

# A Study to Compare the Growth and Development of Exclusive and Non Exclusive Breast Fed Infants at Selected Community Areas of District Patiala, Punjab

Akvinder Kaur<sup>1</sup>, Sukhvir Kaur<sup>2</sup>, Mukesh Chandra Sharma<sup>3</sup>

<sup>1</sup>M.Sc - Child Health Nursing

<sup>2</sup>Assistant Professor, Child Health Nursing

<sup>3</sup>Associate Professor, Child Health Nursing

**Abstract:** ***Introduction:** According to WHO guidelines breastfeeding is mandatory up to 6 months of life of an infant without any supplementation. It protects infants from various infections and helps in proper growth and development. **Aim:** The aim of the study is to compare the growth and development of exclusive and non exclusive breastfed infants at selected community areas of district Patiala, Punjab. **Method:** A comparative descriptive study was conducted on 150 sample (infants) .Sample was selected by using quota sampling technique. The data was collected by using socio demographic profile, growth chart given by centers for disease control and prevention (CDC) and self structured observation checklist. **Result:** Regarding growth – Shows that mean height of aged 2,4 & 6 months exclusively and non exclusively breastfed infants were ( $52.16 \pm 15.90$ ), ( $60.76 \pm 4.16$  vs  $59.72 \pm 3.61$ ) and ( $64.48 \pm 4.45$  vs  $61.48 \pm 2.22$ ) respectively, mean weight of 2,4 & 6 months of infants were ( $4.23 \pm 0.74$  vs  $3.64 \pm 0.68$ ), ( $5.57 \pm 1.11$  vs  $7.49 \pm 10.55$ ) and ( $8.41 \pm 9.78$  vs  $6.02 \pm 6.67$ ) respectively. Mean head circumference were ( $39.52 \pm 2.45$  vs  $38.44 \pm 2.08$ ), ( $40.80 \pm 1.66$  vs  $40.60 \pm 1.91$ ) and ( $41.96 \pm 2.05$  vs  $40.72 \pm 1.24$ ) respectively. Finally, the findings revealed that growth of exclusive breastfed infants was better as compared to non exclusive breastfed infants. Simultaneously, The results regarding developmental milestones shows that exclusive breastfed infants had better developmental milestones as compared to non exclusive breastfed infants.*

**Keywords:** Exclusive breast feeding, non exclusive breastfeeding, growth and development.

## 1. Introduction

Mother and child bonding is a beautiful creation by God. It is the first step for relationship and fosters a sense of security for child. Nursing is a wonderful experience for both mother and baby. It provides ideal nourishment and special bonding experience.<sup>1</sup>Breastfeeding is the most effective way to provide a baby with a caring environment and complete food. It meets the nutritional as well as emotional and psychological needs of the infant. It is the safest, cheapest and the best protective food for infants. It is the perfect food for infants and provides total nutrient requirements for the first six months of life. It prevents malnutrition and allows the child to develop fully.<sup>2</sup>

## 2. Background of the study

Evidence from several studies suggests that breastfeeding exclusively for the first six months of life supports optimal growth with the lowest risks of infection and ill health. The acquisition of the many anti-infective agents in colostrums and breast milk provides protection for the young infant against infective agents. Exclusive breast-feeding for the first six months of life however conflicts with local knowledge in our environment and mothers frequently start complementary feeding before the age of six months.<sup>3</sup>

Mo-suwan et al (1998)found that exclusive breastfed infants were healthy and developed normally, so exclusive breastfeeding is necessary up to 6 month of age.<sup>4</sup> Jonsdottir (2004) concluded that exclusive breastfeeding prevents

obesity in early childhood .He found out that formula fed infants gain more weight at 3 month of age as compared to exclusive breastfed infants, but later in adulthood it leads to obesity.<sup>5</sup>Kramer et al (2006) found that faster weight and length gains with early weaning and slower gains with prolonged and exclusive breastfeeding.<sup>6</sup>

Exclusive breast feeding is more effective as it causes proper growth and development in infants and boosts immunity that prevents infants from various health problems but now a day's most of the mothers are working, and conscious about their body image. There is lack of knowledge regarding feeding practices that causes lactation failure which promote early introduction of complementary foods. According to WHO guidelines, exclusive breastfeeding is very necessary up to 6 months of age but now a day's, non exclusive breast feeding is more common. There are very few infants who rely on exclusive breastfeeding while most of the infants are on non exclusive breastfeeding.

