World Journal of Advanced Research and Reviews, 2019, 01(03), 045–051

World Journal of Advanced Research and Reviews

Cross Ref DOI: 10.30574/wjarr

Journal homepage: https://www.wjarr.com

(RESEARCH ARTICLE)

Effect of the massage and body manipulations contained in the traditional daily bath on motor development of 830 infants beninois

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Publication history: Received on 18 March 2019; revised on 16 April 2019; accepted on 20 April 2019

Article DOI: https://doi.org/10.30574/wjarr.2019.1.3.0021

Abstract

In Africa and more particularly in Benin, many cultural corporal practices are made to newborns to promote their development. Among these practices we have traditional body care that includes massage and various stretching exercises (mechanical manipulation of the body). And several conclusions of the studies carried out on the motor development of African children have put forward the hypothesis according to which these traditional bodily cares would be at the base of the motor precocity observed with the latter. It is to verify these conclusions that we set ourselves the objective of studying the effect of massage and mechanical manipulations on the motor development of 830 newborns in Benin. This longitudinal study grouped the newborns of the cities of Dangbo, Copargo, Kouandé and Comè declared apparently healthy by the head doctors of their health zones. Our results show that the group of newborns who received massage and mechanical manipulations of the body in their traditional body care acquired early motor skills (sitting, crawling, crawling, standing up and walk) before all the other two groups. And the group of newborns who only received the massage acquired all the motor skills that the newborns of the control group. This is proof that massage and mechanical manipulations of the body are the fundamental causes of the early development of Beninese infants.

Keywords: Motor development; Massage; Mechanical manipulations; Motor skills; Traditional daily bath; Benin

1. Introduction

Many studies in Africa have revealed the early motor development of African infants in the first three months of life [1-3]. How can we understand that infants from Third World countries living in extreme poverty can have early motor development compared to those in developed countries? This question leads us to understand the parameters existing in the African environment and which favor this early motor development. To answer this question, several authors have undertaken studies and found that this early development is neither a physiological difference, nor a difference in genetic factors nor a great maturity of the nervous system at birth [4]. What could then be the basis of this early development?

The work of Hopkins et al. [5] have shown that it is the cultural context that underlies this early acquisition of motor skills in African infants. Indeed, the author found in these studies that African children raised in Western modern conditions have lost this advantage of rapid progression of motor skills. Thus, there is no doubt that cultural differences are the cause of the results of the accelerated motor development of African infants.

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However, the loss of the benefit of early motor skill acquisition in African infants raised in modern European conditions [5, 6], raises awareness of the different cultural factors responsible for this early motor skill.

In Africa massage and stretching accompany the daily baths of infants. Infant members undergo various stretching exercises. Then the lower limbs are brought back to the forehead and the upper limbs in the back [7]. The four limbs of the infant are bent until the body describes a ball [8]. The body is rubbed, handled with shea butter [7]. All joints are manipulated by flexion-extension, rotation, adduction, abduction and supination movements. The spine is carefully massaged and manipulated by pressure on the various muscles of the back, on the buttocks and on each spinous process of the vertebrae [9]. Finally, the matron holding the infant by the ankles, the wrist and by the head shakes the whole body of the latter [7]. What is the effect of massage and body mechanical manipulations that we have just described on the motor development of 830 newborns in Benin?

2. Material and methods

This is a longitudinal study conducted in the departments of Atacora, Donga, Mono and Oueme (Republic of Benin). The health centers of Attakè, Comè, Dangbo, Birni, Chabi Kouma, Copargo, Ouaké and Sèmèrè served as a support framework for the experiment which lasted 15 months. The study involved a group of 830 newborns reported to be apparently healthy by the chiefs of these health centers, whose living parents in these cities agreed to participate in the study.

Infants are washed with water or hot decoction (twice a day) daily by their mothers. Depending on the practice of massage and body mechanical manipulations during this bath, infants were divided into three groups. At the end of each month and for fifteen (15) months, an appointment is made with the mothers to evaluate the motor development (to measure the motor skills acquired during the month) from the infants to the health centers.

The following inclusion criteria allowed us to select 830 infants: to be regularly vaccinated and washed with hot water or hot decoction, is declared healthy by the local chief doctor, to have a birth weight between 2500g and 3500g, have a birth size between 50cm and 55cm, exclusively breast milk fed during birth up to 6 months and have eliminated meconium within 24 hours after delivery.

They were divided into three experimental groups:

First experimental group gathers 278 newborns who received during the traditional baths the massage without the mechanical manipulations of the body;

Second experimental group is made up of 278 newborns who received during the traditional body treatments the massage and exercises of mechanical manipulations of the body;

Control group consisting of 274 newborns who have not received massage and mechanical manipulations of the body during daily care. It is important to note that here 46 newborns were recruited from orphanages that were only touched for rare diaper changes or for a daily bath of a few minutes (no traditional body care).

The first step in our investigation was the recruitment of the subjects. To do this, we approached health centers in these cities to give us permission to carry out the investigations in their centers. Once this authorization was obtained, we presented the objectives of our study to the women who came to these centers for the vaccination of their newborns.

