06 - COMPARATIVE ANALYSIS OF ENERGY EXPENDITURE IN CHILDREN 11 YEARS, THE XOTE DANCES AND DANCE DANCE REVOLUTION

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INTRODUCTION

Advances in technology and facilities of the modern world in several areas, such as telecommunication, computer and electronic games exclusively handled manually, the industry ends up providing a reduction in the practice of AF, as Pereira (2012) and Vasconcelos (2012). Although this type of video game is a form of entertainment, it stimulates reasoning, attention, concentration, creativity, troubleshooting, as mention Bett and Fernandes (2011).

The Exergames® or "active video game" is a new generation of electronic games that interact with body movements performed by players to simulate real movements on the screen. These games differ in the way they promote the movement and interactivity, such as DDR, the player performs movements with the legs (MI) through dance on the carpet; with arrows must be pressed with the rhythm of the music. The Nintendo Wii®, which limits the movement of the upper limbs (MS) through the use of wireless handheld controllers; XBOX 306® and that associated with the Kinect allows the user to use the whole body during games, according to Canabrava (2013); Santos et al (2013); Bett and Fernandes (2011).

According to Spider (2006), video games can have positive or negative contributions depending on their specificity. In children and teenagers, the prevalence of computers and electronic games handled manually (not active), with exposure to long periods sitting in front of the TV and computer are observed, making them increasingly sedentary, mentioned by Pereira (2012), Vasconcelos (2012) and Canabrava (2013). These scholars also argue that the number of sedentary children and adolescents grow gradually, being considered a global public health problem in modern life, which brings as consequence, chronic diseases caused by IF, such as obesity, hypertension, diabetes, dyslipidemia, heart disease, among many others.

Preliminary studies by Kohl et al (2012) pointed out that IF is the fourth leading cause of death worldwide. "Their researches suggest that 31% of the world population does not meet the minimum recommendations of AF, and in 2009 found a prevalence rate of 17% IF. In percentage terms 6-10% of all deaths from NCDs worldwide can be attributed to physical inactivity.

"Seven million deaths worldwide from NCDs could have been avoided if people who were inactive practiced physical activity, making them enough active" (Lee et al, 2012).

Regular AF protects against coronary heart disease, type 2 diabetes, some cancers, clinical depression, hypertension and obesity According to (Heath, 2012).

The World Health Organization (WHO) classifies obesity by body mass index (BMI) defined by calculating the body weight in kg divided by the square of height in meters squared (BMI = kg / h² (m)). It is considered obese when the BMI is above 30 kg / m², informs Tavares et al (2010).

The recommendation of PA and exercise is now a consensus among health professionals and health organization, that adopt it as the most effective mechanism to combat obesity in child, adolescent and adult, as Matos Barbosa (2011) ; Pereira et al (2012) say.

Dance is an alternative to the practice of AF, which besides pleasurable, brings several health benefits and acts to combat sedentary lifestyle and may be practiced in all ages and social classes, mentioned by Ribeiro et al (2007).

The objective of this study was to determine and compare the GE dances Xote and DDR Konami - PlayStation 2 (Music Lesson Mode), 20 minutes for each dance in elementary school children of the State School Madre Belém / Tocantins, Brazil.

Xote was chosen because it is a popular dance and is present in the ballrooms of all regions of Brazil, Garcia and Hass (2003). Already the DDR, as a kind of exergames game (games moving) runs in the form of dance, which has been known worldwide as reports of Brown (2008), Pereira (2012) and Canabrava (2013).

METHOD

Descriptive research, purposive sample of single trial consisting of 15 children, female, a class of elementary school, aged 11, enrolled in the State School Madre Belém - Palmas / TO, Brazil according to Maroco (2003).

PROCEDURES

The children had four hours of class DDR on alternate days. Later, they passed a test to identify those who have mastered the dance Xote and DDR, Playstation 2 - Konami's DDR (Music: Lesson Mode).

