

## REVIEW ARTICLE

**A Meta-Analysis: Colostrum Feeding Practices in Uttar Pradesh, India**Manish Chaturvedi<sup>1</sup>, Sadhana Awasthi<sup>2</sup><sup>1</sup>Professor, Department of Community Medicine, School of Medical Sciences & Research, Sharda University, Greater Noida, Uttar Pradesh; <sup>2</sup>Associate Professor, Department of Community Medicine, Government Medical College, Haldwani, Uttarakhand, India

<a href="#">Abstract</a>	<a href="#">Introduction</a>	<a href="#">Methodology</a>	<a href="#">Results</a>	<a href="#">Conclusion</a>	<a href="#">References</a>	<a href="#">Citation</a>	<a href="#">Tables / Figures</a>
--------------------------	------------------------------	-----------------------------	-------------------------	----------------------------	----------------------------	--------------------------	----------------------------------

**Corresponding Author**

Address for Correspondence: Dr Manish Chaturvedi, Professor, Department of Community Medicine, School of Medical Sciences &amp; Research, Sharda University, Greater Noida, Uttar Pradesh

E Mail ID: [dr.manish.chaturvedi@gmail.com](mailto:dr.manish.chaturvedi@gmail.com)**Citation**

Chaturvedi M, Awasthi S. A Meta-Analysis: Colostrum Feeding Practices in Uttar Pradesh, India. Indian J Comm Health. 2016; 28, 1: 14 – 18.

**Source of Funding:** Nil **Conflict of Interest:** None declared**Article Cycle****Submission:** 15/02/2016; **Revision:** 28/02/2016; **Acceptance:** 09/03/2016; **Publication:** 31/03/2016**Abstract**

**Background:** Breast milk is the natural first food for babies. It continues to provide up to half or more of the child's nutritional needs during the second half of the first year, and up to one third during the second year of life. Breastfeeding is the safest, least allergic and best infant feeding method. It has nutritional, immunological, behavioral and economic benefits and provides desirable mother infant bonding. **Objective:** To do the meta-analysis of Colostrum feeding practices of baseline study of 2004 with other studies conducted after 2004 in Uttar Pradesh. **Material & Methods:** The Baseline study on Colostrum feeding practices in Uttar Pradesh was done in 2004. The meta-analysis was done taking seven other studies following this one taking same variable. **Results:** In baseline study of 2004, the colostrum given was found to be 22.22%. **Conclusion:** Deprivation from colostrum feeding and suboptimal breast feeding practices are significant risk factors for under-nutrition among under-fives. There is need for promotion and protection of optimal breast feeding practices for improving nutritional status of children.

**Key Words**

Colostrum feeding; breast feeding; meta-analysis; forest plot.

**Introduction**

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of the mother. Breast feeding provides ideal nutrition to the babies, protects them against infections, allergies, and asthma. Therefore, all infants must receive the benefits of early initiation of breastfeeding (within one hour of birth), colostrum feeding and exclusive breast feeding for first six months of life and continued breastfeeding for 2 years or beyond for promoting physical, psychological, and mental development of the child. Breastfeeding gives a road start and prepares babies for better learning.(1)

A collaborative reanalysis of studies conducted in middle/low income countries reported a reduced risk of mortality from infectious diseases among breastfed infants, up to the second birthday.(2) Infants who were exclusively breastfed for 6 months presented lower morbidity from gastrointestinal and allergic diseases, while showing similar growth rates as compared to non-breastfed children.(3) Breastfeeding also stimulates an infant's immune system and response to vaccination and, according to some studies, confers cognitive benefits as well.(4,5,6,7) Despite all these known facts, efforts to improve and encourage exclusive breast feeding for infants could only increase the prevalence in developing countries from 33% in 1995 to 39% in 2010.(8) The scenario of breast feeding practices in

India as per NFHS-3 survey is not very encouraging, only half of the infants in Uttar Pradesh (51% and 46% respectively) were given exclusive breastfeeding (EBF) for 6 months and complementary feeding started after 6 months.(9) ([Table 1](#))