In this study, the Information was gathered regarding growth and development of exclusive and non exclusive breast fed infants that will be helpful for health workers to educate the mother regarding the importance of exclusive breastfeeding for healthy growth and development of the infants.

## 3. Material & Methods

This was a comparative descriptive study to compare the growth and development of exclusive and non exclusive breastfed infants at selected community areas of district

Patiala, Punjab. The study was carried out among 150 infants which includes 75 each exclusive and non exclusive breastfed infants. Sample was selected by quota sampling technique. The data collection tool was based on the socio demographic profile and data was collected by growth chart given by CDC. It included parameters such as height, weight and head circumference. Weight was checked by weighing machine and height and head circumference was measured by measuring tape. The milestones development was observed by self structured observation checklist. It included physical, cognitive, psychosocial and language milestones. Further, the Data was analyzed by descriptive and inferential statistics.

#### 4. Results

##### Section – A Description of sample characteristics

**Table 1:** Frequency, percentage distribution of sample characteristics, N=150 (N<sub>1</sub>=75, N<sub>2</sub>=75)

Demographic Characteristics	Breast feeding pattern			
	Exclusive breastfed		Non exclusive breastfed	
	F	%	f	%
<b>Age of mother</b>				
Up to 20 Years	13	17	12	16
21-25 Years	47	63	38	51
26-30 Years	12	10	23	31
Above 30 Years	03	10	02	02
<b>Education</b>				
Illiterate	19	21	15	20
Matriculation	35	47	28	37
Senior Secondary	12	10	25	33
Graduation	08	21	07	01
Post Graduation	01	01	00	10
<b>Employment</b>				
Government Employed	10	20	17	23
Private Employed	13	17	24	32
Self Employed	06	02	08	10
Home Maker	46	61	26	35
<b>Characteristics of Infants</b>				
<b>Baby Gender</b>				
Male	44	59	32	43
Female	31	41	43	57
<b>Age of infant</b>				
2 months	12	10	13	12
3months	17	13	28	31
4months	43	10	32	51
6 months	03	67	02	06
<b>Mode of Delivery</b>				
Normal vaginal delivery	49	61	24	32
NVD with instrumentation	11	22	27	46
Cesarean section	13	17	19	22
<b>Weight at birth</b>				
2.5-3 kg	55	74	45	40
3.5-4 kg	20	27	30	60
<b>Breast feeding pattern of infants</b>				
<b>Breastfeeding pattern</b>				
Exclusive breastfed	75	100	00	11
Non exclusive breastfed	00	00	75	89

Table 1 describes the distribution of sample characteristics according to the sociodemographic profile. Majority of subject's mothers in exclusive breast fed group (63%) and non exclusive group (51%) belonged to the age group of 21-

25 years. Majority of mothers in exclusive (47%) and in non exclusive group (37%) were metric passed. Majority of the subject's mother in exclusive breastfed group (61%) and non exclusive breastfed group (35%) were home maker. There was maximum number of males in exclusive breastfed group (59%) and females in non exclusively breastfed group (57%). Majority of the infants belonged to the age group of 6 months(67%) in exclusively and age group of 4 months (51%) in non exclusively breastfed infants. If we look at the monde of delivery majority of infants (61%) were normally delivered in exclusive breastfed group whereas in non exclusive group majority of infants (46%) were delivered through cesarean section. Majority of infants (74%) were weighted between 2.5-3 kg in exclusive group where as in non exclusive group majority of (60%) infant's birth weight lying between 3.5-4 kg. In breastfeeding pattern majority of (100%) infants were exclusively breast fed whereas ( 89 %) were non exclusively breast fed.

