



“ASSESSMENT OF INFANT AND YOUNG CHILD FEEDING PRACTICES USING WORLD HEALTH ORGANIZATION (WHO) INDICATORS.”

Paediatrics

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ABSTRACT

Background- Breast-feeding strengthens emotional security and affection creating a strong bond between the mother and the child. Optimal infant and young child feeding practices include initiation of breastfeeding within 1 hour of birth, exclusive breast-feeding for the first 6 months, and continuation of breast-feeding for 2 years or more, along with nutritionally adequate, safe, age appropriate, responsive complementary feeding starting at 6 months. **Objective-** Primary Objective: To study the prevalent infant and young child feeding practices using World Health Organization (WHO) indicators. **Secondary Objective:** To study the influence of age, sex, birth order of the child, socioeconomic status, and education level of mother/ caregiver on feeding practices. **Methodology:** A descriptive cross-sectional study. The measured indicators will be derived by survey method. Dietary recall method to be used. Current-status data will be generated by using information for the day preceding the survey. Result- Out of 1287 studied child, 400 were below 6 months of age, 420 between 6 months to 12 months and 467 were between 12 months to 23 months. The distribution shows higher proportion for continued Breast feeding at 1 year of age 89.6%, Exclusive BF up to 6 months 82.6%, Early initiation of BF 75.2%, Consumption of iron rich food 73%, Minimum dietary diversity 72.3%, Introduction of semisolid foods 70%, Minimum acceptable diet 53.5%, and Minimum meal frequency 22.1% observed. **Conclusion-** This study clearly highlights that although the exclusive breastfeeding rate is satisfactory in this study population, there are many inappropriate feeding practices during early childhood to ensure good health and better nutritional status of young children & children are thus at risk of childhood malnutrition associated with inappropriate feeding.

KEYWORDS

Infant and young child feeding, Minimum dietary diversity, Breast feeding

INTRODUCTION:

The first two years of life are the "critical window" for the promotion of health, good growth, behavioral development, and cognitive function, so it is crucial that infants and young children are fed according to optimal practices. Optimal infant and young child feeding practices include initiation of breastfeeding within 1 hour of birth, exclusive breast-feeding for the first 6 months, and continuation of breast-feeding for 2 years or more, along with nutritionally adequate, safe, age appropriate, responsive complementary feeding starting at 6 months. Breast-feeding strengthens emotional security and affection creating a strong bond between the mother and the child, which in turn promotes psychosocial development of a child. This has an enormous impact in a developing country, like India, with a high burden of disease and low access to safe water and sanitation. The recent studies conducted even in developed countries have also emphasized the role of IYCF practices in reducing child mortality. A global strategy for infant- and young child-feeding has been devised by the World Health Organization (WHO) and United Nations Children Fund. Based on these guiding principles, the GOI, in collaboration with international agencies, has adopted the culturally acceptable IYCF guidelines, which were incorporated in the Integrated Management of Neonatal and Childhood Illness program. These guidelines recognize appropriate infant feeding practices to be crucial for improving nutrition status and decreasing infant mortality in all countries. WHO offers three recommendations for IYCF practices for children aged 6–23 months: continued breast-feeding or feeding with appropriate calcium-rich foods if not breast-fed; feeding solid or semisolid food for a minimum number of times per day according to age and breast-feeding status; and including foods from a minimum number of food groups per day according to breast-feeding status. The National Family Health Survey (NFHS-3) has provided useful national- and state-level information on the IYCF practices. Available data showed a gross interstate variation. However, the NFHS was not designed to provide district-level data. Most of the studies conducted in India have focused on mainly the breast-feeding aspects and not the dietary diversity and diet frequency aspects, which are important in IYCF.

MATERIAL AND METHOD:

This descriptive cross-sectional study was carried out on 1287 pediatric patients of age 0-23 months who visited the OPD of Department of Pediatrics at tertiary care center of central India. During the year of study period and qualified the inclusion criteria were enrolled for the study after taking informed written consent from the parent of the patient. A valid approval from the institutional scientific and ethical committee was also taken. A survey was conducted, and the measured indicators were derived by survey method. 24-hour dietary recall method was used to collect the information.

Inclusion Criteria

Children 0-23 month of age attending outdoor department and immunization center at tertiary care center. Consent given by parents/guardians and care takers are included.