Then, anamnesis for data collection was performed: Age, health history and practice of Xote. After that, parents and / or guardians of selected children were informed about: the research objectives and procedures for data collection; guaranteed anonymity in the publication of research results; freedom of refusal to participate and absence of risk to physical health and moral integrity of the participants. Parents and guardians who have agreed, signed a consent form. This study addresses the Resolution N ° 196/96 and 251/97 of the National Health Council and was approved by the ethics committee of the Universidad Autónoma de Asunción - Py.

After the selection of volunteers and signing of free and consented term, body mass was measured by means of a digital scale Britânia® brand, digital model corpus 2 - Brazil, up to 150 kg and acuity of 0.1kg. Children were measured with appropriate clothing (shorts and T-shirt), barefoot, with a lateral spacing of the feet, in the center of the platform. Height was measured by stadiometer compact tape from Wiso brand - Brazil, 2m, graduated in centimeters and tenths of centimeters, attached to the wall. The students were in the standing position: still, arms along the body feet, looking for contact with the wall surfaces of the posterior heel, buttocks, shoulder girdle and occipital region. The measurement was performed with the rated in inspiratory apnea. The head was positioned in the Frankfurt plane obeying the protocol of Fernandes (2003). The body mass index (BMI) was calculated using the formula adopted by the Health Organization (WHO) (BMI = kg / h² (m)), provided by Tavares et al (2010).

The determination of GE was performed using the accelerometer mark (100/100 Caltrac® Plan) Manufacturer (Ellis's,

Gregory; California - USA; model (MDO19B). Some activities during the four accelerometers were used simultaneously. Weight, height, age and sex: the data were entered into each unit. The equipment was placed at waist height, then, it was activated simultaneously to initiate the reading of GE for 20 minutes for each dance. The children did five minutes of stretching before and after testing.

The intensity was determined using the musical beat according to Trein (1986). Counting the musical beat (bpm) was made by a professional musician through digital metronome by Korg® model MA-30.

Each child participated in two styles of dances on alternate days. On the first day, 8 children started the tests with the DDR dance and the second time they danced Xote. Another part of the group started the tests with the Xote and later, moved on to DDR dance. All tests were performed in the afternoon, equipped with an air conditioner for controlling the room temperature with ample space, adequate lighting and sound system.

Xote was danced and obeyed the movement: two steps to one side and two to the other, in pairs (boys and girls) and evaluated only in the girls, with songs that featured a variation of musical progress between 82 and 85 beats per minute (bpm). But, the DDR was individually done with images on the projector, using the Playstation 2 and the carpet. We used music lesson mode, which includes the three phases of the game. The choice was supposed to be illustrative, drawn with arrows and moving feet, which facilitate the implementation of the steps.

To play DDR, players dance on a mat consisting of sensors, following the tracks of the carpet and the visual screen to the beat of a song. The dance pad has four arrows: Up, down, left and right. The participant must press the arrow dance carpet with their feet following the arrows of visual screen to the beat of a song. The objective of the game is to combine the movements with the arrow signs on the screen.

The game is divided into three stages: easy or beginner with musical beat (104-106 beats per minute - bpm), intermediate (76-78 beats per minute - bpm) and advanced (92-96 bpm). Each of these phases is subdivided into eight selections. At the end of each selection, a score based on how the player appears keep up using the onscreen arrows corresponding to feet movements.

Each test dance (Xote and DDR) lasted 20 minutes. Children made 5 minutes before stretching and after the test.

Statistical treatment

We used the statistical package SPSS (Statistical Package for Social Sciences) version 19. The statistical analysis was made by descriptive analysis to obtain their profile through measures of location (average and median) and dispersion (deviation default). For comparisons of data the test from the paired Student t test was used. To identify differences between the average energy expenditure between the styles of dance, we adopted the statistical significance level of $p < 0.05$ and 95% confidence break.

RESULTS

This study (Table 1), the children's average and standard deviation of body mass 36.67 ± 6,14kg. Body mass index (BMI = 18.0). The average and standard deviation of height was 148.37 ± 6,65cm. The levels of GE DDR had averages and standard deviations of ± 55.53 and 50.60 ± 16,20kcal 8,32kcal to dance Xote and DDR, respectively. The range established for acceptance or rejection of the hypothesis of the study was $p < 0.05$, and the present study showed $p > 0.05$ ($p = 0.095$), $t = -1787$ is smaller than $t = 1.812$ (Table 2), in this case the measurements are different.

