

Gross motor development in preschoolers on the islands of Lake Titicaca (3810 m.a.s.l.), Puno, Peru

Desarrollo motor grueso en preescolares de las islas del lago Titicaca (3810 m s. n. m.), Puno, Perú

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Abstract. The objective of this study was to analyze gross motor development in preschoolers on the islands of Lake Titicaca, considering the variables sex and age. The study corresponds to the descriptive-comparative cross-sectional design. 57 preschool children (31 boys and 26 girls, age $M = 5.0$, $TD = .54$) from the islands of Amantani, Taquile and Uros, located in the province of Puno (Peru), at an altitude of 3810 m.a.s.l. participated. TGMD-2, Spanish version (reproducibility of .82) was used. The results show an average gross motor development (50.9%), with an age equivalent to six years ($M = 6.0$, $TD = .82$), one year above its chronological age ($M = 5.0$, $TD = .54$). Differences were found between islands ($p = .01 < .05$). No gender differences were found in gross motor development ($p = .15 > .05$) or in locomotion development ($p = .74 > .05$), but in object control ($p = .00 < .05$), as well as in age ($p = .00 < .05$). It is concluded that the preschoolers present an average gross motor development with an equivalent age of one year older than their chronological age, of which preschool children from Taquile stand out by presenting a higher – above average development, with an equivalent age of one year and nine months older than their chronological age, being superior to those of Amantani and Uros, who present an average development and a lower equivalent age. Women show more development than men only in object control. Those of four years present more development than those of five.

Key words: Gross motor development, locomotion, object control, chronological age, equivalent age, preschool, Titicaca Lake.

Resumen. El objetivo de este estudio fue analizar el desarrollo motor grueso en preescolares de las islas del lago Titicaca, considerando las variables sexo y edad. El estudio corresponde al diseño transversal descriptivo-comparativo. Participaron 57 niños de etapa preescolar (31 varones y 26 mujeres; edad $M = 5.0$, $DT = .54$) de las islas de Amantani, Taquile y Uros, localizadas en la provincia de Puno (Perú), a una altitud de 3810 m s. n. m. Se utilizó el TGMD-2, versión en español (reproductividad de .82). Los resultados demuestran un desarrollo motor grueso promedio (50.9%), con una edad equivalente a seis años ($M = 6.0$, $DT = .82$), un año por encima de su edad cronológica ($M = 5.0$, $DT = .54$). Se encontraron diferencias entre islas ($p = .01 < .05$). No se encontraron diferencias de género en el desarrollo motor grueso ($p = .15 > .05$) ni en el de locomoción ($p = .74 > .05$), pero sí en control de objetos ($p = .00 < .05$), al igual que en edad ($p = .00 < .05$). Se concluye en que los preescolares presentan un desarrollo motor grueso promedio con una edad equivalente de un año mayor a su edad cronológica, de los que destacan preescolares de Taquile al presentar un desarrollo superior-por encima del promedio, con una edad equivalente de un año y nueve meses mayor a su edad cronológica, siendo superior a los de Amantani y Uros, quienes presentan un desarrollo promedio y edad equivalente menor. Las mujeres presentan mayor desarrollo que los varones solo en control de objetos. Los de cuatro años presentan mayor desarrollo que los de cinco.

Palabras clave: Desarrollo motor grueso, locomoción, control de objetos, edad cronológica, edad equivalente, preescolar, lago Titicaca.

Introduction

Motor development is a continuous and multidimensional process of the human life cycle (Pavez-Adasme et al., 2020). The preschool age constitutes the most abundant space of life in experiences that involve movement and expression. Movement is for the child, from birth, not only a form of expression, but an irreplaceable means by which he discovers himself and the environment that surrounds him, allowing him to function independently (Robinson & Goodway, 2009), interact with other children, manipulate objects and explore space (Da Fonseca, Garrote, Todoli, & Zenarruzabeitia, 2014).