Practice of EBF at birth and complimentary feeding at appropriate age was followed in only 1/5<sup>th</sup> (18.3% and 20% respectively) of children in Uttar Pradesh.(10)

WHO Universally recommends colostrum, a mother's first milk or the 'very first food', as the perfect food for every newborn. The sticky, yellowish substance produced by the mother soon after birth is ideal for the newborn both in composition and in quantity, and is rich in antibodies. Colostrum not only nourishes, it also protects. It is just what the baby needs during its first few days. Colostrum feeding needs to start in the first hour.(11)

Yet, statistics from around the world reveal that colostrum is frequently discarded. There is widespread lack of awareness of its qualities and its key role in contributing to the health and growth of the newborn. Feeding water or other liquids instead of colostrum deprives the child of a good start in life. The WHO, Child Growth Standards show how all children should grow, and babies fed colostrum within the first hour measure up well against these Standards.(11)

There are 170 million underweight children around the world, 3 million of whom die each year as a result of being underweight. WHO recommends that all children be exclusively breastfed for 6 months. Feeding colostrum in the first hour is the first step. It is imperative that every child receives colostrum to get ahead in the race against malnutrition.(11)

## Aims & Objectives

To analyze comprehensively the colostrum feeding practice in the state of Uttar Pradesh, India. To do the meta- analysis of colostrum feeding practice in the baseline study of 2004 with other studies conducted after 2004 in Uttar Pradesh.

## Material and Methods

Meta-analysis is a statistical procedure that integrates the results of several independent studies considered to be combinable. The results of a number of small studies are combined to arrive at the result that might have been obtained from a single large study. The strength of scientific inference depends on the internal validity of the study.

Randomized controlled trials, if properly designed and conducted, are considered as the gold standard of design validity, being less susceptible than other designs to selection and information bias, as well as to confounding.(12) Furthermore, there are clearly defined standards for conducting and reporting on randomized clinical trials, all intended to increase the validity of their results and interpretation.(13,14) The Baseline study on Colostrum feeding practices in Uttar Pradesh was done in 2004.(15) In an attempt to find all published literature on the topic, studies relating to colostrum feeding in neonates were identified through computerized searches. First searches were conducted in Medline and EMBASE for studies published in any language using the following Medical Subject Headings and text words: human, milk, colostrum, underdeveloped countries, malnourished children, infant, premature, preterm, neonate, or newborn, independently by the two investigators in May 2015. In an effort to include all available studies, a Web of Science search was also conducted.

The *inclusion criteria* were: studies that reported on colostrum feeding, term infants (37–42 weeks of gestation) and preterm (<37 weeks of gestation) infants. Review articles and commentaries were *excluded*. Studies conducted in developing countries in the same geographical area were considered in an attempt to include all mothers with similar nutritional status (Optimal or suboptimal). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement for reporting was used to guide this study.

Out of the 20 cross sectional studies, 8 studies were found on colostrum feeding practices in Uttar Pradesh from year 2004 onwards, which fulfilled the inclusion criteria.(15,16,17,18,19,20,21,22) The meta-analysis was done taking seven other studies following the baseline study by S. Awasthi in 2004 (15), taking same variable i.e. the prevalence of colostrum feeding. Mantel-Haenszel test for heterogeneity, meta-analysis and Forest Plots using Microsoft Excel were adopted to test the significance.

A chi-square test is undertaken to test the null hypothesis of no heterogeneity. If this test shows homogeneous results, then the differences between studies are assumed to be a consequence of sampling variation, and a fixed effects model is appropriate. If, however, the test shows that

significant heterogeneity exists between study results, then a random effects model is advocated.