##### Section – B Description and comparison of growth parameters of exclusive and non exclusive breastfed infants.

**Table 2:** Mean Standard deviation and Comparison of growth parameters of exclusive and non exclusive breast fed infants

Physical parameters	Exclusive	Non Exclusive	Mean difference
	Mean ± SD	Mean ±SD	
<b>2 months</b>			
Height	56.04± 3.14	52.16±15.90	3.88
Weight	4.23±.74	3.64±.68	0.59
Head circumference	39.52± 2.45	38.44± 2.08	1.08
<b>4 months</b>			
Height	60.76 ±4.16	59.72 ±3.61	1.04
Weight	5.57 ±1.11	7.49± 10.55	1.92
Head circumference	40.80 ±1.66	40.60± 1.91	0.2
<b>6 months</b>			
Height	64.48±4.45	61.48±2.22	3.0
Weight	8.41 ±9.78	6.02±.67	2.39
Head circumference	41.96± 2.05	40.72± 1.24	1.24

Table 2 depicts that in exclusive and non exclusive breastfed infants the mean height of aged 2,4 & 6 months were (.04 ± 3.14 vs 52.16 ± 15.90 ), ( 60.76± 4.16 vs 59.72±3.61) and (64.48±4.45 vs 61.48± 2.22) respectively and the mean **weight** were (4.23±.74 vs 3.64± .68), ( 5.57± 1.11 vs 7.49 ±10.55) and (8.41± 9.78 vs 6.02±.67) respectively. The Mean **Head circumference** in exclusive and non exclusive breastfed infants aged 2,4 and 6 months were (39.52± 2.45 vs 38.44±2.08), ( 40.80± 1.66 vs 40.60±1.91 ) and(41.96±2.05vs 40.72vs1.24)respectively. Finally, the findings revealed that growth of exclusive breastfed infants was better as compared to non exclusive breastfed infants.

##### Section –C Description and comparison of developmental milestones of exclusively & non exclusively breastfed infant

**Table 3:** Frequency, percentage & comparison of developmental milestones of 2 months exclusively & non exclusively breastfed infants.

2 months	Breastfeeding pattern				
	Exclusive breastfed		Non exclusive breastfed		
	F	%	F	%	
<b>Physical development</b>					
Arms flexed and legs extended	No	00	00	00	00
	Yes	25	100	25	100
No head droop	No	00	00	00	00
	Yes	25	100	25	100
Hold head erect in mid position	No	00	00	01	04
	Yes	25	100	24	96
Hold head up and begins to push up when lying on tummy	No	00	00	04	16
	Yes	25	100	21	84
Smoother movements with arms and legs	No	00	00	05	25
	Yes	25	100	20	80
Hands may be open	No	00	00	08	32
	Yes	25	100	17	68
Holds a rattle when placed in the hand	No	00	00	12	48
	Yes	25	100	13	52
<b>Cognitive development</b>					
Pays attention to faces.	No	00	00	13	52
	Yes	25	100	12	48
Begins to follow things with eyes and recognize people at a distance	No	00	00	12	52
	Yes	25	100	13	48
<b>Psychosocial development</b>					
Sense of trust	No	00	00	12	52
	Yes	25	100	13	48
Distinguish mother or primary care giver	No	00	00	08	32
	Yes	25	100	17	68
Maintain eye to eye contact	No	00	00	02	08
	Yes	25	100	23	92
Smiles back in response to another's smile	No	00	00	02	08
	Yes	25	100	23	92
<b>Language development</b>					
Response to caregiver voice:	No	00	00	04	16
	Yes	25	100	21	84
Soothed by caregiver or mother voice	No	00	00	08	32
	Yes	25	100	17	68
Cry pattern develop	No	00	00	11	44
	Yes	25	100	14	56
Coos, makes gurgling sounds	No	00	00	11	44
	Yes	25	100	14	56

**Table 3** shows that maximum (100%) of exclusively breastfed infants achieved their physical, cognitive, psychosocial, language developmental milestones normally whereas in non exclusive group all infants achieved the physical milestones arms flexed & legs extended and no head drop. Only 96% holds head erect in mid position, 84% push up tummy, and 80 % achieved smoother movements, and only 68% hands open, 52% holds rattle. Regarding the cognitive development, only 48 % infants achieved all milestones. About the psychosocial development, majority of the infants achieved eye to eye contact and smiles back whereas only 68% distinguished between primary care giver & mother, 48% developed sense of trust. Regarding the language development, 56% developed cry pattern & makes sounds like coos & gurgling, majority of the infants 84%

achieved response to caregiver voice, only 68% achieved soothing by caregiver's voice.