Exclusion Criteria

Sick children requiring hospitalization and children with major systemic diseases will be excluded from the study. Parents who refuse to participate in the study.

Study process:

A survey was conducted, and the measured indicators were derived by survey method. 24-hour dietary recall method was used to collect the information. Current-status data was generated by using information for the day preceding the survey.

Statistical analysis:

The data was collected and entered in Microsoft Excel 2010 (Microsoft corp.) and analyzed using the SPSS version 20.0 operating on Windows 10. All the descriptive data were presented as mean, standard deviation, frequency and percentages represented as the pie charts and bar diagrams. The continuous data were analyzed using student t-test for mean difference and the strength of association between the variable using the Pearson's correlation was calculated. A P value of <0.05 was considered statistically significant.

RESULT:

The Chi Square test was applied which shows the significant association between two variables. ($P < 0.05$)

Early Initiation of BF was found in 75.5% for age group 0-6 month, 72.9% for age group 6.1-12 Months and 77.1% for age group 12.1-24 Months respectively. Hence there was significant difference in the proportion for early initiation of breast feed for all age group.

Exclusive Breast Feed Up to 6 Months was found in 91.5% for age group 0-6 month, 79.8% for age group 6.1-12 Months and 77.5% for age group 12.1-24 Months, 88.1%, 91.6%, 87.1%, 93.5% and 88.9% for birth order 1,2,3,4 and 5 respectively. Hence there was significant difference in the proportion for Exclusive Breast Feed Up to 6 Months for all age groups and birth weight.

Continued Breast Feed at 1 year of age was found in 0% for age group 0-6 month, 7.9% for age group 6.1-12 Months and 89.6% for age group 12.1-24 Months, 88.1%, 91.6%, 87.1%, 93.5% and 88.9% for birth order 1,2,3,4 and 5 respectively. Hence there was significant difference in the proportion for Continued Breast Feed at 1 year of age for all age groups and birth order.

The introduction of complementary feeding during 6-8 months was found in 4% for age group 0-6 month, 46.7% for age group 6.1-12 Months and 60.2 % for age group 12.1-24 Months, 66% for 0-5 th grade, 65.7% for 6-10th grade, 74.9% for 11-12th grade and 75.4% for UG-PG grade respectively. Hence there was significant difference in the proportion for Introduce of solid, semi-solid and soft foods during 6-8 months and ≥ 8 months for all age groups, mother education.

Minimum Dietary Diversity Received was found in 0% for age group 0-6 month, 54.8% for age group 6.1-12 Months, 64.5 % for age group 12.1-24 Months, 69.8% of females and 75% of males, 72.6% for 0-5 th grade, 66.9% for 6-10th grade, 71.9% for 11-12th grade and 82% for UG-PG grade respectively. Hence there was significant difference in the proportion for Minimum Dietary Diversity Received for all age groups, sex of child and mother education.

Minimum meal frequency of 3 Times was found in only 0.5% for age group 0-6 month, 99.3% for age group 6.1-12 Months, but high 59.7% for age group 12.1-24 Months respectively. Hence there was significant difference in the proportion for Minimum meal frequency of 3 Times for all age groups,

Minimum Acceptable Diet Received was found in 0% for age group 0-6 month, 47.9% for age group 6.1-12 Months and 45.2% for age group 12.1-24 Months, 57.1% for 0-5 th grade, 48.6% for 6-10th grade,

53.6% for 11-12th grade and 59.2% for UG-PG grade, 53.1%, 51.4%, 51.7% and 64.7% for LC, LMC, ULC and UMC status respectively. Hence there was significant difference in the proportion for Minimum Acceptable Diet Received for all age groups, mother education, socioeconomic status.

Iron Rich Food Consumption Received was found in 0% for age group 0-6 month, 55.5% for age group 6.1-12 Months and 65.5% for age group 12.1-24 Months, 70.5% for birth weight 2.5 kg, 74.1% for 0-5 th grade, 67.5% for 6-10th grade, 72.5% for 11-12th grade and 82% for UG-PG grade respectively. Hence there was significant difference in the proportion for Iron Rich Food Consumption Received for all age groups, birth weight, and mother education.

Table 1. Distribution based on age group, sex group, birthweight, birth order, mother education and socioeconomic status.

