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Exploring foods and physical activities shared between grandparents and their grandchildren

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Abstract

Given the growing influence of grandparents on their grandchildren's upbringing, this study analyzes two key health variables shared by these two generations: diet and physical activity. Interviews were conducted with 114 Spanish grandparents with no physical or cognitive limitations. Questions covered sociodemographic characteristics, the types of foods they serve their grandchildren, and the physical activities that they share with them. The foods were categorized by glycemic index according to whether they were more or less likely to favor overweight and obesity, and the physical activities were categorized as dynamic/sedentary and outdoor/indoor. The data were analyzed using Student's t-test for independent samples and ANOVAS. The results showed that some of the grandparents' sociodemographic variables—age, educational level, health status, time spent with grandchildren, and distance from their grandchildren—were significantly correlated with the types of foods served and physical activities shared. Grandchildren's food consumption and level of physical activity can be directly influenced by their grandparents. Family interventions should take into account the fact that certain sociodemographic variables in grandparents may favor either more or less healthy dietary habits and physical behavior.

Keywords

Grandparents, grandchildren, food, physical activities, health.

Explorando comidas y actividades físicas entre abuelos y sus nietos

Resumen

Ante la creciente influencia de los abuelos en la crianza de los nietos, en este trabajo se analizan dos variables de salud claves compartidas entre ellos: la alimentación y la actividad física. Se entrevistó a 114 abuelos españoles, sin limitaciones físicas ni cognitivas, y se les preguntó por sus características sociodemográficas, las comidas que proporcionan a sus nietos y las actividades físicas compartidas. Los alimentos se organizaron en categorías por índice glucémico en función de si favorecían más o

menos el sobrepeso y la obesidad; y las actividades físicas se clasificaron en dinámicas o sedentarias, de exterior o interior. Los datos se analizaron con la prueba *t* de Student para muestras independientes y con ANOVAS. Los resultados mostraron que algunas variables sociodemográficas de los abuelos, como la edad, el nivel educativo, la salud, las horas compartidas con sus nietos y la distancia de ellos están relacionadas significativamente tanto con los tipos de comida como con la actividad física que comparten. La conclusión es que la comida y las actividades físicas de los nietos pueden estar influidas directamente por sus abuelos. Cualquier intervención familiar debería tener en cuenta que ciertas características sociodemográficas de los abuelos podrían favorecer tanto unos tipos de conducta alimentaria y física más saludables como todo lo contrario.

Palabras clave

Abuelos, nietos, comida, actividades físicas, salud.

INTRODUCTION

Family structures, considered a basic context of human development in infancy, can no longer be understood without taking into account the role of grandparents and their growing influence on their grandchildren (Bordone et al., 2017; Glaser & Hank, 2018), both in terms of overall development and with regard to health (Sadruddin et al., 2019).

Over the past six decades, studies have been conducted of various complementary aspects of the intergenerational relationship between grandparents and grandchildren. For example, there have been studies examining the type of grandparenting role (Kivnick, 1983; Neugarten & Weinstein, 196; Roa & Vacas, 2001; Roberto & Stroes, 1992) as well as the positive (Arpino & Bordone, 2014) and negative effects of grandparenthood (Christiansen, 2014). Grandparents who act as guardians, surrogates or parental substitutes have also been studied (Grinstead et al., 2003). Consideration must also be given to those longer-lived grandparents who have joined the generation of great-grandparents (Castañeda-García et al., 2017).

Some psychologists (Ramos Valverde et al., 2010) have also identified diet, obesity, and childhood and adolescent sedentary lifestyles as priorities for research and for psychosocial and health intervention. However, intergenerational research is very limited with respect to two sociodemographic variables that are key to good health, especially for grandchildren: the diet and physical activities shared by these two generations.

