A cross-sectional study on the prevalence of anemia and its associated factors among antenatal mothers in a tertiary care hospital

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Abstract---Background: Anemia is an important public health problem globally. It is an important determinant of nutritional status. 1.62 billion people globally are affected with anemia which corresponds to 24.8% of the world population. There is relatively lack of interest in identifying the burden of the disease among antenatal mothers in India. Government of India distributes iron and folic acid tablets to preganant women under National Nutritional Anemia Prophylaxis Programme and Anemia Mukt Bharat Strategy. Still, early detection and prompt management of anemia in pregnancy is necessary to prevent complications during puerperium. Objectives: To compare the prevalence of Anemia among antenatal mothers in Institute of Social Obstetrics and Government Kasturba Gandhi

Hospital for Women and Children, Triplicane, Chennai, Tamilnadu, India. To compare the identified associated factors of anemia among the same study population Methodology: A cross sectional survey was conducted among 99 Antenatal mothers in the age group of 18 to 45 years in second trimesters in Institute of Social Obstetrics and Government Kasturba Gandhi Hospital for Women and Children, Triplicane, Chennai, Tamilnadu, India. Socio demographic details, anthropometric measurement was obtained. Haemoglobin was estimated using auto analyzer. Statistical analysis was done using Microsoft Excel 2013. Results: The prevalence of anemia was found to be 59.6% among the antenatal mothers and prevalence is higher in 6th trimester (28.7%). The mean (SD) haemoglobin of the total study population is 10.8 g/dl. Severe anemia was not seen. The proportion of antenatal mother who were underweight was higher (6.9%). The proportion of anemia was high in antenatal mothers living in nuclear family (50%) and upper lower families (15.6%). Conclusion: The study gives an insight that anemia is not only common among adolescent girls but also antenatal mothers. The analysis clearly indicates high prevalence of anemia among antenatal mothers. Nutritional improvement and oral iron supplementation are required for curing anemia.

Keywords---Anemia, Antenatal mothers, Prevalence, Second trimester.

Introduction

'Good health adds life to years'

Anemia is an important determinant of nutritional status. Anemia is a common problem with serious consequences in Antenatal mothers.

Anemia is an important public health problem globally. World Health Organization (WHO) estimates that 1.62 billion people globally (95% CI 1.50-1.74 billion) are affected with anemia which corresponds to 24.8% of the world population.[2]

Anemia is defined as a condition in which the number of red blood cells, and consequently their oxygen-carrying capacity is insufficient to meet the body's physiological needs. Specific physiological needs of an individual vary with age, gender, altitude, smoking behavior, and pregnancy. Iron deficiency is the most common cause of anemia globally, but other nutritional deficiencies (folate, Vitamin B12, and Vitamin A), acute and chronic inflammation, parasitic infections, inherited and acquired disorders of haemoglobin synthesis, RBC's production or RBC's survival, can all cause anaemia.[3] Although clinical evaluation of anemia requires multiple laboratory tests to identify the severity, type and cause of anemia, haemoglobin concentration is the most reliable indicator of anemia at the population level.[4]

National Family Health Survey-4 (2015-16) identified that Pregnant women age 1549 years who are anemic (<11.0 g/dl) (%) -44.4 %. Non-pregnant women age

15-49 years who are anemic (<12.0 g/dl) (%) 55.4%.[5] In all age categories, the burden is more in the rural setup than urban areas.

In view of significant health implications of anemia especially on maternal and

children's health, as well as huge social and economic loss, the government of India has

initiated programs to decrease the burden of anemia among children, adolescent girls, nonpregnant women in reproductive age group and pregnant and lactating women through direct as well as indirect interventions. Indeed, anemia is an important public health challenge among antenatal mothers also, both in developed and developing world.

However, there is relatively lack of interest in identifying the burden of the disease among antenatal mothers in India. This reflects as conspicuous lack of studies regarding prevalence of anemia among antenatal mothers in India.

Anemia in antenatal mothers even if diagnosed, it is commonly overlooked despite mounting evidence that low haemoglobin levels are a significant marker of physiologic decline. It is easy to overlook anemia in the antenatal mothers since symptoms such as fatigue, weakness, and shortness of breath may be attributed to the pregnancy itself. However, the decline of haemoglobin and concomitant increased degree of anemia with antenatal mothers is not necessarily a result of pregnancy.

