

ORIGINAL ARTICLE

Comparative Study of Prevalence of Early Initiation of Breast Feeding, Its Enablers and Impeders

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Abstract	Introduction	Methodology	Results	Conclusion	References	Citation	Tables / Figures
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Abstract

Background: In India the proportion of early initiation of breastfeeding is hovering around 50% and the proportion of cesarean deliveries is increasing substantially. **Objectives:** To compare the prevalence of early initiation of breastfeeding (EIBF) among cesarean and vaginally delivered women in hospitals in Pune District, Maharashtra State, India and to measure any association between EIBF and various socio-demographic, maternal and fetal factors. **Methods:** This was a multi-site study conducted in 13 selected hospitals in Pune District in 2017-18. Pune District by population is the fourth largest in India. All women delivered by cesarean section in these hospitals and an equal number of age and parity matched vaginally delivered women were enrolled. They were interviewed before discharge by obstetricians or nurses under the supervision of obstetricians, using a structured, validated tool. The data were analyzed by using Statistical Package for Social Sciences, version 25. **Results:** In each group, 1,556 women were enrolled. The prevalence of EIBF was 81.5% and 63.6% among vaginally and cesarean delivered women. There was a significant association between EIBF and the place of residence, mode of delivery, gestational period, parity, and presence of some disease. Residence in the rural area was the strongest enabling factor with an adjusted odds ratio of 29.6 (95% C.I.; 18.7-46.9) whereas cesarean section, preterm delivery and first para were impeding factors. **Conclusions:** Among institutional delivered women EIBF was about 70%. Health care workers need to strongly promote EIBF awareness, especially among women from urban areas, and undergoing cesarean section.

Keywords

Breastfeeding; Mode of delivery; Rural; Urban; Gestation; Parity

Introduction

Provision of mother's milk to the newborn within one hour of birth is termed as early initiation of breastfeeding (EIBF). It ensures receipt of colostrum which boosts the immune system of the newborn. It is the easiest, cost-effective and life-saving intervention for the health of the newborn. Numerous studies at diverse places have reiterated the effect of early initiation of breastfeeding on childhood mortality, especially neonatal mortality. (1,2,3) The risk of neonatal mortality due to non-practicing of EIBF and delaying it further may be as high as three to four times. (1,2) EIBF may reduce 44% risk of neonatal mortality. (4) It even reduces the risk among low birth weight babies who are vulnerable. (5) The annual number of neonatal deaths (0.75 million) in India is the highest for any country. (6) Early initiation of breastfeeding is certainly one of the effective strategies for preventing neonatal deaths. (4) EIBF shows an increasing trend in all states. In the seven states of India having high burden of neonatal mortality, the overall rate of EIBF has increased from 12.5% in 2006 to 34.4% in 2014. (4) EIBF in Maharashtra during 2019-20 as per the latest survey was 53.2%. (7) It is usually observed that after cesarean section the initiation of breastfeeding is delayed. In ten years from 2005-06 the rate of cesarean section in India has doubled from 8.5 to 17.2%. (8) In 2019-20 in Maharashtra it has reached to about 25%. (7) Globally also rate of cesarean sections has increased from 13% in 2005 to 20% in 2017. (9) In October 2018, Lancet has published a series, advocating optimization of lower segment cesarean sections. The rising cesarean sections may pose risk to the universalization of EIBF. Although most of the studies confirm that cesarean section is one of the barriers for initiation of breastfeeding, effect of cesarean section on EIBF is not conclusive. Both maternal factors like parity, mode of delivery, body mass index, smoking, breast problems, surgery, illness, psychological and behavioral factors as well fetal characteristics like gestational age, weight at birth, intrinsic disease, suckling ability, etc. have been closely associated with breastfeeding initiation. (2)

Aims & Objectives

To compare the prevalence of EIBF among cesarean and vaginally delivered mothers in hospitals in Pune District, Maharashtra State, India and to study any

association between EIBF and various socio-economic, maternal/fetal factors.

Material & Methods

Study Setting: The study was carried out in the Pune district having a 9,429,408 population. There are six medical college hospitals, one district general hospital, five sub-district hospitals, one women hospital, and 20 rural hospitals (community health centers) in the district. There are two Municipal Corporations, each having one tertiary care hospital.

