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Comparative Study of Emotional Growth between Preterm Infants and Term Infants

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ABSTRACT: Emotional growth of preterm infants in 12th month is assessed in this investigation. 41 preterm infants (M=27.16 weeks) and 22 term infants (M=39.30) were compared in standardized behavioural test. Studying emotional reaction of happiness, anger, fright, and permanent attention were purposes of this investigation. Behavioural assessment showed that preterm infants rejoice the same as term infants during an exciting joy. Preterm infants showed intense reaction relate to situation makes emotional reactions of fear. Preterm infants showed high grade of movement activity in all 3 situations. They had a different heedfulness pattern i.e. reduction of primary attention level during the event. Clinical relation of the effective results on behavioural problems was studied too.
Keywords: Preterm infants, Emotional development, Behavioural assessment

INTRODUCTION

Researchers believe that growth is a continuous dynamic system since birth until death and forms complicated network of biologic psychological and social effects [1]. The main approach of dynamic systems is lifetime point of view including some hypotheses as 1-permanent, 2- multidimensional, 3- flexibility that several effective powers influence on it [2]. In each period, changing occurred in all 3 main connections as corporal, cognitive, emotional- social field. Organizing survival, social communications, and exploring the surrounding is the main role of emotion. Emotional development might be studied in 3 levels as emotional distinctions, excitements interpretations, and controlling excitements. Excitements would be distinguished 2 years after birthday. Primary emotional life includes 2 general excitation moods, attracting to pleasant stimuli and remoteness of unpleasant stimuli [2].

Emotional reaction in the first month depends on inner mood of infant, while during 1-6 month after birth reflects his/her awareness of surrounding and during 6-12 months after birthday reveals controlling environment. The most important emotional reactions include happiness and enjoyment, anger, fear, grief impressed by different factors including pregnancy age in birthday of infant.

Most of researches have showed a negative relation between birth of preterm infant and growth of infant. Weak point of results is due to age of examinees based on school and teenager times that have acquired lots of movement cognitive social skills while development disorders are noticeable during low ages. Research about preterm infants during teenager times has showed some weak of motional skills [3], cognitive delay [4], performance and attention problems and emotional-social problems [5].

Charkaluk et al. [6] studied cognitive- movement problems when 12-month after birth. Different studies reported about emotional development in preterm infants [7]. Pregnancy age when birthday of infant is an important factor for social-emotional development of preterm infants. This item relates to weak of cognitive growth in infants [8, 9].

Emotional-social behaviors of preterm infants compare to term infants in 6-week and late of teenager time is reported differently. Hyperactivity and behavioral problems are the most problems reported for teenager times of preterm infants [10]. Measuring the behaviors in low ages is hard and emphasizes on some factors such as individual-biological differences and special excitements.

Questionnaires are suitable tools for studying morality of teenagers; but questionnaires rarely show differences in lower ages such as 6-12 month year old Questionnaires of 2-year old, show differences . Although their results are vague.

Spittle et.al reported that emotional-social ability in preterm infants is low in 2-year old. Scores of emotional patterns of smile and problem solving in preterm infants were reported low. 4 month preterm infants show less reaction relate to positive emotional motives. They show more reaction relate to negative emotional motives. In addition, preterm infants in two-year old had weaker self-regulation performance compare to term infants [9]. Special Laboratory investigations about emotional reactions of preterm infants are not tangible especially in Iran. Therefore, comparing emotional reaction of preterm infants and term infants in 12-year-old in different emotional situations is purpose of the present paper .standardized behavioral assessment is used in order to study reactions of infants. According to last studies, it is expected that preterm infants react less relate to positive stimulations and

react more relate to negative stimulations.it is expected that experimental assessment relate to questionnaire studies show emotional reaction differences between preterm infants and term infants better.

MATERIAL AND METHODS

Preterm infants were born in Kosar hospital in Ghazvin city in 2012. They were born in less than 29 weeks of pregnancy. Among 102 infants, 20 infants died and 12 infants had congenital rudeness. So they were existed from the study. Among 70 remained infants, 19 infants refused to take part in test and 10 infants existed during the study. Therefore, we gathered 41 infants as examinee. 22 infants who were born more than 38-week after pregnancy formed control group. Matching was done from the viewpoint of age of mother, diseases of mother, and not exposing to Teratogen - factors.

There was not important age difference between the 2 groups. Economical-social situation of families of preterm infants compared with term infants provided in table 1.