A significant difference was found ($p = 0.095$). The standard error of estimate (SEE) of (EPExote = 2.14875 and 4.18486 = EPEDDR). Statistically, there was not a significant difference between the dances Xote and DDR.

Table 1 - Statement of energy expenditure estimated by accelerometer dances in children (n = 15) of primary school.

NP=15 IMC=18kg/m²	Age	Weight (kg)	Height (cm)	GE(xote)	GE(DDR)
Average	11	36,67	148,37	50,6	55,53
(Standard Deviation)	0	6,14	6,65	8,32	16,20
Median	11	6,4	150	52,0	55
Variance	0	37,7	44,2	69,2	262,7
EPE				2,149	4,284

DDR = Dance Dance Revolution; NP = n ° of participants; GE = energy expenditure; SEE = standard error of estimate, BMI = body mass index (kg / m²).

Table 2 - Paired Sample Test

		PAIRED DIFFERENCES					t	df	Sig. (2-tailed)
		Average	Deviation Average	Average Standard Error	95% Confidence Interval of Difference				
					Low	High			
Pair 1	Kcal (Xote) - Kcal (Carpet)	-4,9333	10,6935	2,7610	-10,8552	0,98857	-1,787	14	0,095

T=test t; DDR=Dance Dance Revolution= Carpet Dance ; DF= Significant Difference

DISCUSSION

The present study investigated the GE dances in 15 female children, 11 years old, for 20 minutes of Xote dance and 20 minutes DDR, evaluating the behavior of this variable through comparative study.

Researchers such as Pereira (2012) and Brown (2008), decided to conduct studies on active video games (JEA) and no active electronic games (JENA). Addressed in their studies that the JENA, manually manipulated with exposure to long periods sitting, become more sedentary and conducive to develop diseases.

Pereira et al (2012) conducted a review study, through literature search in PubMed and Science Direct, with articles published in English (2006-2011), aged 6-18 years, analyzing the GE, heart rate (FC) and the level of physical activity (PA) during practice and games JENA and JEA. They reported that all 13 review articles presented results GE with moderate or high-intensity, presenting higher GE in active games that requires movement of the entire body. Brown (2008) conducted a comparative study to assess heart rate and oxygen consumption of children for four types of games: a) a racing video game where the player sits and plays manipulating the buttons with fingers and thumbs; b) wii tennis, c) wii boxing and d) DDR. They realized that there was not much difference in PA levels between DDR games and wii boxing (WB), and the results of active games b, c, d, motion simulators, were three times higher than the games with children sitting and using video. This research confirms, through the results (55.53

kcal), that the game DDR movement reaches a level AF that promotes considerable GE, which proves that it can be practiced as a way of combating diseases caused by physical inactivity.

Regarding GE dances, Xote and DDR respectively, 50.6; 55.53 showed numerically different and statistically identical results. A component that may have influenced the results, may have been the change in musical beat (intensity) of the DDR, for being a game divided into three phases, as the degree of difficulty (according to the game manual); with early stage (104-106 bpm), intermediate (76-78 bpm) and advanced (92-96 bpm) while for the Xote dance, we used the same music with varying musical beat (82-85 bpm). Perhaps, this influenced the results of the Xote, because if you look at the bpm (intensity) in all three phases composing DDR, we can observe that it is superior to Xote dance, which could result in higher levels of GE, as contextualized with studies of Mcardle (2008), Wilmore and Costill (2001), to defend it: the difficulty of movement is proportional to GE; GE varies according to the type of AF, intensity, duration, body mass index (BMI), age and sex. The higher the degree of difficulty, intensity, duration and BMI, the greater the GE; females tend to spend less energy because of their body composition; body mass typically decreases with age; the sedentary ones have lower BMI.