The World Health Organization (WHO, 2018) has identified childhood obesity as a global pandemic caused by unhealthy diets and a lack of physical activity. These in turn are influenced by children's caregivers, who are best placed to combat the pandemic (Papamichael & Fappa, 2016; Wiklund et al., 2017). In Spain, Román-Viñas et al. (2018) have found that the proportion of children and youth who achieve the recommended levels of physical activity and screen time is low (52% males and 39.8% females from 6 to 9 years old).

The current analysis of specific dietary habits shared by grandparents and grandchildren (Jongenelis et al., 2019; Rogers et al., 2019) has focused on studying practices that promote the consumption of fruit, juices, vegetables (Rhodes et al., 2016), and meat (Jiang et al., 2007).

Although diet and exercise are related, there has been little research studying both factors together and in more detail. Some work has been done in Asia, mainly in China, where Li et al. (2015) have studied these two aspects in grandparents of grandchildren aged between eight and ten. Here, the authors examined consumption of unhealthy foods (snacks, sweets, and sugary drinks) and average daily exercise periods of at least 60 minutes. In Western countries, Eli et al. (2016) compared diet and exercise in parents and grandparents and found a greater effect of pre-existing ideas about these two behaviors than of, for example, the child's actual weight. Also, Pulgarón et al. (2013) evaluated unhealthy diets and sedentary activities in grandparents who care for grandchildren between five and 12 years of age and did not observe any influence on overweight or sedentary habits.

Apart from the fact that there have been so few specific studies published, as listed above, Pulgarton et al., (2016) point out other limitations, such as the qualitative character of the studies that have been done, meaning that, for example, something as important as the time grandparents and grandchildren spend together has not been considered. The two variables of diet and physical activity, which are so important for health, also tend to be subject to broad generalizations and are not tested using operational methodologies.

Given these limitations, this preliminary study aims to explore these variables by means of broader measures and consider them both within the interactive, domestic family context and outside it. For this, three specific objectives have been identified: first, to obtain a sociodemographic profile of the sample of grandparents interviewed; second, to establish what types of foods grand-

parents serve their grandchildren and whether these are related to the sociodemographic variables; and third, to analyze the types of physical activity shared between grandparents and grandchildren and whether these are related to the sociodemographic variables.

METHOD

Participants

Participants in this study were a convenience sample of 114 Spanish individuals of both sexes, with different age, health status, educational level and number of grandchildren, as well as with different interaction times, and distance at which they reside from them. They lived at their homes on the island of Tenerife and volunteered to participate. All met two helth conditions: none suffered physical mobility problems or cognitive decline, and all had grandchildren over two years old.

Instruments

A hetero-administered questionnaire with three sections was used. The first section collected the participants' main sociodemographic data: age, sex, educational level, health status, number of children and grandchildren, number of hours spent with them per day, and distance at which they reside from their grandchildren. Table 1 in the Results section provides detailed results for each of these sociodemographic variables.

The second section measured the types of foods that grandparents serve their grandchildren. For this, a questionnaire based on Atkinson et al. (2008) was presented, with a selection of two groups of foods, categorized by opposite glycemic index (GI), an indicator of the ability of different types of foods that contain carbohydrate to raise blood glucose levels: FF+OO (Foods more likely to Favor Overweight and Obesity) with a medium-to-high GI (>60) – *sweets, chocolate, toast, cookies, Cola Cao (processed cocoa, sugar, wheat flour, cola nut...), white rice, processed juices, jam, white bread, and processed milk drinks/milkshakes*; and FF-OO (Foods less likely to Favor Overweight and Obesity) with a medium-to-low GI (<60) – *milk, gofio (wholegrain flour made of roasted wheat/corn), fish, meat, nuts, spaghetti, macaroni, freshly squeezed juices, butter, oats, soups, stews*. The grandparents were asked to indicate how many days per week (from 1 to 7) they served these foods to the grandchild they spend the most time with.