Motor development constitutes a crucial area within the child's global development (Kodzman, 2019), with childhood being the ideal and determining stage for learning motor skills (Delgado & Montes, 2016; Sánchez, 2019), due to the fact that it is a period of maximum sensitivity and vulnerability to the influence of the environment (Ruiz, 2004). The education of the preschool child, basically, is given in function of the

motor action in that all knowledge –learning– starts from the child's own action on the environment (Celis, 2015). Likewise, Teixeira, Barcala-Furelos, Abelairas-Gomez and Arufe-Giraldez (2015) point out that motor experiences are an essential condition for didactic adaptation in child learning.

Sánchez (2019) defines motor development as the control of body movements through the coordinated activity of nerve centers, nerves and muscles. In the framework of the approaches of Baena, Granero and Ruiz (2010); Gallahue (1987); Kodzman (2019); and Rizzoli et al. (2013), we understand motor development as changes in human motor skills from birth to old age, the result of the interaction between genetic and environmental factors, which is based on biological, psychological and social evolution, resulting in the organic and functional maturation of the nervous system, the development of psychic functions and the structuring of the personality.

Cobos (2007) define gross motor development as the natural process that human beings develop at different stages of their lives, in which synchronized muscle movements are acquired to maintain balance, acquire agility, strength and speed, as well as rhythm. These evolutions are subject to the

maturity of the central and peripheral nervous system, the stimulation levels, the genetic load, the socioeconomic and demographic conditions.

Gross motor development is considered as the basic vocabulary of motor skills, on which the most complex and specialized motor responses are built (García-Marín & Fernández-López, 2020), in order to achieve adequate motor competence, that is, to achieve that the person obtains a set of skills and abilities with which he can carry out complex motor tasks to be effective and efficient in his environment (Luis-de-Cos, Arribas-Galarraga, Luis-de-Cos, & Arruza, 2019; Payne & Isaacs, 2007; Ruiz-Pérez, 2014; Ruiz-Perez et al., 2015).

According to Alcover (2010); Campo (2011); Castañer et al. (2012); Delgado and Montes (2017); Jones, Hinkley, Okely and Salmon (2013); Pons and Arufe (2016), adequate motor competence at preschool age enables the child to: First, successfully cope with the motor challenges of daily life and adapt to the characteristics of a changing environment. Also, it helps the initial development of the nervous system, which determines the neural connections that will be used for the learning of formal skills and the acquisition of knowledge. In addition, it favors the control of his or her the body and a sense of security that, soon, becomes psychological security (both elements are important for personality development). Furthermore, it promotes the acquisition of physical activity behaviors and healthy lifestyle habits, which will accompany the child throughout his life, helping him to prevent a number of diseases such as obesity, stress, etc. Finally, the child will be able to successfully surpass achieve the curricular objectives and have greater social success.

Robinson et al. (2015) argue that adequate motor competence in childhood is an essential factor to get involved in the practice of physical activity; likewise, it predicts the possibilities of its practice in the future (Cano, Oyarzún, Leyton, & Sepúlveda, 2014; González-Gross & Meléndez, 2013; Lopes et al., 2011); that is, it functions as an important health indicator (Barnett & Goodway, 2018; Slater et al., 2010). Physical activity produces greater brain oxygenation, favoring neuronal plasticity, the basis of learning (Bueno, 2015). Healthy habits socialized in childhood, especially that of physical activity, are good predictors of the future in terms of the quality of life of the population (Arribas-Galarraga et al., 2018; Molina, 2018).