There are very few studies on prevalence of anemia in antenatal mothers in India and in Tamilnadu. So, the present study has been designed as a cross-sectional study in pregnant women of Institute of Social Obstetrics and Government Kasturba Gandhi Hospital for Women and Children, Triplicane, Chennai, Tamilnadu, India. This study will help us to estimate the prevalence of anemia in antenatal mothers. Also, this study will help us to know the socio-demographic and other associated factors in the antenatal mothers.

Objectives:

- To compare the prevalence of Anemia among antenatal mothers in Institute of Social Obstetrics and Government Kasturba Gandhi Hospital for Women and Children, Triplicane, Chennai, Tamilnadu, India.

- To compare the identified associated factors of anemia among the same study population

Methodology:

Study Design: A cross sectional study.

Study Place: Institute of Social Obstetrics and Government Kasturba Gandhi Hospital for Women and Children, Triplicane, Chennai, Tamilnadu, India.

Study Population: Antenatal mothers between 18 to 45 years

Study Duration: July 2019 to September 2019.

Sample Size: 100

Inclusion Criteria:

In this study, pregnant mothers of second trimester who come to Outpatient department of Institute of Social Obstetrics and Government Kasturba Gandhi Hospital for Women and Children, Triplicane, Chennai, Tamilnadu, India.

Exclusion Criteria:

- Mentally Handicapped

- Recently transfused

- Chronic medical diseases

- Diagnosed haemoglobinopathies

- Early bleeding

- Antepartum hemorrhage

Study Tool:

The study tool is interview schedule and Haemoglobin estimation

The interview schedule was designed and translated in local language and retranslated to assess the content validity. It will have two parts –

Part I: Includes the information on **socio-demographic profile** and **history of preexisting health problems**.

Clinical details of the subject was collected on basis of history and diagnosed chronic diseases was inquired by asking about the presence of chronic diseases diagnosed by physicians & or diseases written in the patients' record.

Part II: Includes - clinical examination and Haemoglobin Estimation

•Clinical examination include height, weight, BMI, blood pressure measurements.

Height measurement: Standing height will be measured by stadiometer.

Weight measurement: By Bathroom scale weighing machine
BMI: Formula: weight (kg) / [height (m)]^2

With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Because height is commonly measured in centimetres, dividing height in centimetres by 100 will be done to get height in meters.

WHO recommended that for many Asians the limits for public health action should be 23 kg/m2. The categories suggested for Asians are: less than 18.5 kg/m2 (underweight); 18.5–23 kg/m2 (normal); 23–27.5 kg/m2 (overweight) and 27.5 kg/m2 or higher (obesity)

Triplicane, Chennai, Tamilnadu, India.

• Written Informed consent was obtained from the participants.

Data Entry and Analysis:

Totally 100 antenatal mothers were approached and data was collected from them. After checking for non-response and erroneous data, 1 subject was removed accounting to a total of 99 participants.

The data were entered in MS Excel 2013 and analysed using SPSS Version 16. Appropriate descriptive and inferential statistics was used to analyse the data. A two tailed p value of less than 0.05 was considered as statistically significant.

Results:

Socio-Demographic details of the study population

The socio – demographic details of the study participants are shown in table 1.

Table 1 Socio-Demographic details   of the study population

Socio-demographic detail	Category	Frequency (N=99)	Percentage
Type of family	Joint	17	16.8
	Nuclear	43	42.6
	Extended Nuclear	26	25.7
	Third generation	13	12.9
Education	No formal education	2	2
	Primary	17	16.8
	Secondary	21	20.8
	Higher Secondary	14	13.9
	Graduation	33	32.7
	Post-graduation	12	11.9
Monthly Income	Up to 5000	6	5.9

	5001–10000	16	15.8
	10001–15000	37	36.6
	Above 15000	40	39.6
Number of family numbers	≤ 4	70	69.3
	> 4	29	28.7

Most of them live in nuclear family set up (42.6%). Regarding the antenatal mother's literacy level, 32.7% are being graduated. No formal education in 2% of antenatal mothers.