Table 1. Population specifications

Preterm infants n=41	(Standard deviation) average
Pregnancy age (week)	27.16 (1.02)
Birth weight (gram)	996.12 (211.16)
Smaller than pregnancy age	6(%14.16)
MDI index of bilos mental development	97.78 (13.40)
PDI Index / Bayls Psychomotor development	77.66 (15.42)

Process: Parents showed their readiness for participating in the study. All of infants were assessed in 4 times as puppet, placing an attractive dull behind obstacle, unpredictable mechanical toy, playing with wooden pieces. These events evaluated respectively happiness, anger, fear, and permanent attention variables.

Puppet: 2 hands of a dull tickle child this experiment was planned in order to make baby happy.

Placing an attractive dull behind obstacle: Favorite toy of child was taken in 2 different times and was placed behind plastic obstacle for 30 seconds. Child can see the toy; but cannot obtain it. This work was done in order to make him/her angry.

Unpredictable mechanical toy: A mechanical dog while barking was taken near child. This experiment was repeated two times in order to make fear in child.

Playing with wooden pieces: Child was permitted to play with wooden pieces for 3 minutes. This process was planned in order to measure permanent attention. This process was performed according to LAB-TAB strategies. Experiment was done in a silent room with presence of one trained person (parent). Parent shall not interfere when experiment. LAB-TAB experiments were offered randomly. The experiment starts with an event that infant is comfortable with it. 11 items of observations of samples took out of the experiment due to experimental deficiency.

Emotional reaction: In this study, excitement reaction was main criteria of LAB-TAB experiment. By using LAB-TAB coding system, 3 criterions were considered for each test as facial changes, vocal changes, and physical changes. Average score and the peak intensity of emotional reactions were calculated in each test.

puppet "happiness": the experiment was divided into 5 time spans: 1- since introducing dolls until the first tickling (lasted as 30 seconds) 2- since the first tickling until second one (lasted 15 seconds) 3- since second ticking until 3rd one (lasted 15 seconds); 4- since 3rd tickling until disappearance of dull (lasted 15 seconds); 5- free play with dolls (lasted 30 seconds).

The last time span (free playing) is not encoded. Different variables were acquired for other 4 time spans including laugh intensity, positive vocal activity, and positive movement activity. Remoteness of doll was measured as negative movement activity variable.

Attractive toy placed behind barrier: Attractive toy that is placed behind barrier (anger): this test includes 2 sections each lasts 30 seconds. Each 30-second test has been divided into 6 spans as 5-second time-span. The following variables have been encoded for each 5-second time-span by LAB-TAB guide as anger intensity in face, Stress sound intensity and physical activity Intensity another variable (distraction) was encoded by searching in room, gazing at examiner.

Rotating, playing by another instrument

Unpredictable mechanical toy "fear: this test was repeated two times. Each time of it was divided into 3 time spans. Dog goes near dog in first 5 seconds; then it stands in front of dog in the next 5 seconds. Each time interval is encoded for the following variables: Terrified face level, Stress sound intensity, and terrified physical body level.

In this test, another variable was encoded as positive motion activity such as going ahead, arriving, or catching a mechanical toy.

Permanent attention

Wooden pieces test: it lasts 3 minutes totally. Each minute is divided into 6 time-span each for 10 minutes. These 10-second time spans are encoded for the variables as follows: interest level in face، Continuity of manipulating toys and continuity of observation. Any other variable is considered in this experiment.

Statistical analyses: Parametric tests were used for comparing emotional reaction for analyses of variables of LAB-TAB test for both groups .as noted, economical-social situation was different between these 2 groups. Therefore, this variable should be considered as diffraction variable. We used Ancova analysis in order to control effect of economic-social situations of families.

Internal validation: 21% of films are encoded independently (9 preterm infants and 4 term infants). This action was performed by 2 trained encoders. Pierson coefficient was used for Validation. Correlation coefficient changes was reported between 0.6 to 0.99 (average 0.84).

RESULTS

Emotional reaction, puppet: Ancova analysis showed that preterm infants showed more positive physical activity relate to dolls. Average of scores confirmed it too. Ancova analysis showed that average and maximum of reaction in face and Phonetic stress of preterm infants was more.

Unpredictable mechanical toy: Results showed that average and maximum amount of peak sound in preterm infant were more in the first test. While in the second test, both of Moderate fear of a face and voice stress were less. On the other hand, average of positive physical activity of preterm infants was high.