In contrast, children with inadequate motor skills experience severe difficulties during their daily activities: they fall frequently, are afraid of physical activity, often drop things, tire quickly when they do physical activity, have poor posture, lack strength, are overweight, have difficulty stopping when running or playing. These difficulties cause episodes of anxiety, depression, loneliness, isolation, rejection, and ridicule in the playground at playtime (Coplan, Findlay, & Nelson, 2004; Nelson et al., 2009; Ruiz, Mata, & Moreno, 2007) or during social participation (King-Dowling et al., 2015), they also cause less participation or even withdrawal from the practice of sports activities (Batey et al., 2013; Cairney, Hay, Veldhuizen, Missiuna, & Faught, 2009; Delgado & Montes, 2017). Children's gross motor development problems can persist throughout their later development (Bornstein & Hendricks, 2013), making it difficult to acquire more complex

skills (Campo, 2011). The most alarming of all this is that these problems are transferred to school performance (King-Dowling et al., 2015), that is, gross motor development problems negatively affect learning processes (Carboni-Román et al., 2006).

The objective of this study, then, was to analyze gross motor development in preschoolers on the islands of Lake Titicaca, considering the variables sex and age.

Material and method

Design

The research design was descriptive, comparative cross-sectional.

Participants

The study included 57 children (Age $M=5.0$, $SD=.54$), from a population of 70 (13 children did not participate because they did not attend on the day of the scheduled assessment), from seven public preschool institutions on the islands of Lake Titicaca (Amantani, Taquile, and Uros; table 1; figure 1), Puno, Peru, located at an altitude of 3810 m above sea level.

Table 1
Descriptive data of the study sample

Islands (n-%)	Age (TD)	Sex (n-%)
Amantani (32-56.1)	5.0 (.54)	Man (31-54.4)
Taquile (11-19.3)		Woman (26-45.6)
Uros (14-24.6)		



Figure 1. Location of the Amantani, Taquile and Uros islands, Puno, Peru

Table 2
Results and equivalent motor development level

Standard result	Gross motor quotient	Motor development level
17-20	Greater than 130	Much higher
15-16	121-130	Higher
13-14	111-120	Above average
8-12	90-110	Average
6-7	80-89	Below average
4-5	70-79	Poor
1-3	Less than 70	Very poor

Instrument

The Test of Gross Motor Development, Second Edition TGMD-2 (Ulrich, 2000) was considered as a data collection tool. The Spanish version was used (Ayán et al., 2019; Cano-Cappellacci, Aleitte, & Durán, 2015). The TGMD-2 is applicable to children between three to 10 years old, it comprises twelve skills grouped into two sub-tests: locomotion sub-test (running, canter, standing jump, jump, horizontal jump and lateral step) and sub-test Object Control (Stationary Ball Hit, Stationary Dribble, Catch, Kick, Over-the-Shoulder Throw and Below-the-Hip Throw).

The execution of each skill is valued according to qualitative criteria that are scored as zero (0) or one (1) depending on whether they are met or not in two attempts. The criteria for each skill range from 3 to 5. Both the locomotion sub-test and the object control sub-test have 24 criteria, which allow a gross result of up to 48 points. The gross result of the locomotion sub-test and the object control sub-test are each transformed into a standard result; the

sum of both gives us the sum of standard results; this result is transformed into a gross motor quotient. The standard result allows determining the level of motor development of locomotion and object control. The motor quotient score allows determining the level of gross motor development. Motor development has seven levels (Table 2): 1) very poor, 2) poor, 3) below average, 4) average, 5) above average, 6) higher, and 7) much higher.

The TGMD-2 used has a reproducibility of Stability Coefficient (Test-retest performed one week later on 18 children representing 32% of the studied population) of .78 locomotion, .82 object control, and .82 score total.

Process

The application of the TGMD-2 in the study subjects was developed according to the following route: First, the permission of the responsible authority of the seven participating institutions was managed. Second, the same was done with the permission of the parents through the informed consent form, in which all parents agreed and authorized their children's participation in the study; Likewise, informed assent was applied, so there was children's acceptance to participate in the study. Third, the children were assessed, four at a time, on each of the skills (Attempt 1 and then Attempt 2). The children's performance of the skills was digitally recorded. Fourth, the TGMD-2 examiner's record sheet was completed via videotape viewing. To avoid errors, the video was observed three times for each of the criteria and attempts. The people who applied the instrument are physical education professionals who were previously trained, so they knew perfectly the protocol to follow.