- **Distribution of Hemoglobin among the study population.**

The distribution of hemoglobin among the study population are shown in table-2

Table 2 Distribution of Haemoglobin among the study population

Prevalence of Anaemia with respect to Trimesters				
Severity	4	5	6	Grand Total
Mild		12 16	18	46
Moderate		2	11	13
Grand Total	26		99	Normal

The mean haemoglobin of the total study population is 10.8 g/dl ± 1.75 g/dl

- **Distribution of Anemia among the study population.**

**The distribution of anemia among the study population are shown in table-3**

Table 3 Distribution of anemia among study population

Distribution of anemia among study population	
ANEMIA CATEGORY	**TOTAL**
NORMAL	**40(40.4%)**
ANEMIA	59 (59.6%)

The proportion of anemia among the study population were 59.6% and proportion in girls was slightly higher in third trimester (28.71%)

- **Distribution of anemia among the study population and trimester differences according to WHO classification on anemia.**

The distribution of anemia among the antenatal mothers according to WHO classification of anemia are shown in figure-1
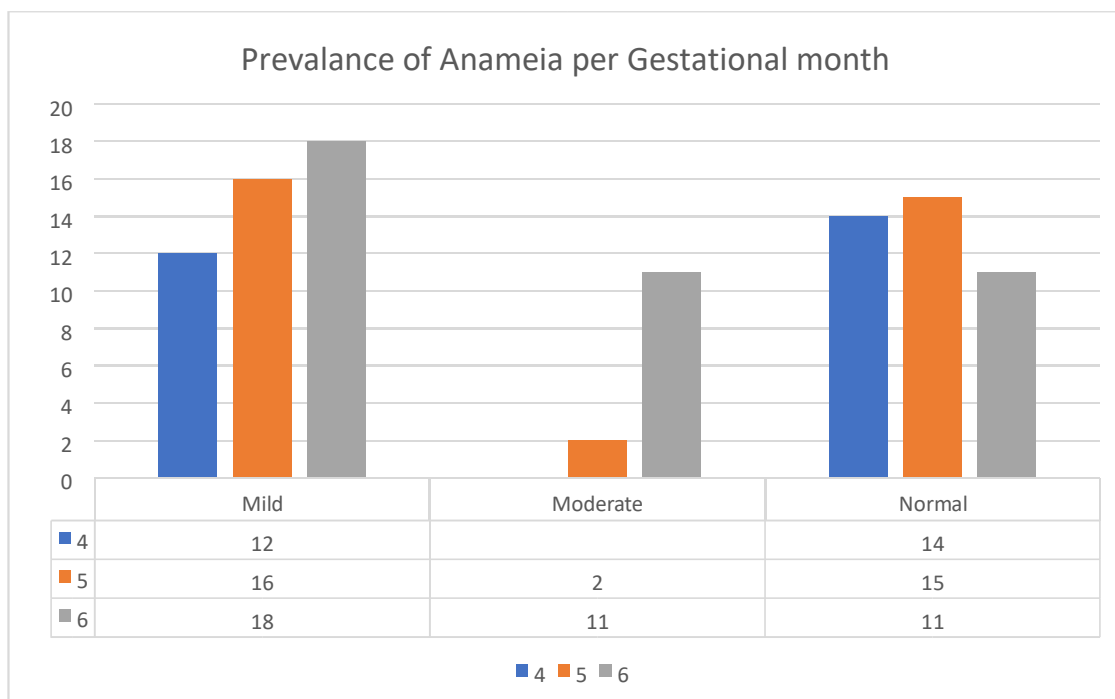
Figure 1 severity of anemia according to WHO classification

Severe anaemia was not found. The proportion of antenatal mothers with moderate anaemia was higher in sixth month. (10.9%)

- Distribution of Anthropometric measurements ⬜ **Distribution of anthropometric measurements**

The distribution of anthropometric measurements is shown in table-5

Table 4 Distribution of Anthropometric measurements

Distribution of Anthropometric measurements		
CRITERIA	Non-Anaemic Mean	Anaemic Mean
Age in years	26.52	26.33
BMI kg/m2	25.92	25.17

Hb	11.7	10.23

The BMI categorized according to WHO growth curve where underweight is less than 5th percentile, normal weight is 5th to 85th percentile and more than 85th percentile is considered as overweight.