Table 2. Average and maximum score of variables with partial effect of economic-social situation (with 0-3 criteria)

Index	Mean (SD)			Max. (SE)		
Variable	preterm	term	Sig.	preterm	term	Sig.
Puppet Play						
Smile	2.04 (0.16)	1.88 (0.21)	0.51	2.57 (0.16)	2.29 (0.22)	0.29
Positive vagary	40.29 (0.08)	0.26 (0.11)	0.85	0.55 (0.14)	0.64 (0.18)	0.77
Positive motional actions	1.09 (0.15)	0.45 (0.2)	*0.02	1.74 (0.2)	1 (0.27)	*0.04
negative motional actions	0.19 (0.6)	0.13 (0.08)	0.58	0.37 (0.12)	0.27(0.16)	0.65
Doll behind the barrier						
Anger in face (1)	0.73(0.12)	0.25 (0.15)	*0.02	1.44 (0.19)	0.7 (0.24)	*0.02
Phonetic stress (1)	0.66 (0.1)	0.37 (0.13)	*0.01	1.44 (0.12)	0.7 (0.24)	*0.02
struggling	0.96 (0.12)	0.68 (0.15)	0.19	1.75 (0.16)	1.28 (0.21)	0.1
Distraction (1)	1.11 (0.13)	1.35 (0.17)	0.28	2.12 (0.16)	2.27 (0.21)	0.58
Anger in face (2)	0.77 (0.14)	0.37 (0.19)	0.1	1.42 (0.21)	0.77 (0.27)	0.07
Phonetic stress (2)	0.65 (0.12)	0.33 (0.16)	0.11	1.21 (0.22)	0.66 (0.23)	0.08
Struggling(2)	0.77 (0.13)	0.45 (0.16)	0.07	1.51 (0.17)	1.02 (0.22)	0.09
Distraction (2)	1.29 (0.16)	1.51 (0.21)	0.4	2.18 (0.18)	2.34 (0.24)	0.61
Unpredictable mechanical toy						
Fear in the face (1)	0.64 (0.15)	0.81 (0.2)	0.31	1.05 (0.18)	1.15 (0.24)	0.75
Phonetic stress (1)	0.05 (0.1)	0.42 (0.13)	*0.03	0.12 (0.12)	0.62 (0.16)	*0.02
Fear of the body (1)	0.36 (0.07)	0.48 (0.09)	0.44	1.29 (0.17)	1.27 (0.23)	0.96
Positive motional acts (1)	0.86 (0.14)	0.5590.19)	0.22	1.36 (0.19)	0.92 (0.25)	0.17
Fear in the Face (2)	0.47 (0.17)	1.22 (0.22)	*0.01	0.69 (0.19)	1.45 (0.26)	*0.02
Phonetic stress (2)	0.22 (0.14)	0.82 (0.19)	*0.04	0.44 (0.17)	1.01 (0.23)	0.06
Fear of the body (2)	0.29 (0.58)	0.55 (0.11)	0.09	0.9 (0.99)	1.44 (0.22)	*0.03

Permanent attention, wooden pieces: Ancova analysis showed that attention level of preterm infants is more than term infants in the first and second minutes. Linear trend of permanent measurement of preterm infants showed different attention pattern. It started in a high attention level. It decreased during the term continuously. While this pattern remained unchangeable in term infants.

Relation between permanent attention and emotional reaction: 3 time spans in wooden pieces experiment had reciprocal correlation (P<0.01). Average of these 3 time spans changed to rank. A partial correlation was observed between score average of permanent attention and emotional reaction.

Effects of economical-social situation of families: Economic-social situation as diffraction variable effected on results of emotional reaction results and permanent attention partially. Communicative study of economical-social situation of groups with positive motional activity variable in puppet and negative motional activity due to fear in the first stage of mechanical toy test decreased group differences from p=0.08 to p=0.06.

There was not any considerable group difference in communicative study of economical-social situation of families and vocal tension variable in unpredictable toy tes (p=0.03) and positive motional activity (P=0.05). Additionally, there was not any economical-social difference in third minutes of wooden pieces test (p-0.03). Effect of economic-social situation of families in results was average.