Data analysis

In order to know and compare the characteristics of gross motor development in preschoolers on the islands of Lake Titicaca, the percentage analysis, the mean and standard deviation were used for the descriptive analysis, and the Anova and T-Test for the inferential analysis. Verification of data normality was given using the Kolmogorov-Smirnov test. Statistical calculations were carried out in Excel and SPSS version 25.

Results

The highest percentage of gross motor development (GMD) of preschoolers on the islands of Lake Titicaca corresponds to the average level (50.9%), and the same is reflected on the islands of Amantani (53.1%) and Uros (64.3%); while in the preschools of Taquile Island a higher-than-average level is observed (36.4%). With respect to the motor development of locomotion (MDL) at the general level of the islands, the highest percentage corresponds to the average level (73.7%), reflecting the same in the Amantani (71.9%), Taquile (72.7%) and Uros (78.6%) islands. In reference to the object control motor development (OCMD) at the general level of the islands, the highest percentage corresponds to the average level (47.4%), and the same is reflected in the Uros Island (71.4%); while in the preschool of Amantani island a level above the average - average is observed (43.8%), and in the preschoolers on Taquile a higher

level is observed (45.5%) (Table 3).

On the side of the equivalent age, the preschoolers on the islands of Lake Titicaca present a GMD age equivalent of six years (M = 6.0, SD = .82), one year above their chronological age (M = 5.0, SD = .54). The preschoolers on the island of Amantani have a GMD age equivalent of five years and nine months (M=5.9, TD=.80), one year above their chronological age (M 4.9, TD=.56), one month below the global average equivalent age (M=6.0, TD=.80). Preschoolers on Taquile Island have a GMD age equivalent of six years and six months (M=6.6, TD=.81), one year and nine months above their chronological age (M 4.9, TD=.52), six months above the overall average of the equivalent age (M=6.0, TD=.82). Preschoolers on Uros Island have a GMD age equivalent of five years and eight months (M=5.8, TD=.69), five months above their chronological age (M=5.3, TD=.35), four months below the overall average of the equivalent age, (M=6.0, TD=.82) (Table 4). With respect to the MDL, the preschoolers on the islands present an age equivalent of five years and four months (M=5.4, DT=1.05), four months above the average of the chronological age (M=5.0, DT=.54). Preschoolers in Amantani present a MDL age equivalent of five years and three months (M=5.3, TD=1.16), six months

Table 3
Motor development level

	Islands								
	Amantani		Taquile		Uros		Global		
	n	%	n	%	n	%	n	%	
GMD	Below average	1	3.1	0	0.0	2	14.3	3	5.3
	Average	17	53.1	3	27.3	9	64.3	29	50.9
	Above average	11	34.4	4	36.4	3	21.4	18	31.6
	Higher	3	9.4	4	36.4	0	0.0	7	12.3
	Total	32	100.0	11	100.0	14	100.0	57	100.0
MDL	Poor	0	0.0%	0	0.0%	1	7.1%	1	1.8%
	Below average	5	15.6%	0	0.0%	1	7.1%	6	10.5%
	Average	23	71.9%	8	72.7%	11	78.6%	42	73.7%
	Above average	3	9.4%	3	27.3%	1	7.1%	7	12.3%
	Higher	1	3.1%	0	0.0%	0	0.0%	1	1.8%
Total	32	100.0%	11	100.0%	14	100.0%	57	100.0%	
MDOC	Average	14	43.8%	3	27.3%	10	71.4%	27	47.4%
	Above average	14	43.8%	3	27.3%	3	21.4%	20	35.1%
	Superior	4	12.5%	5	45.5%	1	7.1%	10	17.5%
	Total	32	100.0%	11	100.0%	14	100.0%	57	100.0%