Sampling: This study was a part of a larger project wherein women were enrolled to assess postpartum morbidity. We confirmed the adequacy of the sample size as given below. The required sample size for estimating prevalence using standard the formula $[n = Z^2 * p * (100 - p) / d^2]$ and by assuming a prevalence of EIBF 54.8% in Pune district (10), with 95% confidence level and allowable difference of 2% was 2,477. Estimated sample size was only 11, using formula, $[n = (Z\alpha/2 + Z\beta)^2 * [(p1(1-p1) + p2(1-p2)) / (p1 - p2)^2]$ for detection of 51% (65-14%) difference as observed in one study. (11)

This study was conducted in 13 selected public hospitals (excluding one). The details are given in (Figure 1). The selection of study centers was based on a criterion of conducting more than five cesarean sections per month. All non-teaching government hospitals fulfilling this criterion were included and from teaching hospitals, one from government and one from private were included. All women, delivered by cesarean section in these hospitals, during the enrolment period, were included in the 'study group'. An equal number of age (+ 5 years) and parity matched women delivered vaginally in the same hospitals during similar enrolment period were included in the 'comparison group'.

Inclusion and exclusion criteria: All women who had undergone cesarean section/vaginal delivery and resident of the Pune district were included. Women with serious psychiatric illness, immediately transferred to other institutions or who could not speak English, Hindi, or Marathi were excluded.

Data collection: Enrollment was carried out from 1st September 2017 to 31st March 2018. Written informed consent was obtained from all the study participants before interviewing them. A structured tool was jointly prepared by all investigators. It was validated, pretested, and translated into the local language (Marathi). It had three sections, 'demographic information', 'obstetric history', and

'early initiation of breastfeeding'. One day training was given to a team of obstetrician or medical officer, the in-charge nurse of the postpartum ward from each selected hospital and from teaching hospitals one professor, post-graduate senior residents, and post-graduate students from the obstetrics and gynecology department. Among the trained members one 'site coordinator' was identified for each site for the collection of data. The women were interviewed 24-48 hours after the delivery and all information was sought definitely before discharge from the hospital. Additional information was collected from case records.

Data analysis: Forms were collected and checked for completion and accuracy at individual sites. Then at the nodal center the data entry operators entered the data under the supervision of the project coordinator. The project coordinator cross-checked the received forms and if needed obtained the required information by calling the site coordinator or the woman. The data was analyzed using Statistical Package for the Social Science Version 25. The Chi-square test was applied to establish the association between various variables. Appropriate adjusted odds ratios were calculated. P-value < 0.05 was considered statistically significant.

Ethics Statement: Institutional Ethics Committee's (ECR/313/Inst/MH/2013/RR-16) approval was obtained before starting the study.

Results

A total of 3, 112 women (1,556 from each arm) participated in the study. Women having stillbirths among singleton pregnancies were not interviewed. The data about all the variables like age, education, occupation and urban-rural location, etc. could not be obtained from some women; however, the missing proportion was less than 10% excepting about education. The overall proportion of women initiating breastfeeding in one hour was 70.18%. (Table 1) gives demographic information of the women in the context of breastfeeding. The mean of age of women was 24.2 (SD =4.69) years. More than half (54.51%) were in the age group of 21-25 and only 0.55% in the age group more than 35 years. More than fifty percent (52.17%) were 10th or 12th pass and only 8.25% of women were illiterate. Most of the women (90.63%) were not formally employed. The proportion of urban women was more than two-thirds.

The details of obstetrics factors and initiation of breastfeeding are given in (Table 2). About 25% of deliveries were preterm. About 85% of women were first or second para. The proportion of low-birth-weight babies was 10.52%. Among male children, the proportion of EIBF was 69.3% and among females, it was 71.1%. ($\chi^2=1.04$; P=0.31). Few women (6.14%) had associated medical illnesses.

Discussion

In hospitals varied types of skilled birth attendant and all other paraphernalia is available hence high proportion of timely initiation was expected. Most of the reported studies are surveys or analyses of secondary data. The current study has many unique characteristics. The number of women enrolled in the present study was higher than several studies. It was a multi-site study representing a large population. The information was collected by trained qualified doctors and nurses before discharge, almost eliminating the possibility of recall bias.

Despite the universal recommendation, globally only 40% of children are breastfed within one hour after birth. (9) Systematic reviews and meta-analysis have revealed that the highest early initiation, about 53% was observed in low-income countries, about 43% in upper-middle-income countries, and 31% in lower-middle income countries. (12,13) Studies conducted in various countries have reported the prevalence of EIBF ranging from 6.9 to 97.3%. (2,3,14–21) The lowest prevalence was reported from Karachi, Pakistan. The highest prevalence was reported from Saudi Arabia. The study from Pakistan was conducted in a squatter settlement area which may explain the reason for having an abysmally low prevalence of EIBF.