This research was conducted in children aged = 11 years, female and shows an average: weight = 36,67kg; height = 1,48cm; BMI = 18.0 kg / m² (Table 1), and intensity in bpm. According to these data, we can see that the subjects involved in the study of short height; children are not obese. As Tavares et al (2010), is characterized obese when the BMI is above 30 kg / m². Based on the studies of McArdle (2008), GE Xote dances DDR and could have presented higher values if the study had been conducted in subjects with Morphophysiological features that elevate GE.

Another relevant component would be the dancing partner in the case of Xote. For him, to lead the dance, it is understood that may contribute to the execution of the movement that the lady decreases the effort and difficulty, corroborating with Wilmore and Costill (2001), mentioning that: the experience of a given movement and reducing the degree difficulty tends to reduce GE.

Given these verifiable studies, it can be stated that if the option is for games, it is preferable active games, because the execution of simulated movements while playing, provide GE resulting in PA practice.

In financial terms, it is suggested the practice of Xote dance, being a popular dance that does not require major technological devices when compared to DDR. Ribeiro et al (2007) gives with this statement, mentioning that the dance is a striking element in the world and in the Brazilian culture and it is spread across all ages and social classes, that it should be included in the PA programs for being pleasurable and promoting GE.

The results demonstrate that, although having a higher GE in the absolute level of DDR, they are statistically equal, and do not present significant difference. In this case, the individual may opt for DDR or dance Xote by presenting the same levels of GE.

For researchers, we suggest the continuity of our study, which is conducted in both sexes; other age groups; larger sample size; with other variations of bpm; with different types of dances and a greater variety of games; in order to obtain more information about activities that contribute to combat diseases caused by physical inactivity.

CONCLUSION

In this study it was observed that Xote and the DDR dance presented significant percentage of energy expenditure. There was no statistically significant difference. The research proves that both dances can be practiced to improve the quality of life and prevent diseases resulting from physical inactivity.

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COMPARATIVE ANALYSIS OF ENERGY EXPENDITURE IN CHILDREN 11 YEARS, THE XOTE DANCES AND DANCE DANCE REVOLUTION

ABSTRACT

The regular physical activity (PA) is important for quality of life and prevention of several diseases resulting from physical inactivity. The physiology of effort seeks to understand the relationship between energy expenditure (EE) and physical activity (PA) and prevention of diseases caused by physical inactivity (IF). This study aimed to determine and compare the GE dances Xote and Dance Dance Revolution® (DDR) for 20 minutes for each style, 15 children, 11 years old, the State School Madre Belém - Palmas / TO, Brazil. This study has shown an average and standard deviation (SD) of body mass (36.67 ± 6,14kg) and height (148.37 ± 6,65cm). To quantify the GE it was used the accelerometer caltrac® 100/100 plan, achieved levels of GE DDR (55.53 ± 16,20kcal) and Xote (50.60 ± 8,32kcal), we used the statistical package SPSS. Statistical analysis was done by the difference in average student paired t test, adopting a significance level of 0.05. A significant difference was found (p = 0.095) (EPExote = 2.14875 and 4.18486 = EPEDDR). The results demonstrate that both GE dances showed high levels. There was no significant difference for p <0.05.

KEYWORDS: Dance. Energy spent. Electronic games.

