3
3	Girl	12	7.1	25.0	8.4	29.7
4	Boy	17	6.8	31.8	8.1	37.8
5	Girl	21	10.4	42.2	12.4	50.2
6	Girl	24	9.3	51.5	11.0	61.2
7	Boy	20	8.8	60.3	10.4	71.6
8	Girl	24	7.5	67.8	8.9	80.5
9	Girl	18	6.6	74.4	7.8	88.3
10	Boy	14	9.9	84.3	11.7	100.0
Total			84.3		100.0	

AF. Absolute Frequency, AAF. Absolute Accumulated Frequency, RF. Relative Frequency, RAF. Relative Accumulated Frequency

Based on table 3, the following statistical parameters were obtained:

The numerical data were ordered: 6.6, 6.8, 7.1, 7.5, 8.4, 8.8, 9.3, 9.5, 9.9, 10.4.

Mean= (6.6+ 6.8+ 7.1+ 7.5+ 8.4+ 8.8+ 9.3+ 9.5+ 9.9+ 10.4) / 10 = 84.3/10 = 8.43=8.4.

Median = Since the data evaluated was an even number, it was obtained as follows:

The numerical data (8.4 and 8.8) were taken, added and divided by 2 and 8.6 was obtained.

Mode = No mode was obtained, because no numerical data is repeated.

Range = (10.4-6.6) = 3.8.

Standard Deviation = The analysis of the difference of each numerical value compared to the mean was carried out, obtaining the following:

S = √ [(6.6-8.4)2 + (6.8-8.4)2 + (7.1-8.4)2 + (7.5-8.4)2 + (8.4-8.4)2 +(8.8-8.4)2 + (9.3-8.4)2 + (9.5-8.4)2 + (9.9-8.4)2 + (10.4-8.4)2] =√ (16.73/10) = √ (1.673) = 4.09, the total result being the standard deviation.

Variance = It was obtained by raising the numerical value obtained from the standard deviation, represented by

= 16.73

4. Conclusion

This investigative analysis shows relevant results, indicating that it is necessary to be aware of the healthy and nutritious diet of any infant in the initial stage, where the direct responsibility lies with the parents, even if they are young or of a certain age, where they can obtain experience how to develop the process of healthy and nutritious eating for your children at the initial stage. The criterion observed in the four initial stage infants was considered based on their educational performance, observing different levels of educational performance of those four initial stage infants evaluated compared to the other infants analyzed. Nutritional evaluation is considered a very important tool by experts in the nutrition area, from which they obtain the necessary information to determine the health status of the people evaluated. Interactive body games between adults and boys and girls in the initial stage help to improve as a person, being able to socialize and develop their abilities in the most optimal way. When these types of interactive activities are properly developed, infants at this stage can develop actions that can surprise parents, close relatives and caregivers of

this type of boys and girls. This is because each boy and girl in the initial stage are developing their abilities as they interact with their peers of the same age or with adults. This is why, in my time as a teacher of nursery, preschool and the first three years of primary school, achieving positive results. With this type of interactive activities, I consider that was contributed a small part of my childhood to the boys and girls of this stage of their life, and thus one day see they fulfilled as good people and that they have achieved their goals in their life projects.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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