The third section measured the physical activities that grandparents share with their grandchildren. We used the questionnaire from Peraza et al. (2017), with 40 questions about different physical activities, categorized as dynamic outdoor (DO), dynamic indoor (DI), sedentary outdoor (SO), and sedentary indoor (SI) activities. These authors

conducted a two-part study with 95 participants. The first part was a pilot study with 30 grandparents, validating the activities with 70% or greater agreement, asked ten questions under each of the four categories (DO, DI, SO, SI), with the grandparents responding on a Likert-type scale of 1 (never), 2 (rarely), 3 (sometimes), 4 (often), and 5 (always), for the grandchild they spend the most time with. In the second part, they applied these activities in a main study with 65 grandparents not involved in the pilot study (Peraza et al., 2017). The Dynamic Outdoor (DO) activities were: *We go for walks in the countryside; We go for walks around the city; We go out to celebrate Carnival together; We swim together in the sea; We walk together on pilgrimages; We go on brisk walks for exercise; We do exercise or sports outdoors; We go together to school/from school; We go for walks in the hills; We go for walks around our town.*

The Sedentary Outdoor (SO) activities were: *We sit down to eat in the countryside; We read on a bench in a park or square; We lie on the beach or on the grass; We sit and talk in a park or square; We stop on the street to talk to strangers; We wait for the bus or tram together; We watch a movie in the cinema or a play in the theatre; We eat in a restaurant; We sit and have a drink together in an outdoor café; We call each other on our mobile phones outside.*

The Dynamic Indoor (DI) activities were: *We dust the house; We tidy the house; We wash the house's windows; We cook together at home; We mop the house's floor; We do exercises in the house; We play actively in the house; We unpack the groceries at home and put them away; We sweep or vacuum the house; Before we go on an excursion or on holidays, we check that everything in the house is in order (lights, gas connection, etc.).*

The Sedentary Indoor (SI) activities were: *We sometimes draw at home; We watch TV in bed; We rest together after meals; We play while seated at home; We watch TV on the sofa; We have supper together at home; We read books and/or magazines together at home; We look at family photos at home, either in print form or on the computer or phone; We call each other on the landline; We spend quiet time together at home.*

Procedure

The procedure was carried out in three phases over three months:

a) Voluntary collaboration was requested from the students about their own and known grandparents, who had grandchildren of a certain age and met certain health requirements.

b) The collaborating students contacted them to see their willingness to participate voluntarily in an anonymous interview about relationships between grandparents and grandchildren.

c) The grandparents who met the two requirements and who agreed to participate were visited by the researchers and interviewed.

First, the participating sample was selected by the researchers and students of the Faculty of Psychology, from among their own grandparents, neighbors or acquaintances who met the criteria of spending time with grandchildren over two years old and being sufficiently physically and cognitively fit. The grandparents were asked if they wanted to participate in this anonymous study on the relationship between grandparents and grandchildren. Once they accepted, the researchers, after making an appointment, directly or through the contact provided by the students, visited them in their own homes, in a room alone with them. Before administering the questionnaire to each participant, it was confirmed at the home of each that they met the criteria for inclusion that had been applied in their initial selection: they agreed to participate (saying "yes"), they had grandchildren over two years of age (which ensured an intergenerational interaction), and they had a level of physical and cognitive health that would not prevent them from spending time with their grandchildren—in other words, they had no mobility, memory, or cognitive problems (*Do you have any problems walking or moving when you meet with your grandchildren or spend time with them? Do you have any problems with memory or communication when you meet with your grandchildren or spend time with them?*). The sample of participants came from the Santa Cruz-La Laguna metropolitan area in Tenerife, the area closest to the Faculty, and the interview was conducted using a hetero-administered paper-and-pencil questionnaire. The participants were given sufficient time to respond, without rushing, and any requests for clarification were met.