**Table 4:** Frequency, percentage & comparison of developmental milestones of 4 months exclusively & nonexclusively breastfed infants

4 MONTHS	Breast feeding pattern			
	Exclusive breast fed		Non- exclusive breast fed	
	F	%	F	%
<b>Physical Development</b>				
Holds head steady, unsupported	No	00	00	0
	Yes	25	100	25
Pushes down on legs when feet are on a hard surface	No	00	00	2
	Yes	25	100	23
Able to roll over from tummy to back	No	00	00	3
	Yes	25	100	22
When lying on stomach, pushes up to elbows	No	00	00	6
	Yes	25	100	19
Activates arms at the side of preferred toy	No	00	00	6
	Yes	25	100	19
Brings hands together at midline	No	00	00	4
	Yes	25	100	21
Grasp object in hand	No	00	00	7
	Yes	25	100	18
Brings hands to mouth	No	00	00	6
	Yes	25	100	19
<b>Cognitive development</b>				
Responds to affection	No	00	00	5
	Yes	25	100	20
Reaches for toy with one hand.	No	00	00	4
	Yes	25	25	21
Uses hands and eyes together, such as seeing a toy and reaching for it.	No	00	00	4
	Yes	25	100	21
Recognizes familiar people and things at a distance	No	00	00	7
	Yes	25	100	18
<b>Psychosocial development</b>				
Sence of trust	No	00	00	6
	Yes	25	100	19
Smile in response to smiles of others	No	00	00	3
	Yes	25	100	22
Likes to play with people and might cry when playing stops.	No	00	00	3
	Yes	25	100	22
Copies some movements and facial expressions, like smiling	No	00	00	3
	Yes	25	100	22
<b>Language development</b>				
Begins to babble.	No	00	00	3
	Yes	25	100	22
Babbles with expression and copies sounds he hears	No	00	00	4
	Yes	25	100	21

Table 4 depicts the frequency, percentage & comparison of 4 months exclusively & non exclusively breastfed infants. It shows that the exclusively breastfed infants achieved physical, cognitive, psychosocial & language development milestones normally whereas in non exclusively breastfed infants all the infants achieved head supporting, (92%) achieved pushing feet down, only (88%) achieved rolling movements, (84%) achieved bringing hand together in midline under the physical development. Regarding cognitive development, majority of the infants achieved the milestones reaching to the toy & using hands & eyes together whereas only (80%) achieved the response to affection. If we look at psychosocial development maximum

of the infants (88%) achieved all milestones; only 76% achieved sense of trust where as in language development majority of the infants (88%) achieved begins to babble while only (84 %) babbling with expression & coping sounds started at the age of 4 months.

**Table 5:** Frequency, percentage & comparison of developmental milestones of 6 months exclusively & non exclusively breastfed infants