Characteristics	Frequency	Percentage
Age group	400	31.1
0-6 (in months)		
6-12	420	32.6
12-23	467	36.3
Sex group		
Male	632	49.10
Female	655	50.90
Birth weight		
<2.5 kg	702	54.5
>2.5 kg	585	45.5
Birth order		
1	352	27.4
2	489	38
3	318	24.7
4	92	7.1
5	36	2.8
Mother education		
0-5 grade	212	16.5
6-10 grade	496	38.5
11-12 grade	295	22.9
UG-PG	284	22.1
Socioeconomic		
Lower class	192	14.9
Lower middle	477	37.1
Upper lower	451	35
Upper middle	167	13

Table 2 Association between IYCF indicators and Demographic factors

Demographic factor	Status	Age group (months)		Sex group	Birth order			
Core indicators		0-6	6-12	F	1	2	3	4
		12-23		M	5			
1.Early initiation of breastfeeding	Yes	302 (75.5%) 360(77.1%)	306 (72.9%)	491(75%) 477(75.5%)	265(75.3%) 34(94.4%)	368(75.3%)	233(73.3%)	68(73.9%)
	No	98(24.5%) 107(22.9%)	114(27.1%)	164(25 %) 155(24.5%)	87(24.7%) 24(26.1%)	121(24.7%) 2(5.6%)	85(27.7%)	
Total		400 467	420	655 632	352 36	489	318	92
P-value		0		0.831	0.096			
2.Exclusive breastfeeding up to 6 month	Yes	366(91.5%) 362(77.5%)	335(79.8%)	539(82.3%) 524(82.9%)	278(79%) 76(82.6%)	420(85.9%) 29(80.6%)	260(81.8%)	
	No	34(8.5%) 105(22.5%)	85(20.2%)	116(17.7%) 108(17.1%)	74(21%) 16(17.4%)	69(14.1%) 7(19.4%)	58(18.2%)	
Total		400 467	420	655 632	352 36	489	318	92
P-value		0		0.769	0.128			
3.Continued breastfeeding at 1 year	Yes	0(0%) 367(89.6%)	33(7.9%)	580(88.5%) 573(90.7%)	310(88.1%) 86(93.5%)	448(91.6%) 32(88.9%)	277(87.1%)	
	No	400(100%) 100(21.4%)	387(92.1%)	75(11.5%) 59(9.3%)	42(11.9%) 4(11.1%)	41(8.4%)	41(12.9%)	6(6.5%)
Total		400 467	420	655 632	352 36	489	318	92
P-value		0		0.355	0.017			
4.Introduction of complementary feed	Yes	4(1%) 281(60.2%)	196(46.7%)	454(69.3%) 447(70.7%)	254(72.2%) 63(68.5%)	350(71.6%) 27(75%)	207(65.1%)	

	No	399(99%) 224(53.3%) 186(39.8%)	201(30.7%) 185(29.3%)	98(27.8%) 139(28.4%) 111(34.9%) 29(31.5%) 9(25%)
Total		400 420 467	655 632	352 489 318 92 36
P-value		0	0.58	0.237
5.Minimum dietary diversity(MDD)	Yes	0(0%) 230(54.8%) 301(64.5%)	457(69.8%) 474(75%)	246(69.9%) 373(76.3%) 220(69.2%) 64(69.6%) 28(77.8%)
	No	400(100%) 190(45.2%) 166(35.5%)	198(30.2%) 158(25%)	106(30.1%) 116(23.7%) 98(30.8%) 28(30.4%) 8(22.2%)
Total		400 420 467	655 632	352 489 318 92 36
P-value		0	0.036	0.12
6.Minimum meal frequency(MMF)	Yes	2(0.5%) 417(99.3%) 279(59.7%)	146(22.3%) 138(21.8%)	83(23.6%) 104(21.3%) 76(23.9%) 14(15.2%) 7(19.4%)
	No	398(99.5%) 3(0.7%) 188(40.3%)	509(77.7%) 494(78.2%)	269(76.4%) 385(78.7%) 242(76.1%) 78(84.8%) 29(80.6%)
Total		400 420 467	655 632	352 489 318 92 36
P-value		0	0.844	0.416
7.Minimum(MAD) acceptable diet	Yes	0(0%) 201(47.9%) 211(45.2%)	350(53.4%) 338(53.5%)	180(51.1%) 272(55.6%) 166(52.2%) 46(50%) 24(66.7%)
	No	400(100%) 219(52.1%) 256(54.8%)	305(46.6%) 294(46.5%)	172(48.9%) 217(44.4%) 152(47.8%) 46(50%) 12(33.3%)
Total		400 420 467	655 632	352 489 318 92 36
P-value		0	0.987	0.303
8.Consumption of iron rich food	Yes	0(0%) 233(55.5%) 306(65.5%)	463(70.7%) 476(75.3%)	249(70.7%) 376(76.9%) 222(69.8%) 64(69.6%) 28(77.8%)
	No	400(100%) 187(44.5%) 161(34.5%)	192(29.3%) 156(24.7%)	103(29.3%) 113(23.1%) 96(30.2%) 28(30.4%) 8(22.2%)
Total		400 420 467	655 632	352 489 318 92 36
P-value		0	0.062	0.122