Note: GMD = Gross motor development, MDL = Motor development of locomotion, MDOC = Motor development of object control

Table 4
Motor development according to chronological age and equivalent

	Amantani (n=32)		Taquile (n=11)		Uros (n=14)		Global (n=57)	
	M	TD	M	TD	M	TD	M	TD
Chronological age	4.9	.56	4.9	.52	5.3	.35	5.0	.54
Equivalent GMD age	5.9	.80	6.6	.81	5.8	.69	6.0	.82
Equivalent MDL age	5.3	1.16	6.0	.79	5.2	.84	5.4	1.05
Equivalent MDOC age	6.5	.80	7.3	1.27	6.5	1.09	6.6	1.01

Note: GMD = Gross motor development, MDL = Motor development of locomotion, MDOC = Motor development of object control

Table 5
Inter-variance analysis (Anova) of the gross motor quotient and standard result

		n	M		TD	Sig.
			Amantani	Taquile		
GMQ	Amantani	32	108.34	10.30	0.01	
	Taquile	11	115.55	9.37		
	Uros	14	102.79	9.74		
	Total	57	108.37	10.69		
SLR	Amantani	32	10.19	2.21	0.05	
	Taquile	11	11.36	1.80		
	Uros	14	9.29	1.98		
	Total	57	10.19	2.16		
SROC	Amantani	32	12.47	1.61	0.01	
	Taquile	11	13.82	1.83		
	Uros	14	11.64	2.13		
	Total	57	12.53	1.90		

Note: GMQ = Gross motor quotient, SLR = Standard locomotion result, SROC = Standard result of object control

Table 6
Motor development according to sex and age (Test T)

		Sex				Age			
		n	M	TD	Sig.	n	M	TD	Sig.
GMQ	Man	31	106.48	10.90	0.15	Four years	23	113.43	9.40
	Woman	26	110.62	10.19		Five years	34	104.94	10.26
SLR	Man	31	10.29	2.34	0.74	Four years	23	11.13	2.07
	Woman	26	10.08	1.96		Five years	34	9.56	2.00
SROC	Man	31	11.74	1.59	0.00	Four years	23	13.35	1.80
	Woman	26	13.46	1.84		Five years	34	11.97	1.78

Note: GMQ = Gross motor quotient, SLR = Standard locomotion result, SROC = Standard result of object control

above their chronological age ($M=4.9$, $TD=.56$), one month below the overall average of the equivalent age ($M=5.4$, $TD=1.05$). Preschoolers on Taquile Island have a MDL age equivalent of six years ($M=6.0$, $TD=.79$), one year and three months above their chronological age ($M=4.9$, $TD=.52$), eight months above the overall average of the equivalent age ($M=5.4$, $TD=1.05$). Uros Island preschoolers have a MDL age equivalent of five years and two months ($M=5.2$, $TD=.84$), one month below their chronological age ($M=5.3$, $TD=.35$), two months below the overall average of the equivalent age ($M=5.4$, $TD=1.05$). In relation to the OCMD, preschoolers on the islands are six years and six months ($M=6.6$, $TD=1.01$), one year and six months above the average chronological age ($M=5.0$, $TD=.54$). Preschoolers in Amantani have a OCMD age equivalent of six years and five months ($M=6.5$, $TD=.80$), one year and eight months above their chronological age ($M=4.9$, $TD=.56$), one month below the overall average of the equivalent age ($M=6.6$, $TD=1.01$). Taquile preschoolers have a OCMD age equivalent of seven years and three months ($M=7.3$, $TD=1.27$), two years and six months above their chronological age ($M=4.9$, $TD=.52$), nine months above the overall average of the equivalent age ($M=6.6$, $TD=1.01$). Uros preschoolers have a OCMD age equivalent of six years and five months ($M=6.5$, $TD=1.09$), one year and two months above their chronological age ($M=5.3$, $TD=.35$), one month below the overall average of the equivalent age ($M=6.6$, $TD=1.01$) (Table 4).