Various studies conducted in India, including the present study, also reported a wide range of prevalence of EIBF from 12.5 to 75%. (11,22–35) The lowest prevalence was observed in North India. The highest prevalence was observed in Union Territory Puducherry in South India. Studies analyzing secondary data have yielded a wide range from 12.5 to 34.4%. (1,4,26) The NFHS 4 survey conducted in 2015-16 reported that in India there was wide variation and the overall proportion of EIBF was only 41.6%. (8) There may be several explanations for this wide variation. The increasing trend that emerged from 19 studies (including the present study) conducted across India is reflected in (Figure 2). Even the overall proportion in India has increased from

23.4 to 41.6%. (8) The trend is similar in other countries also. However, a study from Namibia needs attention, because the national survey has shown a substantial decline from 82.5% to 74.9% from 2000 to 2013. (14) Generally, facility-based studies had shown high prevalence. In community-based studies including national-level surveys, the surveyors gather past information, hence the extent of recall is difficult to measure. Even facility-based studies, if investigators obtain history, may have the same drawback.

The proportion of EIBF reported in this study is higher than the national and state estimate. Maharashtra state has always better statistics than national. (8,36) In the Pune district, EIBF proportions in the last but one national-level survey was 62.0%; (37) it reduced to 54.8. (10) Although the observed proportion in the present study is higher, authors expected very high proportion for two reasons; the present study is comparatively recent and conducted in hospitals. EIBF is a product of the socio-cultural environment. A high proportion of 68% in the tribal area has been reported. (6) The lowest prevalence in a city from North India (38) and the highest prevalence from a city in South India (34) has been reported. This may be a reflection of higher female literacy and matrimonial hierarchy in Southern India. But one study from Chandigarh has reported a high prevalence of 72.6% like in South India. (29)

Data given in (Table 1), indicated that the best enabler age group was 20-25 years and most impeding was 30-35 years; however, the strength of association was not significant. In various studies reporting age-wise variation highest prevalence ranged from 45.0-85.1% and the lowest prevalence ranged from 12.8%-37.9%. The highest prevalence in these studies was reported from 20-33 years (excepting one study) and the lowest prevalence among 15-24 years or more than 30 years. (11,16,34,39) Most of the studies thus confirm that the prevalence of EIBF is less in extremes of age group and higher among age group 21 to 30 years. But in Namibia prevalence was about two times higher among women from 15-19 years. (14) This bimodal age distribution may be due to lack of experience and less preparedness among young ladies and a slightly careless attitude in elderly mothers.

According to the current study, secondary school certificate passing enabled women to practice EIBF. Minimal education was an impediment. There are very

dissimilar observations reported by different studies. In a neighboring country, various levels of education of women did not affect prevalence which was about 69% across education groups. (16) Like our study, a high prevalence of 85% was reported among women having secondary school education (34). In the tribal population women having more than primary schooling had a prevalence of 73.% and less educated had 46.3%. (6) One secondary analysis revealed that the proportion was twofold among women having education compared to illiterate. (26) Probably educated mothers have some information and access to substitute foods and they might use it, and practice early breastfeeding to a lesser extent. (14)

(Table 1) indicates that professional occupation is the greatest impeding factor in the present study. Most facilitating occupations were small shop keeper and clerical work followed by unemployment. In another study, EIBF was better among employed women (77.9%) than non-employed (22.1%), including daily wage earners (86.3%) and lowest (66.7%) in businesswomen. (34) Employed women initiated early breastfeeding in a higher proportion compared to non-employed but the difference was slight. (16) In an African country, the highest prevalence was noted among agricultural workers. (14)