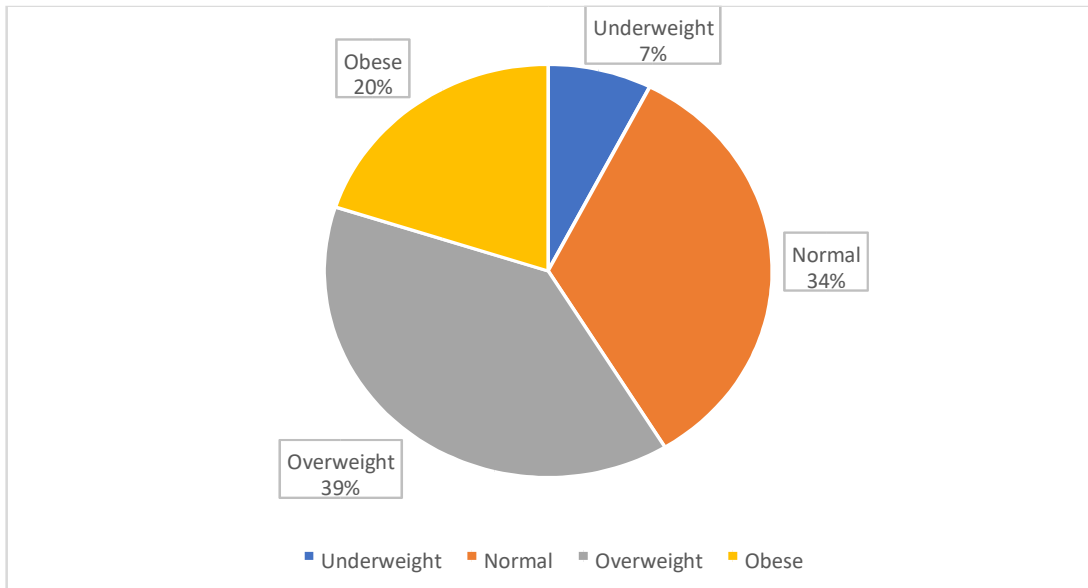The BMI categorized according to WHO growth curve for antenatal mothers are shown in figure-3.

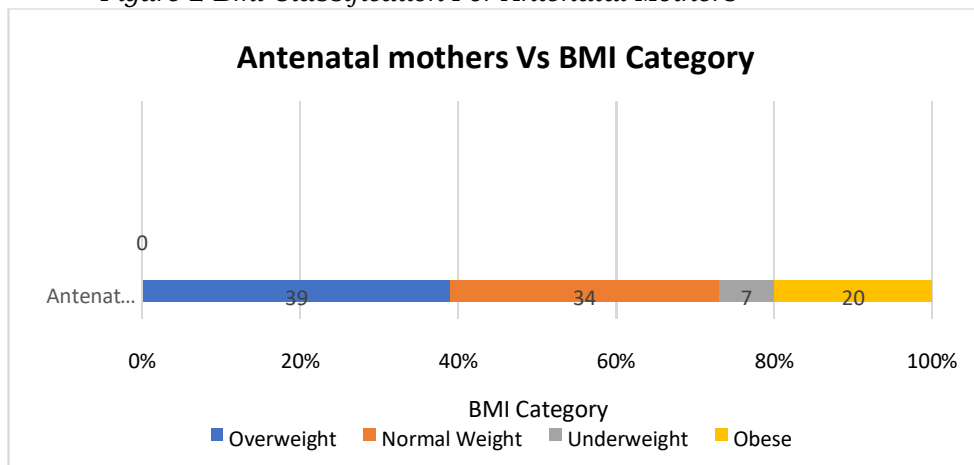*Figure 2 Bmi Classification For Antenatal Mothers*

Figure 4 BMI categorization among antenatal mothers

The distribution of anemia Vs BMI categorization among antenatal mothers are shown in table-6

Table 6 Distribution Of Anemia Vs Bmi Among Antenatal Mothers

Antenatal mothers	**Anemia(N=59)**	**Non Anemia (40)**	**Total (99)**
under weight	4 (6.77%)	2(5%)	6(6.06%)
Normal	30(50.84%)	17(42.5%)	47(47.47%)
Overweight	16(27.11%)	14(35%)	30(30.3%)
Obese	9(15.25%)	7(17.5%)	16(16.16%)

Results showed that 6.06% of antenatal mothers were underweight.