ANALYSE COMPARATIVE DE LA DÉPENSE D'ÉNERGIE PAR LES ENFANTS DE 11 ANS, LES DANSES XOTE ET DANSE DANSE REVOLUTION

RÉSUMÉ

L'activité physique régulière (PR) c'est importante pour la qualité de vie et la prévention de plusieurs maladies résultants de la sédentarité. La physiologie de l'effort essaye de comprendre la rélation entre la dépense d'énergie (DE) et la pratique d'activité physique, afin de prévenir les maladies occasionnées par l'inactivité physique (IF). L'objectif de cette étude est de vérifier et de comparer l'énergie dépensée par 15 enfants âgés de 11 ans, dans les danses Xote et Dance Dance Revolution (DDR), durant 20 minutes pour chaque rythme. Ces enfants, étudiants à l'Escola Estadual Madre Belém située dans la ville de Palmas\TO, au Brésil(,) ont présenté la moyenne et d'écart-type du poids (36,67±6,14kg) et la stature (148,37±6,65cm). La DE a été estimée par l'accéléromètre Caltrac® 100/100 plan, où on a obtenu des niveaux de DE entre les danses DDR (55,53±16,20kcal) et Xote (50,60±8,32kcal), selon les calculs du logiciel statistique SPSS. L'analyse statistique a été faite par la différence de niveau du test t Student, en adoptant le niveau qui correspond à 0,05.La différence trouvée entre les rythmes a été (p=0,095), (EPExote =2,14875 e EPEDDR =4,18486). Les résultats montrent que les deux rythmes de dances ont des niveaux de DE élevées. Donc, la différence n'a pas été significative pour p< 0,05.

MOTS-CLÉS: Danse. Dépensé d'énergie. Jeux électroniques.

ANÁLISIS COMPARATIVO DEL GASTO ENERGÉTICO EN NIÑOS DE 11 AÑOS, LAS DANZAS XOTE E DANCE DANCE REVOLUTION

RESUMEN

La actividad física (AF) regular es importante para la calidad de vida y la prevención de diversas enfermedades resultantes de la inactividad física. La fisiología del esfuerzo busca comprender la relación entre los gastos energéticos (GE) y la práctica de actividad física (AF) y la prevención de enfermedades causadas por la inactividad física (IF). Este estudio tuvo como objetivo verificar y comparar el GE de las danzas Xote y Dance Dance Revolution (DDR), con duración de 20 minutos para cada estilo, en 15 niños de 11 años, la Escuela Estatal de Madre Belém - Palmas / TO, Brasil. Presentarán una media y desviación estándar (DE) de masa corporal (36,67 ± 6,14kg) y altura (148,37 ± 6,65cm). Para cuantificar el GE utilizó el acelerómetro caltrac® 100/100 plan, obtuvo niveles de GE DDR (55.53 ± 16,20kcal) y Xote (50.60 ± 8,32kcal), se utilizó el paquete estadístico SPSS. El análisis estadístico se realizó por la diferencia de media del teste estudent pareado, adoptado el nivel de significación de 0,05. Se encontró una diferencia significativa de (p = 0,095) (EPExote = 2.14875 y 4.18486 = EPE DDR). Los resultados demostran que ambas las danzas presentan niveles de GE elevados. No hubo diferencia significativa para p <0,05.

PALABRAS CLAVE: Danza. Gastos Energéticos. Juegos electrónicos.

ANÁLISE COMPARATIVA DO GASTO ENERGÉTICO, EM CRIANÇAS DE 11 ANOS, ENTRE AS DANÇAS XOTE E DANCE DANCE REVOLUTION

RESUMO

A atividade física (AF) regular é importante para a qualidade de vida e prevenção de várias doenças resultantes do sedentarismo. A fisiologia do esforço busca compreender a relação entre gasto energético (GE) e prática de atividade física (AF) como prevenção das doenças ocasionadas pela inatividade física (IF). Este estudo teve como objetivo verificar e comparar o GE das danças xote e Dance Dance Revolution® (DDR), durante 20 minutos, para cada estilo, em 15 crianças, 11 anos, da Escola Estadual Madre Belém-Palmas/TO, Brasil. Apresentaram média e desvio padrão (DP) da massa corporal (36,67±6,14kg) e estatura (148,37±6,65cm). Para quantificar o GE utilizou-se o acelerômetro caltrac® 100/100 plan, obteve níveis de GE DDR (55,53±16,20kcal) e xote (50,60±8,32kcal), utilizou-se o pacote estatístico SPSS. A análise estatística foi feita pela diferença de média do teste student t pareado, adotando o nível de significância de 0,05. A diferença significativa encontrada foi (p=0,095), (EPExote =2,14875 e EPEDDR =4,18486). Os resultados demonstram que ambas as danças apresentaram níveis de GE elevados. Não houve diferença significativa para p< 0,05.

PALAVRAS-CHAVE: Dança. Gasto Energético. Jogos eletrônicos.