The gross motor quotient (GMQ) among preschoolers from the Amantani, Taquile and Uros islands presents a significant difference ($p=.01 < .05$, data normality was verified using the Kolmogorov-Smirnov test, $p=.20 > .05$), as well as the standard locomotion result (SLR) ($p=.01 < .05$). Regarding the object control standard result (OCSR), they do not present differences ($p=.05 = .05$) (Table 5).

Regarding sex, there are no differences between men and women in the GMD ($p=.15 > .05$) and MDL ($p=.74 > .05$), but in the MDOC ($p=.00 < .05$), women have a higher average ($M=13.46$, $TD=1.84$) than men ($M=11.7$, $DT=1.59$). In the case of age, differences are found both in the GMD ($p=.00 < .05$), MDL ($p=.01 < .05$) and MDOC ($p=.01 < .05$), being the children of four years who present greater motor development (Table 6).

Discussion

The present study had as objective to analyze the GMD in preschoolers of the islands of Lake Titicaca, considering the variables sex and age. The results show that preschoolers present an average GMD. At the island level, preschoolers from Taquile (higher-than-average) present higher GMD than those from the Amantani (average) and Uros (average) islands, repeating the same at the equivalent age. These findings are similar (except for those of Taquile Island) to those found by Iriarte, Pacheco and Tapia (2018) in Chilean preschoolers (between three and four years old); and Bermudez, Poblete, Pineda, Castro and Inostroza (2018) in Mexican preschoolers (between four and five years old), who also identified an average GMD in the subjects studied. Barrios and Mendieta (2018), in their study of an older Colombian school population (between six and 10 years old),

identified a poor GMD, whose results are lower than those found in the study and to those referred to. We did not find results similar to those achieved by preschoolers on Taquile Island. The motor skills presented by the preschoolers from the islands of Lake Titicaca, especially Taquile Island, will allow them to interact efficiently with their peers; it will also allow them to integrate more easily into the practice of physical activities and sports (Cairney et al., 2009; Lopes, Santos, Pereira, & Lopes, 2012; Stodden et al., 2008), with more influence on later stages (Barela, 2013).

As for MDL, the results show that preschoolers on the islands of Lake Titicaca have an average MDL. At the island level, all three present the same MDL (average) and equal to the overall. With respect to the equivalent age, the preschoolers on the island of Taquile present a higher age than those on the islands of Amantani and Uros. These findings coincide with those found by Valentini (2012) in Brazilian preschoolers (between four and five years old); Iriarte et al. (2018) in Chilean preschoolers (between three and four years old); and Martínez (2017) in Colombian preschoolers (5 years old), who also identified an average MDL in the subjects studied. We did not find different findings from the study. In general, preschoolers with these locomotion characteristics present autonomy in their movements (walking, running or jumping) to explore their environment (Molina, 2009; Palau, 2005).

In relation to the OCMD, the results show that preschoolers on the islands of Lake Titicaca have an average OCMD. At the island level, preschoolers on Taquile Island (upper) have a higher average OCMD than preschoolers on Amantani Island (above average-average) and Uros Island (average), with the latter being the least developed. As for the equivalent age, the same result is given. These findings are similar (except for the Taquile and Amantani islands) to those found by Valentini (2012) in Brazilian preschoolers (between four and five years old); Iriarte et al. (2018) in Chilean preschoolers (between three and four years old); and Martínez (2017) in Colombian preschoolers (five years old), who also identified an average OCMD in the subjects studied. Pope, Liu y Getchell (2011), in their study of vulnerable Hispanic preschoolers (ages 3-4) residing in the United States, and Amui Goodway, Robinson and Amui (2007), in their study of vulnerable Hispanic and African-American preschoolers residing in the United States, identified a poor OCMD, results that are lower than those achieved in the study and to those referred to. In this contrast, preschoolers on the Taquile and Amantani islands have a higher OCMD than those identified in other contexts, especially with respect to the U.S. children mentioned. This difference is due to the influence of the environmental factor (García-Marín & Fernández-López, 2020; Guillen et al., 2019), that is, the characteristics of the environment (Castañer et al., 2012). It has been shown that natural spaces favor motor skills in the early stages (Castell, 2020). In this sense, children from the Taquile and Amantani islands are surrounded by natural spaces and resources, which allows them to interact effectively and efficiently with objects spontaneously (Martínez, 2017), which is not the case especially for children in the United States, who live in an increasingly artificialized environment, an environment that generates little active