Although it is believed that place of residence doesn't matter; (9) in the present study residence of women in rural areas was a very positive influential factor. Even in African countries, Zimbabwe and Namibia rural women were more likely to initiate early breastfeeding compared to urban women. (14,15) But in only one study the prevalence was higher among urban women than rural women. (11) Across the countries, EIBF is categorically lower among cesarean-delivered women than vaginally delivered. (9) We also confirmed that cesarean section was one of the factors contributing to the delay in the early initiation of breastfeeding. This observation is almost universal. (17,21,34,39–41) In the studies, the remarkable difference between the prevalence of EIBF among vaginally delivered women (65 to 85%) and cesarean delivered women (14-15%) is observed. (11,20) Women admit that because of the cesarean section they did not feed the newborn within an hour. (19) Cesarean section is a hindering factor in African and South Asian countries also. (14,15,42) Even in hospitals including a designated Baby-Friendly Hospital in a developed

country like Australia, there was a persistent barrier to initiation of early breastfeeding among cesarean delivered women. (43) However; another meta-analysis mentioned that cesarean delivery may not be a risk factor of EIBF in the presence of passable support. (44) It is essential to encourage and support EIBF in all mothers irrespective of the mode of delivery and to educate all prospective mothers and health care staff about the negative effects of cesarean delivery on breastfeeding and the well-being of the infant. Counseling has resulted in a remarkable change in EIBF practices. (38)

Almost similar to the present study, a larger proportion of full-term newborns (71.7%) received earlier breastfeeding compared to pre-term (65.10%) in Bangladesh. (16) Contrarily in one study, the prevalence of EIBF was higher (81.1%) when the outcome is preterm newborn compared to full term (70.2%).(34) This finding is contradictory to our study. The difference may be due to the setting of the referred study. It was conducted in a rural area and was a survey.

The proportion of initiating early breastfeeding amongst first paras is usually lower than multiparous women. In various Indian studies, including the present study the prevalence among first paras varied, from 32.5 to 65.8%; and the prevalence among multiparous varied from 56.9 to 81.5%, including the present study.(11,32) In other countries also multipara was more likely to initiate early breastfeeding first para.(11) Multiparity was enabling factor in Namibia and Zimbabwe also.(14,15)

We observed that mothers having newborns with birth weight greater than 2.5 kg have a higher prevalence (72.4%) of EIBF as compared to newborns with birth weight lesser than 2.5kg (73.9%). A higher proportion, about 42% newborn weighing 2.5 kg or more received breastfeeding within one hour while weighing less, only 30% received.(11) Another study conducted in Saudi Arabia showed a higher prevalence (49%) among newborns with low birth weight < 2.5kg as compared to newborns (43%) with birth weight >2.5kg.(20) Low birth weight as well as macrosomia resulted in delaying initiation of breastfeeding.(14,15) The size of the baby is a proxy of birth weight.

Although some studies reported differential prevalence for gender; the prevalence among male

and female newborns was similar in the present study. Globally also it is observed that the sex of the newborn doesn't matter.(9)

About 10.7% of the mothers reported that due to some sickness they did not initiate breastfeeding early.(20) Women gave many reasons for not initiating breastfeeding earlier; even hypertension was one of the reasons given for not initiating breastfeeding early.(19) Mothers having some medical problems like sore nipple, cracked nipple and inverted nipple were less likely to initiate early breastfeeding.(22)

Conclusion

The main impeding factors for EIBF were the cesarean section and the residence in the urban area. Increasing cesarean sections may pose risk to the enhancement of EIBF. The most likely reason seems to be sub-optimal awareness among the health staff as well as the mothers. The observations reiterate the need for expansion, monitoring, and re-accreditation of Baby-Friendly Hospital Initiative as well as other breastfeeding promotion programs. There is a strong need to strengthen the national and state policies, hospital and maternity practices, and the knowledge of all the categories of skilled birth attendants, to support EIBF as a key component of essential newborn care. The studies have shown that barriers are not insurmountable. Behavior Change Communication certainly and substantially improve the prevalence. The communication may be specially targeted to pregnant mothers throughout the peripartum period particularly women undergoing cesarean section, residents of urban areas.

Recommendation

All health workers must provide information about the necessity of early initiation of breastfeeding to all women during antenatal visits and especially to those who are from urban areas and cesarean delivered.

Limitation of the study

The study had some limitations. Few forms received from various centers had incomplete data. Adherence to the skin-to-skin care practice was not studied. The comparison is between the two groups is valid but overall results may be slightly skewed; as in the population, the proportion of cesarean section is not 50%.

Relevance of the study

Cesarean delivery is a strong barrier for initiation of early breastfeeding.

Authors Contribution

Conceptualization and design: PPD, VMV, AVP. Data acquisition and monitoring: PPD, VMV, APSN, CNW, TMP, AVP. Analysis and interpretation: PPD, VMV. Initial drafting the article: VMV. Final draft: PPD, AVP. Critical review by all authors. Final draft of the article was approved by all authors.