Women who met the inclusion criteria received a questionnaire that allowed us to know the evolution of pregnancy, childbirth and follow-up after birth. After a record of data collection on the stages of motor development of infants was given to women. On this card, women marked the days when their children acquired the various motor skills (sit alone, crawl, stand up by clinging to a support, walk on all fours, stand up without help and walk alone).It was concluded with the women of an appointment per month so that we can collect on our file the motor development of the infants during the month.

2.1. The variables of the study

2.1.1. The independent variables

Massage and mechanical manipulations of the child's body;
The age of infants.

2.1.2. Dependent variables

The age to sit down;
The age of crawling;
The age to walk on all fours;
The age to stand with help;
The age to stand without help;
The age to walk.

2.2. Ethical considerations

The confidentiality of the collected data was guaranteed to the parents of the children concerned by the study, no name will appear in the final document. Only the data relating to the different variables will be taken into account. No children were included in the sample without the written informed consent of their parents.

We have received the authorization of the departmental health department and the health zone coordinators of the various municipalities of the study. The approval of the Sectoral Scientific Committee of Science and Technology of Physical and Sports Activities (CSS / STAPS) of the National Institute of Youth, Physical Education and Sport (INJEPS) was requested and obtained.

2.3. Statistical analysis

The collected data was compiled and then analyzed using IBM SPSS software version 21. For each variable, the normality of the distribution was verified, using the Kolmogorov-Smirnov test. Descriptive statistics: mean, standard deviation, were calculated. The Kruskall-Wallis test was used to compare the variation in development between the three groups during the experimental period. The threshold of significance was set at $p < 0.05$.

3. Results

3.1. Presentation of the motor development of the children of our sample

Almost all of our subjects walked before their first birthday (Table 1)

Table 1 Motor skill acquisition periods of the subjects in our sample

HM	N	Minimum (months)	Maximum (months)	Means (months)	Standard deviation (months)
Sit	830	4,00	8,00	4,77	1,41
Crawl	830	5,00	8,00	5,90	1,21
Walking on all fours	830	6,00	11,00	7,61	1,19
Stand with help	830	6,00	11,00	7,91	1,53
Stand without help	830	8,00	13,00	9,86	1,31
Walk	830	9,00	14,00	11,17	1,42

HM: Motor skill; N: total number; Minimum is the means of early skill acquisition;
Maximum represents the final date of acquisition of the skill;
Means is the date on which half acquires the skill.

3.2. Analysis of the development of children according to the types of body care received

Table 2 Motor development of infants in three body care groups received

Acquisition date	$GExp_2$ (month)	$GExp_1$ (month)	GC (month)
Sit	4,24 ±1,33**	5,46±1,01*	7,42 ± 1,09
Crawl	5,37 ±0,81**	6,51± 1,44*	7,63 ± 1,17
Walking on all fours	7,02 ±1,57**	7,89±0,75*	8,33 ± 1,14
Stand with help	7,91 ±1,19 **	8,43± 0,94*	10,82 ± 1,38
Stand without help	9,86± 1,07**	10,71±1,32*	12,73 ± 1,11
Walk	11,07 ± 94**	11,92±0,79*	13,16 ± 1,44

* in p. 0.05; ** p.0.01; ***p.0,001; the numbers represent the means of acquiring skills ± standard deviation. And all these means are expressed months

Variation in motor development of newborns in experimental groups. GC: Control Group; GExp1: experimental group 1 (massage without mechanical manipulation of the body); GExp2: Experimental group 2 (massage + mechanical manipulation of the body). Significant difference at $p < 0.05$ between experimental group 1 and experimental group 2 regardless of month and sex; significant difference at $p < 0.05$ between the control group and the first experimental group; significant difference at $p < 0.01$ between the control group and the second experimental group at monthly level.

In the second experimental group, newborns acquired all motor skills faster than newborns from other groups. These newborns sat at 4.24 ± 1.33 months (5.46 ± 1.01 for the first experimental group and 7.42 ± 1.09 for the control group). They crawled at 5.37 ± 0.81 months while neonates in the first group could do so at 6.51 ± 1.44 months and the control group at 7.63 ± 1.17 months. Neonates in the second group walked on all fours at 7.02 ± 1.57 (7.89 ± 0.75 months for the first experimental group and 8.33 ± 1.14 months for the control group). to stand with help at 7.91 ± 1.19 months (8.43 ± 0.94 for the first experimental group and 10.82 ± 1.38), can stand unaided at 9.86 ± 1, 07 months (10.71 ± 1.32 months for the first experimental group and 12.73 ± 1.11 months for the control group) and are able to walk at 11.07 ± 94 months (11.92 ± 0.79 months for the first experimental group and 13.16 ± 1.44 months for the control group).

4. Discussion

The average infant can sit without support at 4.77 ± 1.41 months. This average date of acquisition of this motor skill joins the results of the work carried out by Gerber. Indeed, Geber [3], for his part, found for Ugandan children, 4 months as the average age to sit without support.