behavior (Castell, 2020).

According to sex, both men and women on the islands of Lake Titicaca have a similar GMD and MDL; but different in the OCMD, with women being more developed than men. As for the GMD, Bermudez et al. (2018), in their study of Mexican preschoolers (between four and five years old), found similar results. In contrast, Valentini (2012), in Brazilian preschoolers (between four and five years old), and Iriarte et al. (2018), in Chilean preschoolers (between three and four years old), found different results: in the first case, they found that boys were more developed than girls; and in the second case, they found that girls were more developed than boys. It is worth noting that in both studies similar results were found regarding MDL. Regarding the OCMD, no similar, but different results were found. Pope et al. (2011), in vulnerable Hispanic preschoolers (three to four years old) living in the United States, and Iriarte et al. (2018), in Chilean preschoolers (three to four years old), found that both women and men had similar development. For their part, Valentini (2012), in Brazilian preschoolers (ages four to five), and Goodway et al. (2007), in vulnerable Hispanic and African-American preschoolers living in the United States, found that boys were more developed than girls.

In relation to age, results show that four-year-old preschoolers on the islands of Lake Titicaca have higher GMD, MDL and OCMD scores than the five-year-old ones. The findings found by Valentini (2012) in Brazilian preschoolers (between four and five years old) are contrary to those reached in the study, since five-year-old preschoolers show greater development than the four-year-old ones. No similar results were found.

The various studies related to gross motor development, particularly the present study, do not emphasize the analysis of the results on the basis of the equivalent age, doing so solely on the basis of categorizations, this being one of its main limitations. In the present study we find that it is possible to carry out a more accurate analysis of results using the equivalent age.

We recommend carrying out gross motor development studies that include variables as priority activities that the family environment deals with; culture or lifestyle of the family environment; time parents spend interacting with their children at home and free spaces; access and use of technology by children; occupation of free time; nutritional condition; school performance (reasoning and reading comprehension); socioeconomic level; motor intervention at school; development of social skills; among others, that can explain to us how much one influences the other, so that it is possible to act and intervene efficiently and in a timely manner in the overall development of the preschooler, especially the motor; in such a way that it can positively influence other variables of direct linkage.

Conclusions

The preschoolers present an average gross motor development with an equivalent age of one year older than their chronological age, highlighting the Taquile preschoolers by presenting an above-average development with an equivalent age of one year and nine months older than their

chronological age, being superior to those of Amantaní and Uros, who present an average development and a lower equivalent age.

Regarding the motor development of locomotion, in general, preschoolers present an average development with an equivalent age of four months older than their chronological age. At the island level, they present a similar development, differing in the equivalent age, being superior those of Taquile.

In relation to the motor development of object control, in general, they present an average development with an equivalent age of one year and six months greater than their chronological age, highlighting the Taquile preschool children by presenting a superior development with an equivalent age of two years and six months older than their chronological age, far exceeding those of Amantaní and Uros, the latter being the one with the least development.

Regarding sex, there are only differences in the motor development of object control, being the women who present greater development.

Regarding age, overall, preschoolers with four years of age show more development than those with five.

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