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Tables

TABLE 1 SOCIO-DEMOGRAPHIC AND OBSTETRIC CHARACTERISTICS OF STUDY PARTICIPANTS, 2017-18

		Initiation of Breast feeding				Total	$\chi^2 (p)$	Adjusted Odds Ratio (CI)	
		Within one Hour (%)	Within four hours (%)	After four hours (%)	Not Initiated (%)				
Age in completed years	<20	373 (71.7)	90 (17.3)	36 (6.9)	21 (4.0)	520	61.38	1	
	20 - 24	1189 (74.3)	264 (16.5)	110 (6.9)	37 (2.3)	1600	(< 0.001)	1.15 (0.86-1.53)	
	25 - 29	414 (62.9)	157 (23.9)	61 (9.3)	26 (4.0)	658		0.77 (0.55-1.08)	
	30 - 34	79 (56.0)	28 (19.9)	22 (15.6)	12 (8.5)	141		0.82 (0.51-1.33)	
	≥35	11 (68.8)	2 (12.5)	2 (12.5)	1 (6.3)	16		2.33 (0.68-8.00)	
	Total	2066 (70.4)	541(18.4)	231(7.8)	97(3.3)	2935*			
Education	Graduate/above	265 (69.9)	70 (18.5)	29 (7.7)	15(4.0)	379	44.92	1	
	12 th / post 10 th diploma	535 (73.4)	121 (16.6)	46 (6.3)	27 (3.7)	729	(< 0.001)	0.98 (0.69-1.40)	
	10 th pass	536 (75.2)	96 (13.5)	61 (8.6)	20 (2.8)	713		0.94 (0.65-1.34)	
	Middle school	341 (65.0)	124 (23.6)	44 (8.4)	16 (3.0)	525		0.55 (0.38-0.80)	
	Primary school	186 (61.0)	75 (24.6)	35 (11.5)	9 (3.0)	305		0.52 (0.35-0.79)	
	Illiterate	160 (70.2)	46 (20.2)	16 (7.0)	6 (2.6)	228		0.66 (0.41-1.04)	
	Total	2023 (73.2)	532 (19.2)	231 (4.2)	93 (3.4)	2879*			
	Occupation	Professional	25 (59.5)	10 (23.8)	4 (9.5)	3 (7.1)	42		1
Semi professional		13 (68.4)	4 (21.1)	1 (5.3)	1 (5.3)	19		0.99 (0.25-3.91)	
Clerical, Shop Owner		36 (72.0)	10 (20.0)	3 (6.0)	1 (2.0)	50	11.3 -0.881	0.51 (0.15-1.74)	
Skilled worker		41 (68.3)	12 (20.0)	7 (11.7)	0 (0)	60		1.07 (0.40-2.89)	
Semi-skilled worker		26 (61.9)	9 (21.4)	6 (14.3)	1 (2.4)	42		1.32 (0.46-3.76)	
Unskilled worker		40 (69.0)	11 (19.0)	4 (6.9)	3 (5.2)	58		2.50 (0.93-6.72)	
Unemployed		1851 (70.6)	481 (18.3)	207 (7.9)	83 (3.2)	2622*		1.40 (0.65-3.04)	
Total		2032 (70.2)	537 (18.6)	232 (8.0)	92 (3.2)	2893			
Address		Urban	1158 (60.2)	535(27.8)	229 (11.9)	87 (4.5)	1922	476.71	1
		Rural	911 (98.1)	12 (1.3)	6 (0.6)	10 (1.1)	929	(< 0.001)	29.6 (18.73-46.86)
		Total	2069 (72.5)	1337 (46.9)	235 (8.2)	97(3.4)	2851*		

*Difference in grand total is due to differential non-response to various variables