Demographic factor	Status	Birth weight (kg)		Mother education (class)			Socioeconomic status			
Core indicators		<2.5	>2.5	0-5	6-10	11-12	LC	LMC	ULC	
				UG-PG			UMC			
1.Early initiation of breastfeeding	Yes	535(76.2%) 433(74%)		158(74.5%) 362(73%) 232(78.6%) 216(76.1%)			149(77.6%) 361(75.7%) 335(74.3%) 123(73.7%)			
	No	167(23.8%) 152(26%)		54(25.4%) 134(27%) 63(21.4%) 68(23.9%)			43(22.4%) 116(24.3%) 116(25.7%) 44(26.3%)			
Total		702 585		212 496 295 284			192 477 451 167			
P-value		0.364		0.341			0.783			
2.Exclusive breastfeeding up to 6 month	Yes	565(80.5%) 498(85.1%)		181(85.4%) 396(79.8%) 245(83.1%) 241(84.9%)			158(82.3%) 381(79.9%) 380(84.3%) 144(86.2%)			
	No	137(19.5%) 87(14.9%)		31(14.6%) 100(20.2%) 50(16.9%) 43(15.1%)			34(17.7%) 96(20.1%) 71(15.7%) 23(13.8%)			
Total		702 585		212 496 295 284			192 477 451 167			
P-value		0.029		0.186			0.182			
3.Continued breastfeeding at 1 year	Yes	628(89.5%) 525(89.7%)		189(89.2%) 448(90.3%) 260(88.1%) 256(90.1%)			172(89.6%) 417(87.4%) 409(90.7%) 155(92.8%)			
	No	74(10.5%) 60(89.7%)		23(10.8%) 48(9.7%) 35(11.9%) 28(9.9%)			20(10.4%) 60(12.6%) 42(9.3%) 12(7.2%)			
Total		702 585		212 496 295 284			192 477 451 167			
P-value		0.958		0.861			0.124			
4.Introduction of complementary feed	Yes	488(69.5%) 413(70.6%)		140(66%) 326(65.7%) 221(74.9%) 214(75.4%)			137(71.4%) 324(67.9%) 316(70.1%) 124(74.3%)			
	No	214(30.5%) 172(29.4%)		72(34%) 170(34.3%) 74(25.1%) 70(24.6%)			55(28.6%) 153(32.1%) 135(29.9%) 43(25.7%)			
Total		702 585		212 496 295 284			192 477 451 167			
P-value		0.673		0.004			0.46			
5.Minimum dietary diversity(MDD)	Yes	493(70.2%) 438(74.9%)		154(72.6%) 332(66.9%) 212(71.9%) 233(82%)			133(69.3%) 342(71.7%) 321(71.2%) 135(80.8%)			
	No	209(29.8%) 147(25.1%)		58(27.4%) 164(33.1%) 83(28.1%) 51(18%)			59(30.7%) 135(28.3%) 130(28.8%) 32(19.2%)			