6 MONTHS	Breast feeding pattern				
		Exclusive breast fed		Non- exclusive breast fed	
		F	%	f	%
<b>Physical Development</b>					
Roll over in both directions from front to back and back to front.	No	0	0	0	0
	Yes	25	100	25	100
Begins to sit without support	No	0	0	0	0
	Yes	25	100	25	100
Back is straight when sitting on high chair	No	0	0	0	0
	Yes	25	100	25	100
Springs up and down when sitting	No	0	0	1	4
	Yes	25	100	24	96
When standing, supports weight on legs and might bounce	No	0	0	1	4
	Yes	25	100	24	96
Use fingers to feed self	No	0	0	1	4
	Yes	25	100	24	96
Retains transient hold on two objects, one in each hand	No	0	0	2	8
	Yes	25	100	23	92
<b>Cognitive development</b>					
Drops one object when another is offered	No	0	0	2	8
	Yes	25	100	23	92
Begins to bang objects that are held	No	0	0	1	4
	Yes	25	100	24	96
Looks around at things nearby	No	0	0	1	4
	Yes	25	25	24	96
Brings things to mouth	No	0	0	1	4
	Yes	25	100	24	96
Shows curiosity about things and tries to get things that are out of reach	No	0	0	1	4
	Yes	25	100	24	96
Begins to pass things from one hand to the other	No	0	0	0	0
	Yes	25	100	25	100
<b>Psychosocial development</b>					
Sense of trust	No	0	0	4	4
	Yes	25	100	96	96
Recognizes strangers.	No	0	0	4	4
	Yes	25	100	96	96
Begins to extend arms to be picked up	No	0	0	0	0
	Yes	25	100	100	100
Thrashes arms and legs when frustrated	No	0	0	0	0
	Yes	25	100	100	100
Likes to play with others, especially parents.	No	0	0	0	0
	Yes	25	100	100	100
Likes to look at self in a mirror	No	0	0	0	0
	Yes	25	100	100	100
<b>Language development</b>					
Responds to sounds by making sounds	No	0	0	4	4
	Yes	25	100	96	96
Strings vowels together when babbling	No	0	0	0	0
	Yes	25	100	100	100
Likes taking turns with parent while making sounds	No	0	0	0	0
	Yes	25	100	100	100
Responds to own name	No	0	0	4	4
	Yes	25	100	96	96
Makes sounds to show joy and displeasure	No	0	0	4	4
	Yes	25	100	96	96
Begins to say consonant sounds (jabbering with "m," "b")	No	0	0	4	4
	Yes	25	100	96	96

Table 5 shows the frequency, percentage & comparison of the developmental milestones of 6 month exclusively & non exclusively breastfed infants. It depicts that in exclusive group all the 100% infants achieved physical, cognitive, psycho social & language development milestones normally whereas in non exclusive group maximum 100% infants achieved only physical development milestones whereas 96 % of infants achieved other milestones under physical parameters. If we look at the cognitive development parameters begin to pass things was achieved by all infants, 96% achieved other milestones. About the psychosocial development maximum infants achieved all milestones whereas 96% achieved sense of trust & recognizing strangers. In the language development maximum 100% infants achieved strings vowels together & responds to sounds, 96% achieved other milestones.

## 5. Discussion

### Findings regarding growth parameters of 2, 4 and 6 months of infants

In exclusive and non exclusive breastfed infants the mean height of aged 2,4 & 6 months were ( $.04 \pm 3.14$  vs  $52.16 \pm 15.90$ ), ( $60.76 \pm 4.16$  vs  $59.72 \pm 3.61$ ) and ( $64.48 \pm 4.45$  vs  $61.48 \pm 2.22$ ) respectively and the mean **weight** of 2,4 & 6 months of infants were ( $4.23 \pm .74$  vs  $3.64 \pm .68$ ), ( $5.57 \pm 1.11$  vs  $7.49 \pm 10.55$ ) and ( $8.41 \pm 9.78$  vs  $6.02 \pm .67$ ) respectively. The Mean **Head circumference** in exclusive and non exclusive breastfed infants aged 2,4 and 6 months were ( $39.52 \pm 2.45$  vs  $38.44 \pm 2.08$ ), ( $40.80 \pm 1.66$  vs  $40.60 \pm 1.91$ ) and ( $41.96 \pm 2.05$  vs  $40.72 \pm 1.24$ ) respectively. Finally, the findings revealed that growth of exclusive breastfed infants was better as compared to non exclusive breastfed infants.

These findings were supported by the study conducted by **Nkanqinieme et al (2004)** regarding growth pattern of exclusively breastfed infants in the first 6 months of life and compares them. Results shows that exclusively breastfed infants doubled their birth weights at 3 months. The mean weight and length gains were maximal at 2 months respectively So conclusion of the study is that the growth in weight, length of exclusively breastfed infants appears adequate for the first 6 months of life.<sup>7</sup>

### Findings regarding developmental milestones of 2, 4 and 6 months of infants.

Regarding the **2 months** of infants

Maximum (100%) of exclusively breastfed infants achieved their physical, cognitive, psycho-social, language developmental milestones normally whereas in non exclusive group all infants achieved the physical milestones arms flexed & legs extended and no head drop. Only 96% holds head erect in mid position, 84% push up tummy, and 80 % achieved smoother movements, and only 68% hands open, 52% holds rattle. Regarding the cognitive development, only 48 % infants achieved all milestones. About the psychosocial development, majority of the infants achieved eye to eye contact and smiles back whereas only 68% distinguished between primary care giver & mother, 48% developed sense of trust. Regarding the language

development, 56% developed cry pattern & makes sounds like coos & gurgling, majority of the infants 84% achieved response to caregiver voice, only 68% achieved soothing by caregiver's voice.