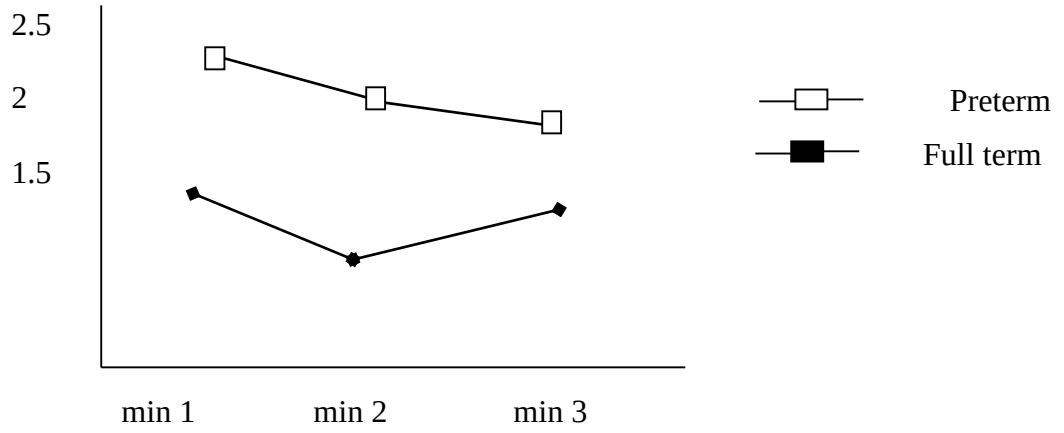

Figure 1. Average of permanent attention of preterm infants and term infants affected by economical-social situation

DISCUSSION

Studying emotional reaction of preterm infants compare to average term infants of LAB-Tab behavioral assessment system is objective of the present investigation. Results of behavioral assessment showed that preterm infants express happiness the same as term infants. But preterm infants reacted more compare to fear and situations that create fear. Compare to term infants, they showed more negative emotional reaction in inflammatory anger situation. While they showed less negative emotional reaction in fearful situation. Preterm infants had more attention level compare to term infants. But this level of attention decreased at the end of test. In history of research it was expressed that preterm infants in younger ages laugh less in exciting situations.

These differences were not confirmed in this investigation. Happiness amount in all 3 tests were the same in face and voice in both of 2 groups; but preterm infants showed more emotional reaction relate to happiness (such as clawing to dull) that showed high emotional response relate to stimulator. This hypothesis was confirmed that preterm infants react more relate to negative stimulators in provoking test. But it was not the same in fear-maker stimulators. In examination of attractive toy behind barrier, preterm infants showed their frustration more in face and voice. In functionalist perspective, Emotional reaction in face and voice would be interpreted as a reaction relate to environment [11].

Revealing anger, child wants to change something in environment. It seems that preterm infants have less emotional strategies to confront with environment. Preterm and term infants used distraction strategy for decreasing anger intense [12], while performance was better in term infants.

In test of response to fear stimulator, the intensity of the emotional reaction of fear for preterm infants was less. According to similar results of Cooke [8] it can be due to delay in growth. Fear is an excitement which would be appeared in infant six months after birthday. Before six-month year old, infant does not recognize threatening situation [13]. If reduced fear pattern disappears by increasing age, it shows growth delay that is a special emotional experience. Therefore it is suggested that emotional examinations be performed in younger infants in next studies.

In all examinations, infants showed high motional activity pattern apart from this point whether the examination is for provoking anger or stimulating happiness or fear. Preterm infants manipulated toy more than term infants. This pattern was obvious in permanent attention examination too. In this analysis, we measured manipulation amount more. In the first minute, preterm infants showed more amount of manipulation level compared to term infants, while in 3rd minute these manipulations reduced to level of term infants. In contrast, term infants started the test by lower level of manipulation. But kept this level during 3-minute period. According to above items, these behaviors can forecast hyperactivity disorder [4]. Although it would be recognized when school time, but studies show that hyperactivity of preterm infants is recognizable in 3-year-old age. In order to determine whether behavioral differences of these 2 groups in 12-month age in ADHD is effective, it is necessary to study behavior of this group of preterm infants until school age.

Unlike results in history of the research, this study showed there is a significant relation between permanent attention and emotional reaction. De Kieviet et al. [3] showed there is a negative correlation between negative emotional reaction and reaction in 6-month age. It is suggested to study other factors such as attachment and bearing up method of parents for more study of emotional-social growth of preterm infants. Depression of preterm mothers after birth of infants is an effective factor in emotional-social growth of infant. In addition, it is suggested to study effective factors on emotional growth of preterm infants such as negative structural changes or environmental factors. Results of the research showed that preterm infants are exposed to an unusual emotional-social development when they are 12 month such as high-level anger excitement reaction, reduced reaction of fear, elevated motional activity and increased attention level but fast reducer. As these kinds of behaviors may be background of ADHD disorders in older ages, it is better to study these behaviors when 12-month age in order to control ADHD on time.

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