Total		702	585	212	496	295	192	477	451	167
P-value		0.064		0			0.062			
6.Minimum meal frequency(MMF)	Yes	147(20.9%) 137(23.4%)		43(20.3%) 69(23.4%)	122(24.6%) 50(17.6%)		35(18.2%)	113(23.7%)	101(22.4%)	35(21%)
	No	555(79.1%) 448(76.6%)		169(79.7%) 226(76.6%)	374(75.4%) 234(82.4%)		157(81.8%)	364(76.3%)	350(77.6%)	132(79%)
Total		702	585	212	496	295	192	477	451	167
P-value		0.286		0.12			0.471			
7.Minimum(MAD) acceptable diet	Yes	365(52%) 323(55.2%)		121(57.1%) 158(53.6%)	241(48.6%) 168(59.2%)		102(53.1%)	245(51.4%)	233(51.7%)	108(64.7%)
	No	337(48%) 262(44.8%)		91(42.9%) 137(46.4%)	255(51.4%) 116(40.8%)		90(46.9%)	232(48.6%)	218(48.3%)	59(35.3%)
Total		702	585	212	496	295	192	477	451	167
P-value		0.249		0.023			0.02			
8.Consumption of iron food	Yes	495(70.5%) 444(75.9%)		157(74.1%) 214(72.5%)	335(67.5%) 233(82%)		134(69.8%)	343(71.9%)	326(72.3%)	136(81.4%)
	No	207(29.5%) 141(24.1%)		55(25.9%) 81(27.5%)	161(32.5%) 51(18%)		58(30.2%)	134(28.1%)	125(27.7%)	31(18.6%)
Total		702	585	212	496	295	192	477	451	167
P-value		0.03		0			0.059			

DISCUSSION:

According to IYCF (2021) guidelines, Government of India recommends that initiation of breastfeeding should begin immediately after birth, preferably within one hour.⁶⁵ In our study of the total 1287 studied children, the majority [968 (75.2%)] were put on breastfeeding within 1 hour of birth referred as early initiation of breast feeding. The results were comparable to study done by Jain S et al.⁵⁷ where 67% of infants started breast feeding within 1 hour of birth. National Family Health Survey-5 (NHFS-5)⁶⁶ at the national level and at Madhya Pradesh showed it to be 41.8% and 41.3% which was higher than data on NHFS-4 and NHFS-3 survey⁶⁷ for children aged under 3 years which is quite lower than our study. Study from West Bengal⁶⁸ had shown it much lower as 13.6%. An epidemiological evidence of a casual association between early initiation of breastfeeding and reduced infection- specific neonatal mortality has also been documented.⁶⁹ Breast-feeding was initiated within 1 hour in only 8% cases among Paroja community in Orissa⁶⁹ whereas 60% babies were breast-fed within 1 hour of birth in Tanzania.¹¹ A statistically insignificant correlation ($P>0.05$) was observed between early initiation of breast feeding and demographic variables (Age, Sex, Birth weight, Birth order, Mother's education and socioeconomic status).

Exclusive breastfeeding was reported by 91.5% mothers of children under 6 month of age and was better than the corresponding national (63.7%) and Madhya Pradesh (21.6%) figure of the NHFS-5. ⁶⁶ However, it was in concurrence with study done by Jain S et al. on Madhya Pradesh population with an incidence of 84.9%. A study from West Bengal has shown that only 57.1% of the children below 6 months were exclusively breastfed.⁶⁸ The possible reasons for these difference that exclusive breastfeeding was based on a 24-hour recall rather than a longer recall period, and this short recall may have missed some infants who were fed other liquids or foods prior to the 24 hours before the survey. A statistically significant correlation (Chi Square test; $P<0.05$) was found on correlating exclusive breast feeding with age group and birth weight.

In the present study, continued breast feeding at one year was being done by 76.8% of children between 12.1 and 24 months which was like study done by Jain S et al. who reported an incidence of 87.5%. This was higher as compared with a study done by Khan et al. ⁷⁰ in Delhi which showed that 72.1% of children between 12 and 23 months were continuing breast feeding. Another study from West Bengal has shown that 91.1% of the children between 12-23 months were continuing breast feeding.⁶⁸ On correlating continuous breast feeding with the demographic factors assessed, only birth order was found to be significant statistically ($P=0.017$).