## Results

Out of the 8 cross sectional studies of colostrum feeding practices in Uttar Pradesh ([table 2](#)) (including the base study S. Awasthi (2004)) with the corresponding sample sizes and prevalence of colostrum feeding. The chi-square test shows that significant heterogeneity ( $I^2=93.76$ , which measures the proportion of the total variation that is caused by heterogeneity between the studies) exists between study results, therefore, a random effects model has been chosen here. Out of eight studies, the confidence interval of six of them crosses the value of random (effect size), and therefore, are not statistically significant. (16,18,19,20,21,22). The remaining two studies show statistically significant results (95% confidence interval does not cross the random (effect size)).(15,17)

In the forest plot ([Figure 1](#)) which is the graphical display of the results of the individual studies and the estimate of the overall result of the meta-analysis. This forest plot is based on the eight studies related to colostrum feeding practices in Uttar Pradesh from 2004 onwards that are included for meta-analysis. The plot shows prevalence of colostrum feeding for the individual studies and the total prevalence of colostrum feeding for the aggregated data. Each study is represented by a square and a horizontal line, which corresponds to the rate and 95% confidence intervals of the rate, respectively. The solid vertical line corresponds to the random (effect size=0.53679). The area of the diamond reflects the result of the meta-analysis.

According to the forest plot, all the studies are randomly scattered and there is no definite direction of useful or harmful effects. The confidence interval of studies 1,4,5,6 and 8 includes the reference line and are therefore inconclusive. The overall effect size is also insignificant (0.54).

## Discussion

In baseline study of 2004, the colostrum given was found to be 22.22%. The studies on Colostrum feeding by Pratibha Gupta (2006) and S Awasthi (2004) were found significant on meta-analysis by Forest Plot. However, the overall result of the meta-analysis was found to be insignificant. Although not significant on meta-analysis but the study by Mahmood SE *et al* (22) reported very low i.e. 15.5% colostrum feeding in Barielly, Uttar Pradesh and

Chaturvedi *et.al.*(10) reported high (28%) proportion of initiation of breastfeeding within a day, in an 80 cluster study in district Agra. In most of the studies the main reasons behind discarding the colostrum were - they were not considering the colostrum good for health, some thought that it would not be properly digested by the newborn baby, while in some households, as a customary, it was fed in presence of sister in law after third day. No apparent effect of religion, family type, education of mother, and parity was evident on the practice of feeding. The market promotion of artificial milk substitutes and infant formulas is also a big challenge in addressing the issue of colostrum feeding. The traditional socio-cultural environment messengers like elderly family members, priest, untrained dais etc. pose a major challenge in promoting evidenced based practices specifically colostrum feeding and pre-lacteal feeding. Therefore, the messages for changing behaviour should be clear and structured in a such a way so that the traditional believes be respected and the process for changing practices also addressed simultaneously.

## Conclusion

The maternal & child health services in India have been initiated strengthened and expanded over the years and are still underutilized particularly in urban slums. In view of this, National Health Mission (NHM) has introduced ASHAs with intention to improve maternal child health scenario in Uttar Pradesh. Recently NHM has further strengthened the ASHA initiative by introducing home based new born care (HBNC) with emphasis on home visit to share pre-fixed guidelines with mother in first three days of birth to reduce neonatal mortality and to enhance colostrum feeding.

## Recommendation

Unfortunately, delayed initiation of breast-feeding, pre-lacteal feeding, deprivation from colostrum, and improper weaning are significant risk factors for under-nutrition among under-fives specially in slum areas. Recently government has started urban health mission to improve health conditions of slum areas. Probably the past efforts may brighten the future and will bring a positive change in public health.

## Limitation of the study

The limitation of the study includes wide variation in the sample size, limited number of studies fulfilling selection criteria.

## Authors Contribution

Both Authors have contributed equally in the study.