Data analysis

After the data were collected and encoded, the analyses were run using the statistical package SPSS v.21. Since the questionnaire by Peraza et al. (2017) only used the content validation criterion, with 70% or greater match between participants, we wanted to first calculate the questionnaire's reliability using Cronbach's alpha, with the results being 0.888 for FF+OO and FF-OO; and 0.699 for the four activities DO, SO, DI, and SI. The instrument's mean internal consistency was thus higher for the part on food than for the part on physical activity, although in both cases it met minimum reliability requirements (≥ 0.7).

Since the sample size was greater than 100, parametric analyses were run assuming a standard distribution. The data on dietary habits were grouped into two variables: foods more likely to favor overweight and foods less likely to favor overweight, and means and standard deviations were calculated for each. The same was done for the data on physical activity, with the mean frequency calculated for each of the four types of activity. As for the analyses, Student's t-test for independent samples was applied in the comparisons of means, while ANOVA were used for crossing the means with the age variable.

RESULTS

Sociodemographic profile of the interviewed sample

Table 1 shows the detailed sociodemographic profiles. Generally speaking, most of the sample was made up of grandmothers over 65. Most had a low educational level and a good perceived health status. Most had four or fewer grandchildren. Most spent fewer than three hours per day with their grandchildren, and about half lived near their grandchildren and the other half lived further away.

Analysis of the types of foods grandparents serve their grandchildren, and whether these are related to the sociodemographic variables

Types of foods. Grandparents reported mostly serving their grandchildren the types of foods that are more likely to favor overweight (M = 1.13; SD = 1.19), although there were no statistically significant differences compared to the other foods they served them, which are less likely to favor overweight (M = 0.94; SD = 0.94). The foods served most often from the category FF+OO were mainly rapid-absorption carbohydrates in both solid and liquid form, such as *Cola Cao (processed cocoa, sugar, wheat flour, cola nut…)*, *white bread*, and *cookies*, and the foods served most often from the category FF-OO included dairy products and slower-absorption carbohydrates, such as *milk*, *stews*, and *gofio (whole grain flour made of roasted wheat/corn)/oats*. For both food types, the mean number of servings grandparents gave their grandchildren was four per week. See **Table 2**.

Health status. Grandparents in good health reported serving their grandchildren the types of foods that are more likely to favor overweight, as compared to grandparents with a normal to poor health status, t (82) = 1.82 p = .072 d = 0.32.

Hours per day spent together. Grandparents who spend more than four hours with their grandchildren tended to serve their grandchildren more foods that are more likely to favor overweight than grandparents who spend fewer than three hours with their grandchildren, t (42) = -2.76 p = .000 d = 0.69.

Distance at which they reside. Grandparents who reside closer to their grandchildren were as likely to serve their grandchildren both foods that are more likely to favor overweight, t (90) = 2.63 p = .052 d = 0.51, and foods that are less likely to favor overweight, t (82) = 3.18 p = .002 d = 0.63, as grandparents who live further away. See **Figure 1**.

Table 1. Profile of sample of grandparents.

Sociodemographic variables and levels		N	%
Sex	Male	20	17.5
	Female	94	82.5
	Total	114	100.0
Age	65 or under	23	20.4
	Over 65	90	79.6
	Total	113	100.0
Educational level	Low	77	67.5
	Medium to high	37	32.5
	Total	114	100.0
Health status	Good	82	71.9
	Normal to poor	32	28.1
	Total	114	100.0
Number of grandchildren	1 to 4	68	59.6
	5 or more	46	40.4
	Total	114	100.0
Hours per day spent with grandchildren	Up to 3	75	69.4
	4 to more	33	30.6
	Total	108	100.0
Distance at which they reside from their grandchildren	Quite close	52	46.0
	Not very close	61	54.0
	Total	113	100.0

Analysis of possible links between the activities (DO, SO, DI, SI) shared with grandchildren and sociodemographic variables (grandparents' age, educational level, health status, and time spent together)

Shared activities. The activities most shared between grandparents and their grandchildren were sedentary indoor (SI) activities, followed by dynamic indoor (DI), sedentary outdoor (SO), and dynamic outdoor (DO) activities. See **Figure 2**.