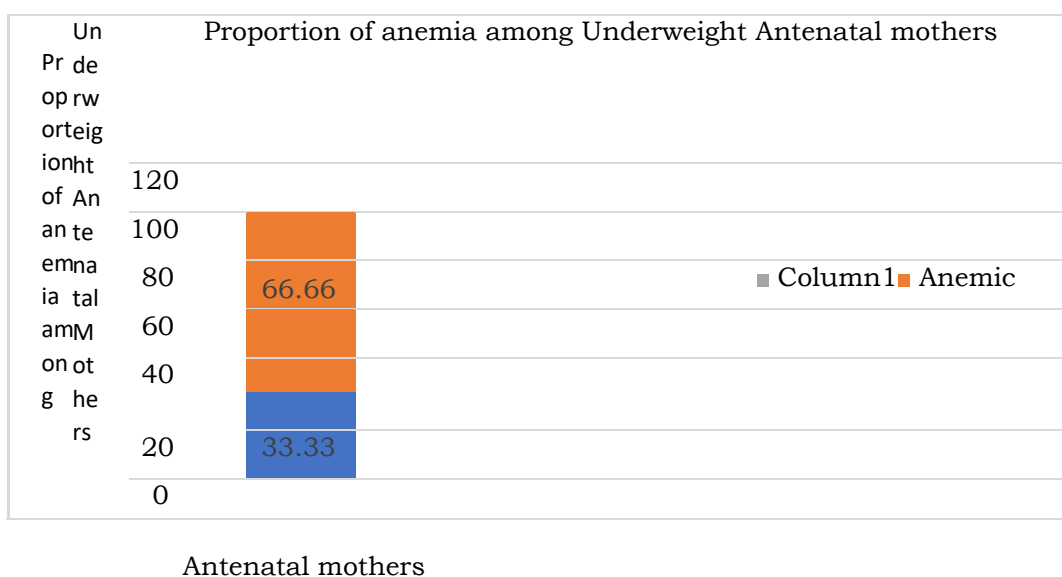The proportion of anemia among underweight antenatal mothers are shown in figure -5

Antenatal mothers

Figure 5 Proportion of anemia among underweight antenatal mothers

 Distribution of history and clinical details among the study population

Table8 Distribution of history and clinical details among the study population

CRITERIA	**Anemic(N=59)**	**Non anemic(N=40)**	**Total(N=99)**
Have Symptoms of worm infestation?	1(1.7%)	2(5%)	3(3.03%)

Regularly take iron supplements	59(100%)	39(97.5%)	98(98.9%)
Conjunctival pallor	9(15.25%)	3(7.5%)	12(12.12%)

All antenatal mothers are given iron folic acid tablets daily under maternal iron folic acid supplementation program. In spite of the regular IFA supplementation 59.6% were found to be anemic. Among those who were proved to be anemic 15.25% had conjunctival pallor.

- **Distribution of Knowledge and practice about anemia among the study population**

The distribution of knowledge and practice about anemia among the study population are shown in table -9

Table 9 Distribution of Knowledge and practice about anemia among the study population

	Yes	Percentage	NO	Percentage
1.Symptoms of worm infestation				
	3	3%	96	96.9%
2.Prevention of Anemia				
Healthy iron rich diet	87	87.8%	12	12.12%
IFA Supplement	98	98.9%	1	1.01%
Avoid consumption of Tea with Food	20	20.2%	79	79.8%
3. Frequency of Iron rich foods				
Daily	44	44.4%		
2 times per week	25	25.25%		
3 times per week	18	18.18%		
Rarely	12	12.12%		
4.Foods inhibiting iron absorption				
Tea	79	79.8%	20	20.2%

- **Distribution of nutritional factors contributing to anemia**

The distribution of nutritional factors contributing to anemia are shown in table -10

Iron rich foods	Non anemic (40)	Anemic (59)
Adequate	18(45%)	26(44%)
Inadequate	22(55%)	33(56%)

Table 10 Distribution of nutritional factors Vs anemia

Proportion of anemia higher in inadequate iron intake (56%).