## References

1. WHO | Breastfeeding - world Health Organization [www.who.int/topics/breastfeeding/](http://www.who.int/topics/breastfeeding/). Downloaded on june2015
2. Effect of breastfeeding on infant and child mortality due to infectious diseases in less developed countries: a pooled analysis. WHO Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality. Lancet. 2000 Feb 5;355(9202):451-5. Erratum in: Lancet 2000 Mar 25;355(9209):1104. PubMed PMID: 10841125. [PubMed]
3. Kramer MS, Kakuma R. The optimal duration of exclusive breastfeeding: a systematic review. Adv Exp Med Biol. 2004;554:63-77. Review. PubMed PMID: 15384567. [PubMed]
4. Dòrea JG. Breastfeeding is an essential complement to vaccination. Acta Paediatr. 2009 Aug;98(8):1244-50. doi: 10.1111/j.1651-2227.2009.01345.x. Review. PubMed PMID: 19594471. [PubMed]
5. Drane DL, Logemann JA. A critical evaluation of the evidence on the association between type of infant feeding and cognitive development. Paediatr Perinat Epidemiol. 2000 Oct;14(4):349-56. PubMed PMID: 11101022. [PubMed]
6. Mortensen EL, Michaelsen KF, Sanders SA, Reinisch JM. The association between duration of breastfeeding and adult intelligence. JAMA. 2002 May 8;287(18):2365-71. Erratum in: JAMA 2002 Jun 12;287(22):2946. PubMed PMID: 11988057. [PubMed]
7. Anderson JW, Johnstone BM, Remley DT. Breast-feeding and cognitive development: a meta-analysis. Am J Clin Nutr. 1999 Oct;70(4):525-35. PubMed PMID: 10500022. [PubMed]
8. Cai X, Wardlaw T, Brown DW. Global trends in exclusive breastfeeding. Int Breastfeed J. 2012 Sep 28;7(1):12. doi: 10.1186/1746-4358-7-12. PubMed PMID: 23020813; PubMed Central PMCID: PMC3512504. [PubMed]
9. National Family Health Survey (NFHS-3), India, 2005-06: International Institute for Population Sciences and ORC Macro, Demographic and health Surveys, Mumbai: IIPS, 2006.
10. Chaturvedi M, Nandan D, Gupta SC. Rapid Assessment of Infant Feeding Practices in Agra District. Indian J of Community Medicine;2007;32:3:227
11. WHO | First Food First, available from [www.who.int/nutrition/topics/world\\_breastfeeding\\_week/en/](http://www.who.int/nutrition/topics/world_breastfeeding_week/en/).
12. Neyeloff JL, Fuchs SC, Moreira LB. Meta-analyses and Forest plots using a microsoft excel spreadsheet: step-by-step guide focusing on descriptive data analysis. BMC Res Notes. 2012 Jan 20;5:52. doi: 10.1186/1756-0500-5-52. PubMed PMID: 22264277; PubMed Central PMCID: PMC3296675. [PubMed]
13. Chalmers I. Unbiased, relevant, and reliable assessments in health care: important progress during the past century, but plenty of scope for doing better. BMJ. 1998 Oct 31;317(7167):1167-8. PubMed PMID: 9794844; PubMed Central PMCID: PMC1114148. [PubMed]
14. Altman DG, Schulz KF, Moher D, Egger M, Davidoff F, Elbourne D, Gøtzsche PC, Lang T; CONSORT GROUP (Consolidated Standards of Reporting Trials). The revised CONSORT statement for reporting randomized trials: explanation and elaboration. Ann Intern Med. 2001 Apr 17;134(8):663-94. Review. PubMed PMID: 11304107. [PubMed]
15. S.Awasthi et al. "Knowledge, Attitude, Behavior and Practices in Safe Motherhood among women of reproductive age group in Urban Slums of District Agra", MD (SPM) Thesis submitted to SN Medical College, Agra; 2004.
16. Kumar D, Goel NK, Mittal PC, Misra P. Influence of infant-feeding practices on nutritional status of under-five children. Indian J Pediatr. 2006 May;73(5):417-21. PubMed PMID: 16741328. [PubMed]
17. Gupta P, Srivastava V, Kumar V, Jain S, Masood J, Ahmad N, Srivastava J. Newborn Care Practices in Urban Slums of Lucknow City, UP. Indian J Community Med. 2010 Jan;35(1):82-5. doi: 10.4103/0970-0218.62570. PubMed PMID: 20606927; PubMed Central PMCID: PMC2888375. [PubMed]
18. Singh S, Gosvami A. The level of awareness and prevalent mode of use/ rejection of colostrums among mothers in Azamgarh area of Eastern U.P. Indian J. Prev. Soc. Med. 2008; 39 (3-4):155-60.
19. Khan Z, Mehnaz S, Siddiqui AR, Ansari A, Khalil S, Sachdeva S. All Slums are Not Equal: Maternal Health Conditions Among Two Urban Slum Dwellers. Indian J Community Med. 2012 Jan;37(1):50-6. doi: 10.4103/0970-0218.94027. PubMed PMID: 22529541; PubMed Central PMCID: PMC3326809. [PubMed]
20. Aruldas K, Khan M E ,Hazra A. Increasing early and exclusive breastfeeding in rural Uttar Pradesh. The Journal of Family Welfare. 2010;56:43-9.
21. Khan MH, Khalique N, Siddiqui AR, Amir A, Ahmad A, Shah MS et.al. Indian J of Community Health;2012;24(2):102-6.
22. Mahmood SE, Srivastava A, Shrotriya VP, Mishra P. Infant feeding practices in the rural population of north India. J Family Community Med. 2012 May;19(2):130-5. doi: 10.4103/2230-8229.98305. PubMed PMID: 22870418; PubMed Central PMCID: PMC3410177. [PubMed]