TABLE 2 OBSTETRIC FACTORS AND INITIATION OF BREAST FEEDING, 2017-18

		Initiation of Breast feeding				Total	$\chi^2 (p)$	Adjusted Odds Ratio (CI)
		Within one Hour (%)	Within four hours (%)	After four hours (%)	Not Initiated (%)			
Gestational age (weeks)	< 32	17 (33.3)	11(21.6)	6 (11.8)	17 (33.3)	51	216.36	1
	32 - 37	432 (65.5)	103 (15.6)	85 (12.9)	40 (6.1)	660	(< 0.001)	2.60 (1.22-5.52)
	> 37	1558 (72.6)	414 (19.3)	137 (6.4)	37 (1.7)	2146		3.41 (1.62-7.16)
	Total	2007 (70.2)	528 (18.5)	228 (8.0)	94 (3.3)	2857*		
Parity	Primipara	762 (65.8)	263 (22.7)	133 (11.5)	51 (4.4)	1209	53.46	1
	2 nd Para	920 (75.8)	220 (18.1)	74 (6.1)	34 (2.8)	1248	(< 0.001)	1.44 (1.16-1.80)
	3 rd Para	301 (79.6)	54 (14.3)	23 (6.1)	11 (2.9)	389		1.71 (1.20-2.43)
	Multipara	22 (81.5)	04 (14.8)	01 (3.7)	01 (3.7)	28		1.70 (0.58-4.96)
	Total	2005 (69.8)	541 (18.8)	231 (8.0)	97 (3.4)	2874*		
Birth Weight	< 2.5	212 (73.9)	43 (15.0)	32 (11.1)	23 (8.0)	310	24.6	1
	≥ 2.5	1857 (72.4)	504 (19.7)	203 (7.9)	74 (2.9)	2638	(< 0.001)	0.97 (0.70-1.36)

	Total	2069 (70.2)	547 (18.6)	235 (8.0)	97 (3.3)	2948*		
Mode of Delivery	LSCS	902(63.6)	320(22.6)	197(13.8)	69(4.8)	1488	174.41	1
	Vaginal	1167(81.5)	227(15.8)	38(2.6)	28(1.9)	1460	(<0.001)	3.26 (2.66-3.99)
	Total	2069 (70.2)	547 (18.6)	235 (8.0)	97 (3.3)	2948*		
Associated Medical illness	Yes	84 (50.9)	53 (32.1)	28 (17.0)	16 (9.7)	181	59.13	1
	No	1985 (73.9)	494 (18.4)	207 (7.7)	81 (3.0)	2767	(< 0.001)	1.86 (1.28-2.71)
	Total	2069 (70.2)	547 (18.6)	235 (8.0)	97 (3.3)	2948*		

**Difference in grand total is due to differential non-response to various variables*

Figures

FIGURE 1 SELECTED HOSPITALS IN PUNE DISTRICT, 2017-18

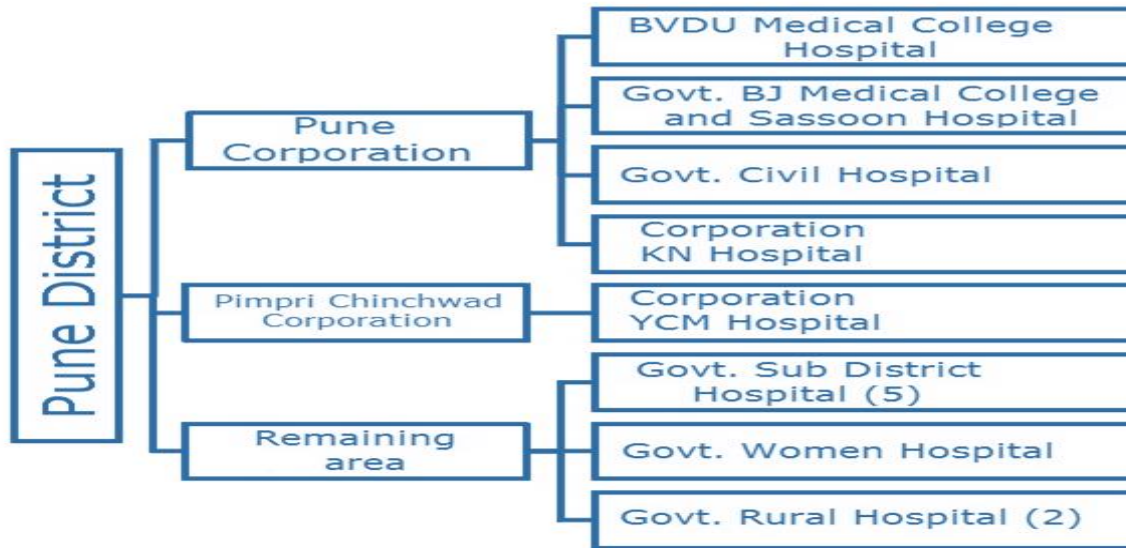


FIGURE 2 TREND OF EIF IN INDIA, 1994-2018