Age. The older the grandparents, the less frequent the dynamic outdoor activities (F (2,105) = 7.81; p = .001; η^2 = 0.13) and sedentary indoor activities (F (2,101) = 3.90; p = .023; η^2 = 0.07).

Educational level. The higher the grandparents' educational level, the higher the frequency of activities they shared with their grandchildren in the dynamic outdoor (DO) category, t (105) = -2.33 p = .022 d = 0.48, followed by dynamic indoor (DI) activities, t (50) = -2.06 p = .044 d = 0.48, and sedentary outdoor (SO) activities, t (110) = -2.95 p = .004 d = 0.58.

Health status. Grandparents in good health reported a higher frequency of activities in the dynamic outdoor (DO) category, t (105) = 3.85 p = .000 d = 0.81, and sedentary outdoor (SO) category, t (110) = 2.13 p = .035 d = 0.45, than grandparents with normal to poor health.

Hours per day spent together. Grandparents who spend more than four hours per day with their grandchildren engaged in more sedentary indoor (SI) activities, t (97) =

Table 2. Weekly frequency of the FF+OO and FF-OO foods most consumed by grandchildren when with their grandparents.

Position consumption	FF + OO	Weekly average (1-7 times)	Position consumption	FF - OO	Weekly average (1-7 times)
1	Cola Cao*	4.6	1	Milk	4.0
2	White bread	3.6	2	Freshly squeezed juices	3.3
3	Cookies	3.5	3	Butter	2.8
4	Processed juices	3.4	4	Stews	2.7
5	Processed milk drinks/Milkshakes	3.2	5	Gofio**/oats	2.3

* Cola Cao (processed cocoa, sugar, wheat flour, cola nut ...)
** Gofio (wholegrain flour made of roasted wheat/corn)