Children can crawl between 5 and 8 months of life. The average age of appropriation of this skill is 5.90 ± 1.21 months. This result confirms the work of Super [10]. Indeed, the author found that the average Ugandan child crawls to 5.5 months. It is the same for Chisholm [11] who has shown that generally Navaho children acquire skills such as crawling and sitting between 6 and 8 months of life.

Infants studied can stand up without any outside help when they are between 6 to 11 months old. The average age to acquire this motor skill is 09.86 ± 1.29 months. These results confirm those of Geber's work [12]. Indeed, work done on Ugandan children shows that the average age of acquisition of standing without assistance is 10 months.

The age of ownership of infant walking selected for this study is between 9 and 14 months. The average walking age is 11.17 ± 1.42 months. These results are close to the results of Gerber [12] which revealed that the average age of walking in Ugandan children is 12 months.

Comparisons between the dates of appropriation of the different motor skills show that Beninese infants have an early motor development compared to Bayley's scale of development [13]. The average of the children in our sample acquired motor skills at least one month before the average of the children in the Bayley sample [13]. In addition, our infants have an advance of at least 1 month for the start date of all motor skills and an advance of more than 3 months for all motor skill acquisition age limits. . These results confirm the literature data on early motor development of

African infants in the first two months. Among these studies will be Geber's [12] work on Ugandan children, which shows a remarkable advance in the development of motor skills by Bayley [13] and Gesell [14] standards. He reported that Ugandan children sat without support at 4 months, stood at 7 months, worked well at 10 months and ran at 14 months. Similar patterns of accelerated dates of appropriation of sitting, standing, walking, climbing and descending stairs have been found in infants of African descent living in Jamaica [15] and living in the States. United States [13]. Many other studies have resulted in the results of early motor skill acquisition dates in African infants [16, 17].

Table two highlights the effect of massage and mechanical manipulations of the body on the motor development of infants. It reveals that the massage associated with the mechanical manipulations of the body greatly favor the precocity of the motor development of the infants. Indeed, in the group that received both elements, regardless of the motor skill considered, the motor skill acquisition ages are earlier than in the other two groups. Several studies have produced the same result as our study. A perfect illustration of the advantage of the practice of massage and mechanical manipulations on the age of appropriation of motor skills is given by the work of Hopkins [5]. Indeed, the author has experimented with the practice of massage, exercises of body manipulation and walking exercises of Jamaican mothers of African origin on the ages of motor skills. The results of this work showed that babies who receive this body education have better control of the head at 1 month, have sat and walked at an earlier age compared to children whose mothers did not do this. convenient. In addition, he found that these trained Jamaican children have an accelerated motor acquisition compared to English infants [5,6]. This confirms that traditional bodily education in Africa and Benin in particular through a few minutes of stimulation and body manipulation a day over a few months, accelerate the motor calendar of children [18]. In Zelazo's study [19] children are subjected to a few minutes daily of walking exercise. It was noticed that these girls had gained the walk before 9 months of life. Porter [20], showed that eight weeks of passive exercise (20 minutes of daily leg climbing) resulted in higher scores on the Gesell scale compared to controls who did not perform this exercise. In addition, Lagerspetz [21] proved that three weeks of training (moving infants to crawl for 30 to 40 minutes a day) resulted in higher scores on the Bayley scale [13] and a higher acquisition. Early age of the ramp compared to children who have not undergone this training. Zelazo's study [22] shows that an eight-week training (standing up for 12 minutes a day) allows early onset of walking compared to children who have not been trained or trained. Who have been passively trained. The same author, in another study, submitted his child to a series of exercises as early as his eighth week of life. This child walked 7.5 months later.

However, the delayed contact in infants of the private control group of massage and mechanical manipulation of the body shows the paramount importance of these elements contained in the traditional body care on the motor development of the child. These results are consistent with those of the literature. Indeed, Dennis [23-24] reported after this work, dramatic delays in the motor development of infants deprived of any bodily stimulus.

5. Conclusion

From all the foregoing, it emerges that body-to-body (massage) and body mechanical manipulations contained in traditional body care are very important for the motor development of infants. They promote the early acquisition of motor skill ages among them. Thus, these various actions mentioned above are the first elements that justify the rapid motor progression observed in Beninese infants.

Compliance with ethical standards

Acknowledgments

The authors thank Mr DOSSOU Nicolas Assogba and Mrs ZINSOU Honorine for the financial support they received for the implementation of the research. They also express their thanks to the Director of the 3S Center for providing us with the necessary material for carrying out this research. We would like to thank all the vaccination teams at the health centers selected for this study. Finally, our thanks to the newborns who participated in this study.

Disclosure of conflict of interest

The authors declare no conflicts of interest.

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How to cite this article

Dossou SG, Lawani MM, MESSAN F, Yessoufou L, Tigri NT and Houéto GV. (2019). Effect of the massage and body manipulations contained in the traditional daily bath on motor development of 830 infants beninois. World Journal of Advanced Research and Reviews, 1(3), 45-51.