Regarding the **4 months** of infants

Result shows that the exclusively breastfed infants achieved physical, cognitive, psychosocial & language development milestones normally whereas in non exclusively breastfed infants all the infants achieved head supporting, (92%) achieved pushing feet down, only (88%) achieved rolling movements, (84%) achieved bringing hand together in midline under the physical development. Regarding cognitive development, majority of the infants achieved the milestones reaching to the toy & using hands & eyes together whereas only (80%) achieved the response to affection. If we look at psychosocial development maximum of the infants (88%) achieved all milestones; only 76% achieved sense of trust where as in language development majority of the infants (88%) achieved begins to babble while only (84 %) babbling with expression & coping sounds started at the age of 4 months.

Regarding the **6 months** of infants

Result shows that in exclusive group all the 100% infants achieved physical, cognitive, psycho social & language development milestones normally whereas in non exclusive group maximum 100% infants achieved only physical development milestones whereas 96 % of infants achieved other milestones under physical parameters. If we look at the cognitive development begin to pass things was achieved by all infants, 96% achieved other milestones. About the psychosocial development maximum infants achieved all milestones whereas 96% achieved sense of trust & recognizing strangers. In the language development maximum 100% infants achieved strings vowels together & responds to sounds, 96% achieved other milestones.

## 6. Conclusion

The conclusion was based on findings of the study. The results of the study conclude that the exclusive breastfed infants had better growth and development as compare to the non exclusive breastfed infants.

## References

- [1] Azar B. The bond between mother and child. [Online]. 2000 [Cited 2014 Feb 27]; Available from: URL: [http://www.thelizlibrary.org/liz/APA-Monitor attachment. htm](http://www.thelizlibrary.org/liz/APA-Monitor%20attachment.htm).
- [2] Park K. Text book of Preventive and Social medicine. 21<sup>st</sup> ed. Jabalpur: Banarsidas Bhanot publishers; 2011.p 491-92.
- [3] Aniansson G., Alm B., Andersson B et al. Human milk intake and growth in exclusively breast-fed infants. [Online].2004[Cited 2015 April 2]; Available from:URL:<http://www.thehealthsite.com/news/breastfeedingdecreases-the-risk-of-obesity-in-children>.
- [4] Bauchner H., Leventhal A et al. Effects of age of introduction of complementary foods on infant breast milk intake, total energy intake, and

- growth.[Online].2004 [Cited 2015 April 3]; Available from: URL: [www.google.co.in/url](http://www.google.co.in/url).
- [5] Beaudry M., Dufour R et al. Effect of frequent breastfeeding on early milk production and infant weight gain.[Online].2002[Cited 2015 April 3]; Available from:URL:[http://www.babycenter.com/0\\_how-breastfeeding-benefits-you-and-your-baby\\_8910.bc](http://www.babycenter.com/0_how-breastfeeding-benefits-you-and-your-baby_8910.bc)
- [6] Blomquist K., Jonsbo, F et al. Maternal versus infant factors related to breast milk intake and residual milk volume [Online].2004 [Cited 2015 April 4]; Available from:URL:<http://www.healthynewbornnetwork.org/blog/importance-exclusivebreastfeeding>.
- [7] Lesmana S et al. Duration of breastfeeding and developmental milestones during the latter half of infancy. Acta Paediatr, 88, 1327-32.
- [8] Otaigbe BE, Alikor EA, Nkanginieme KE. Growth pattern of exclusively breastfed infants in the first 6 months of life. Niger J Med. 2008 Jul-Aug; 17(3):317-23.