Figure 1. Differences in food consumption that favor overweight and obesity (FF+00) depending on some sociodemographic variables of grandparents.
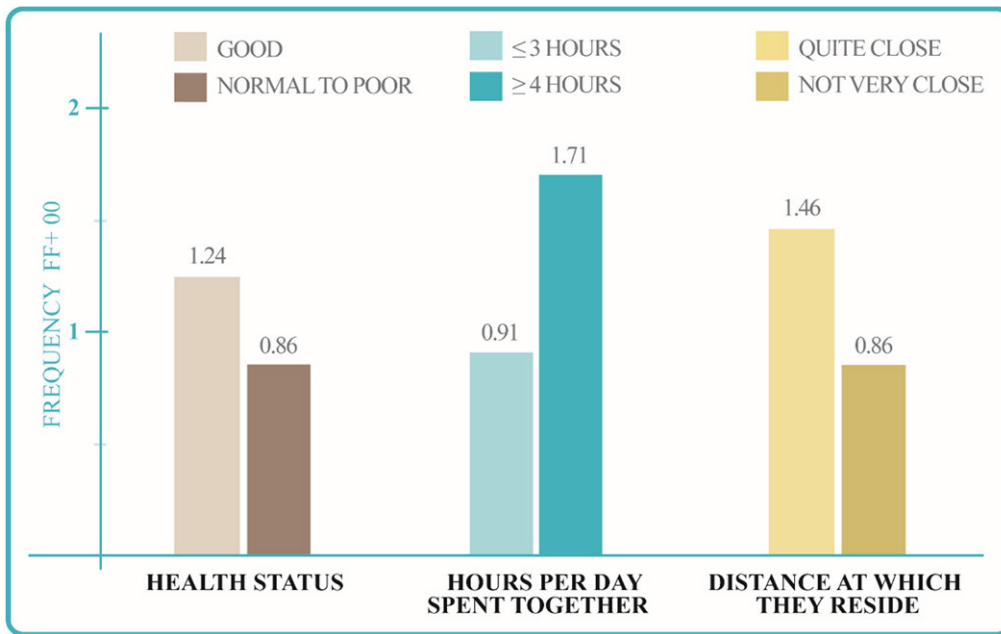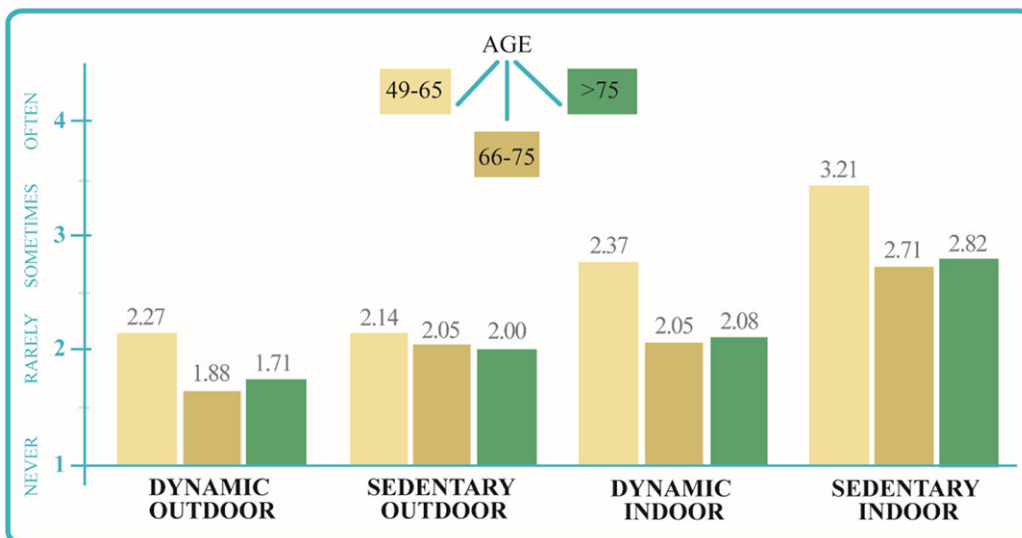

-2.51 p = .014 d = 0.55) than grandparents who spend fewer than three hours with them.

DISCUSSION AND CONCLUSIONS

The profile of the participant sample in this study is in line with that found in the related literature, illustrating the phenomenon of the feminization of the elderly population that interacts more with their grandchildren, given the greater potential longevity of grandmothers than of grandfathers (Austad & Bartke, 2016), and this despite the disadvantages associated with their gender (less education, more chronic diseases), so rarely the subject of study (O'Rand & Henretta, 2018).

In relation to the second objective, regarding the foods that grandparents serve their grandchildren, the results did not show any significant differences between the two types of foods, categorized by glycemic index, which may indicate that grandparents do not distinguish between foods that are more or less likely to favor overweight and obesity. This apparent lack of information on dietary health could hypothetically be indirectly related to the study's other finding, which is that grandparents with normal to poor health seem to have a greater awareness of which foods are less likely to favor overweight, probably because they have been told by their healthcare professionals that they should not eat foods with a medium-to-high glycemic index; this would then influence the foods they serve, probably more for corrective/palliative reasons than for preventive ends. It would be interesting to explore in future studies whether their awareness of the different types of food and meals is related to their own health problems.

Another important result in this second objective is that the more time grandparents spend with their grandchildren each day, the more likely it would seem to be that the food served will favor overweight and obesity. In this study, most participants spent fewer than three hours with their grandchildren at a time and indicated that they serve the five least healthy foods an average of just under four times a week; perhaps these positive data overlap with and

Figure 2. Frequency in types of activity between grandparents and their grandchildren, as a function of the grandparents' age.

compensate for another of the sociodemographic variables: the generally low educational level of most (two-thirds) of the sample, which is usually associated with a less healthy diet, where snacks abound (Jiang et al., 2007; Jongenelis et al., 2019). Also, it is relevant to consider that cultural context can influence views on diet and health; for instance, in China, grandparents believe that overweight children are happier, stronger, and healthier (Jiang et al., 2007).