In our study, the introduction of solid, semi-solid and soft foods during 6-8 months was found in 46.7% for age group 6.1-12 Months and 60.2 % for age group 12.1-24 Months respectively and was statistically significant correlated with age. This was lower than as reported in

earlier study done by Jain S et al. who reported the incidence as 59.8% in 6 months children. A wide variation in the proportion of children who received complementary feeding at 6 months of age was reported from two other studies done in India, that is, 71.7% in Kolkata⁷¹ and 38.7% in Allahabad.⁷² Introduction of complementary feeding at 6 months of age is very crucial for proper preventing malnutrition in infants. In a study conducted in Bangladesh, 13% Garo mothers started complementary feeding before 6 months of age.⁷³ Surprisingly, exclusive breast-feeding was practiced for a long period of 1 year and supplementary foods were introduced only after the child attained about 1 year of age in a tribal community of Orissa.⁶⁹ About 40% of the mothers did not start complementary feeding in time in this study. In a tribal area of Andhra Pradesh, 48.8% infants were given complementary feeding early (9 months). Complementary feeding was started by 48% tribal mothers in Mysore district.⁷⁴ Supplementary feeding was, however, started by 6 months in majority of the children (84.5%) in Jabalpur study.

A statistically significant correlation ($P=0.000$) was observed between MMF and age, with minimum meal frequency of 3 Times in 99.3% for age group 6.1-12 Months. However, it was low 59.7% for age group 12.1-24 Months respectively. In a study done by Jain S et al. MMF was observed in about 67.6% of children aged 6-23 months.⁵⁷ This was better than a study conducted by Khan AM et al which showed MMF in 48.6% of children.⁷⁰

A statistically significant correlation ($P=0.000$) was observed between MDD and age with minimum dietary diversity in 54.8% for age group 6.1-12 Months and 64.5 % for age group 12.1-24 Months respectively. In a study done by Jain S et al. MDD was observed in only 47.8% of the children between 6- 23 months. A study from Delhi has reported MDD in 32.6% of children.⁷⁰ A statistically 103 significant difference was observed in the proportion for Minimum Dietary Diversity received for all mother education groups.

A statistically significant correlation ($P=0.000$) was observed between MAD and age group with Minimum acceptable diet (MAD) in 47.9% for age group 6.1-12 Months and 45.2% for age group 12.1-24 Months respectively. In a study done by Jain S et al. MAD was found to be adequate in 32.8% of the 6-23-month-old children. However, Khan AM et al. reported only 19.7% children receive adequate MAD.⁷⁰ A statistically significant difference was observed in the proportion for Minimum Acceptable Diet Received for all mother education groups.

A statistically significant difference ($P=0.000$) was found between age group and Iron Rich Food Consumption Received for all age groups. Further, iron rich food consumption was also found to be significantly correlated statistically. Iron Rich Food Consumption Received was found in 55.5% for age group 6.1-12 Months and 65.5% for age group 12.1-24 Months respectively. A statistically significant difference ($P=0.000$) was found between mother education and iron rich food.

This study clearly highlights that although the exclusive breastfeeding

rate is satisfactory in this study population, there are many inappropriate feeding 104 practices during early childhood to ensure good health and better nutritional status of young children & children are thus at risk of childhood malnutrition associated with inappropriate feeding. The finding from the present study clearly highlights the importance of educating the women on infant and child feeding practices not only regarding frequency but also about diversity for meal. Mothers should also be encouraged to attend antenatal and postnatal care clinics where they are likely to be taught appropriate infant and young child feeding practices. Interventions to improve nutritional quality of the complementary foods are also recommended based on the finding from this study that complementary foods given to children had inadequate dietary diversity.

CONCLUSION:

This study clearly highlights that although the exclusive breastfeeding rate is satisfactory in this study population, there are many inappropriate feeding practices during early childhood to ensure good health and better nutritional status of young children & children are thus at risk of childhood malnutrition associated with inappropriate feeding. Age of the child was found to be significantly correlated statistically with all the IYCF indicators. The finding from the present study clearly highlights the importance of educating the women on infant and child feeding practices not only regarding frequency but also about diversity for meal. Mothers should also be encouraged to attend antenatal and postnatal care clinics where they are likely to be taught appropriate infant and young child feeding practices. Interventions to improve nutritional quality of the complementary foods are also recommended based on the finding from this study that complementary foods given to children had inadequate dietary diversity.

Limitation-

In the present study we were not able to examine the nutritional adequacy of diet due to lack of information in the surveys regarding the amount of food fed. This research based on mother understanding and memory of feeding practices, so recall bias may be there. This was a hospital-based study so may not represent population.

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