## Tables

**TABLE 1 CURRENT SCENARIO OF BREASTFEEDING PRACTICES IN INDIAN STATES AND INDIA AS A WHOLE**

States	Initiation of breastfeeding within 1 hr (%)	Exclusive Breastfeeding (0-6) months (%)	Complementary Feeding [6-9 months] (%)
Andhra Pradesh	25	63	64
Arunachal Pradesh	59	60	60
Assam	51	63	60
Bihar	4	28	57
Chhattisgarh	25	82	55

Delhi	21	35	60
Goa	59	18	70
Gujarat	28	48	57
Haryana	22	17	45
Himanchal Pradesh	45	27	66
Jammu & Kashmir	32	42	58
Jharkhand	11	58	65
Karnataka	36	58	73
Kerala	57	56	94
Madhya Pradesh	16	22	52
Maharashtra	52	53	48
Manipur	58	62	78
Meghalaya	58	26	76
Mizoram	66	46	85
Nagaland	54	29	71
Orissa	55	50	68
Punjab	13	36	50
Rajasthan	14	33	39
Sikkim	43	37	90
Tamil Nadu	59	33	78
Tripura	35	36	60
Uttar Pradesh	7	51	46
Uttarakhand	34	31	52
West Bengal	24	59	56
India	25	46	57

\*NFHS 2006 (9)

TABLE 2 COLOSTRUM FEEDING PRACTICES IN UTTAR PRADESH FROM 2004 ONWARDS

Author's Study	Sample Size	Colostrum feeding present	Outcome (Effect Size)	Std. Error	CI lower (95%)	CI upper (95%)
Dinesh Kumar	217	98	0.45	0.07	0.32	0.58
S Awasthi	360	80	0.22*	0.05	0.12	0.32
Pratibha Gupta	524	228	0.44*	0.04	0.35	0.52
Sikha Singh	100	57	0.57	0.1	0.37	0.77
Zulfia Khan	92	68	0.74	0.11	0.53	0.94
Kumudha Aruldas	5062	3442	0.68	0.01	0.65	0.70
Khan MH	100	39	0.39	0.1	0.19	0.59
Syed Mahmood	123	104	0.85	0.09	0.67	1.02
Total	6578	4116	0.54	0.08	0.39	0.69

I<sup>2</sup>=93.76

## Figures

FIGURE 1 FOREST PLOT FOR THE COLOSTRUM FEEDING PRACTICES IN UTTAR PRADESH FROM 2004 ONWARDS