In relation to the findings under the third objective, that of shared physical activity between grandparents and grandchildren, overall the data show more sedentary activities than dynamic activities and more indoor domestic activities than outdoor activities. The main variable explaining this result is the age of the participants, two-thirds of whom are over 65. These data coincide with those of a previous review of grandparents' age and physical activity (Rico et al., 2001). Thus, the older the grandparent, the less frequent the activities overall. Of course, the importance of this factor may vary considerably by country and culture: while in Western Europe the grandparent's role usually begins between 70 and 80 years of age, in China one usually becomes a grandparent at 55 (Zhang et al., 2018). Nor would the low educational level reported by most of the grandparents studied favor these dynamic activities. However, their good health overall, which tends to be related to dynamic activities, may overlap here with the previous variables of age and educational level.

With respect to this exploratory study's limitations, it is necessary to point out, among other things, the lack of homogeneous subgroups in the sociodemographic variables of age, gender, educational level, health status, and time spent together, which may have led to overlap and thus limited the clarity of their effects on the results. Also, the questionnaire did not ask about serving sizes, which, together with the glycemic indexes, would have allowed us to calculate the total glycemic load of the foods served and thus better predict their ultimate effect on overweight and obesity (Lopes de Sales & Calixto de Oliveira, 2018).

The stereotypical argument among families that a healthy diet involves eating "a bit of everything" or having a "varied diet" is no longer considered to be true (Oliveira Otto et al., 2018). It would seem to be a priority to have more public campaigns to target people's beliefs about obesity, dietary restraint and body image perception (Magallares et al., 2016) and also to ensure better psychosocial planning and intervention, focused on the family context, with information on foods that favor overweight and obesity, on the difference between dynamic and sedentary activities inside and outside the domestic setting, and on organizing food choices and family activities to benefit, above all, those grandchildren with grandparents who exhibit some of the variables (older, a low educational level, normal to poor health, and more time spent with grandchildren) associated with dietary

habits that favor overweight and obesity and a more sedentary shared lifestyle. Also, in this family psychosocial planning, information and training should be provided about more egalitarian intergenerational relationships, where grandfathers and grandmothers do not differentiate the type of physical activity or diet shared as being "appropriate" according to their own gender or that of their grandchildren, nor in relation to whether they are alone with their grandchildren or with their spouses.

With the data from this study, we can conclude that grandparents' sociodemographic variables directly influence two aspects related to the present and future health of their grandchildren: the foods they serve them, and the types of physical activities they share with them. Therefore, it seems appropriate to emphasize that childhood is the best time to acquire good eating habits, since these are acquired by repetition and in most cases unconsciously and are harder to modify later in life (Rodríguez-Santos et al., 2008). Also, grandparents can play a determining role in adolescence, apart from physical diseases of obesity, in other psychological effects such as distorted self-perception and feelings of dissatisfaction with oneself (Gaylis et al., 2019). Relationships with grandparents can remain didactic until grandchildren reach early adulthood (Castañeda et al., 2004).

Given the power and influence that grandparents have in the daily lives of their grandchildren, they should be a priority group of research, including the changes that may occur now with the impact of the COVID-19 pandemic on these intergenerational relationships. It is necessary to study the different styles of grandparenthood and their associated patterns of diet and physical activity, as well as their relationship to the gender and marital status of the grandparents. Without forgetting to measure their knowledge and management of their own diet, through new classifications such as the NOVA (Álvarez & Delgado, 2019; Monteiro et al., 2016), more simplified and accessible for older people. Better understanding of family functioning in a changing world and optimizing healthy multigenerational relationships between them is vital for the future of mankind.

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