- **Proportion of anemia among different socio demographic variables of the study population**

The proportion of anemia among different socio demographic variables of the study population are shown in table -11

Table 11 Proportion of anemia among different socio demographic variables

Variable		Anemic (N=59)	Non Anemic(N=40)	Total (N=99)
Type of family	Joint	9(15.25%)	8(20%)	17(17.51%)
	Nuclear	30(51.86%)	13(32.5%)	43(43.43%)
	Extended nuclear	16(27.11%)	10(25%)	26(26.26%)
	Third generation	4(6.78%)	9(22.5%)	13(13.1%)
Antenatal mother Education	No formal education	2(3.38%)	0	2(2.02%)
	Primary	9(15.25%)	7(17.5%)	16(16.16%)
	Secondary	13(22%)	9(22.5%)	22(22.22%)
	Higher Secondary	7(11.86%)	6(15%)	13(13.13%)
	Degree	23(38.9%)	11(27.5%)	34(34.34%)
	Post-graduation	5(8.47%)	7(17.5%)	12(12.1%)
Monthly Income	up to 5000	5(8.47%)	1(2.5%)	6(6%)
	5001-10000	14(23.72%)	2(5%)	16(16.16%)
	10001-15000	16(27.11%)	21(52.5%)	37(37.37%)
	Above 15001	24(40.67%)	16(40%)	40(40.4%)
Number of family numbers	Less than 4	41(69.49%)	29(72.5%)	70(70.7%)
	More than 4	18(30.5%)	11(27.5%)	29(29.3%)

Discussion

In the study, most of them live in nuclear family setup (42.6%). Regarding the antenatal mother's literacy level, 32.7% had been graduated. No formal education is found to be in 2% of antenatal mothers.

The prevalence of anemia was found to be 59.6% among the antenatal mothers and prevalence is higher (28.71%) in sixth month. The mean haemoglobin of the total study population is 10.8 g/dl ± 1.75 g/dl. Severe anemia was not found.

The proportion of underweight among antenatal mothers is 6.06%. The proportion of anemia increases among antenatal mothers who had poor intake of iron rich foods and underweight which is statistically significant(P=0.01).

In GS Toteja et al study 2006 (9), prevalence of anemia is 84.9% among antenatal mothers from 16 districts of 11 states in India. 13.1% had severe anemia and 60.1% had moderate anemia.

In Reeta Bora et al study 2014 (10), prevalence of anemia is 89.6% among antenatal mothers in Northeast India. 8.3% had severe anemia.

In Pushpa O Lokare et al study 2012 (11), prevalence of anemia is 87.21% among antenatal mothers in Aurangabad city, India. Factors such as religion, level of education of women and their husbands and socioeconomic status were found to be significantly associated with the prevalence of anemia in pregnancy.

In Ravishankar Suryanarayana et al study 2017 (12), prevalence of anemia is 62.3% among antenatal mothers in Kolar District, Karnataka. Factors such as educational status, gravida, duration of pregnancy and birth interval were found to be significantly associated with the prevalence of anemia in pregnancy.

In Jai Bhagwan Sharma et al study 2003 (13), prevalence of anemia is 96% among antenatal mothers from Delhi, India. Out of them, 89.9% had mild anemia whereas 5.3% had severe anemia. Anemia was seen in 96.18% cases of vegetarian women.

Conclusion

The prevalence of anemia was found to be 59.6% among the antenatal mothers and prevalence is higher (28.71%) in sixth month. The mean haemoglobin of the total study population is 10.8 g/dl ± 1.75 g/dl. Severe anemia was not found.

The study gives an insight that anemia is not only common among adolescent girls but also among antenatal mothers. Strengthen schemes like maternal iron folic acid supplementation programme, Anemia Mukt Bharat strategy, iron rich meal should be regularly monitored in terms of quality and quantity of food and its supply.

Recommendation:

To address the problem of anemia in pregnant women, anemia among adolescent girls should be early diagnosed and treated. Prevalence of anemia among antenatal mothers can be reduced in their adolescent phase of life, through weekly supplementation of iron folic acid tablets under direct supervision and Nutrition Education by peer educator at community level.

Awareness must be created among health care professionals as well as among adolescents, antenatal mothers and teachers about the importance of screening for anemia and early treatment and also prevent complications in later life.

Future studies can be done to analyse etiology of anemia among pregnant women and intervention study after iron therapy for those antenatal women.

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