

Trends Of Adult Height in India Using National Family Health Survey Data: A Systematic Review

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Abstract: The national family health survey (NFHS) is a multi-round, large scale, survey conducted throughout India in a customary sample of households. It was first conducted in 1992-93, till then five surveys have been conducted. The survey was done using four types of questionnaires namely Men's, Women's, Biomarker, and household. The survey was funded by many international Funding agencies like United States Agency for International Development (USAID), United Nations Children's Fund (UNICEF) etc. In India department of Ministry of Health and Family Welfare (MOHFW) has delegated the International Institute for Population Sciences (IIPS), Mumbai as a nodal agency for mutual support in the survey. Each survey of NFHS has two definite goals i.e) to anticipate data on family welfare and health for program and policy purposes and ii) to contribute an information on important family welfare and emerging health issues. Systematic review was conducted as per PRISMA guidelines, we carried out an extensive electronic search of PubMed, Google and Google Scholar to identify published studies on trends in adult height using NFHS India data. Out of a total 43 potential studies 38 were excluded and 5 relevant studies were used for final review. There is a decrease in average adult height in India. Despite of genetic, non-genetic factors like social, nutritional, and environmental plays a very important role in adult height.

Keywords: NFHS, India, Adult Height

INTRODUCTION:

The National Family Health Survey (NFHS) was conducted for the first time in India in 1992-93 in three phases which covers 24 states and one union territory at that time. Since then, five rounds of the survey have been completed. The national family health survey provides national, state, and district level data for India on maternal and child health, fertility, infant and child mortality, the practice of family planning, reproductive health, nutrition, anaemia, utilization and quality of health and family planning services. All the data was collected in a representative sample through questionnaires.¹

The national family health survey was the first national survey which collected the demographic, health, and anthropometric data altogether simultaneously.¹⁻²

Each consecutive rounds of the National Family Health Survey have had two specific objectives:

- i) to anticipate data on family welfare and health for program and policy purposes and
- ii) to contribute an information on important family welfare and emerging health issues.¹

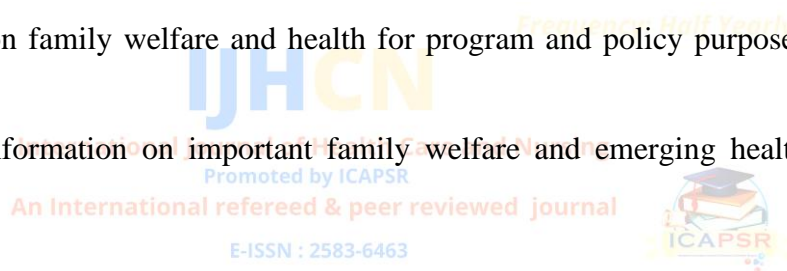


Table 1: Summary of Information collected in NFHS survey using questionnaires

S.no	NFHS Survey	Year	Number of questionnaires used	Name of questionnaires	Sample size	Age group	Information collected
1	NFHS-1	1992-93	3	i) Household ii) Woman’s and iii) Village questionnaires	89777 (women) 500492 (household)	13-49 years	Population, Health, Nutrition

2	NFHS-2	1998-99	3	i) Household ii) Woman's and iii) Village questionnaires	89199 (women) 91196 (household)	15-49 years	Quality of life, family welfare, women's status, reproductive health, Education, and domestic violence.
3	NFHS-3	2005-06	3	i) Household ii) Woman's and iii) Man's	124385 (women) 74369 (men) 109041 (household)	15-49 years (Women) 15-54 years (Men)	Fertility, mortality, family planning, STDs like HIV, women nutrition, health, and health care. it also includes the testing of adult population for HIV.
4	NFHS-4	2015-16	4	i) Household ii) Woman's iii) Man's and iv) Biomarker	699686 (women) 112122 (men) 601509 (household)	15-49 years (Women) 15-54 years (Men)	malnutrition, anaemia, hypertension, HIV, and Random blood sugar.
5	NFHS-5	2019-21	4	i) Household ii) Woman's iii) Man's and iv) Biomarker	724115 (women) 101839 (men)	15-49 years (Women) 15-54 years	waist and hip circumference, Vitamin D3, HbA1c, and malaria parasites

					636699 (household)	(Men)	
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NFHS=National family health survey

Table 2: Summary of states and Union territory covered in NFHS

S.NO	NFHS SURVEY	YEAR	PHASES	No. of STATES	No. of UT
1	NFHS-1	1992-93	3	24	1
2	NFHS-2	1998-99	2	26	-
3	NFHS-3	2005-06	2	29	-
4	NFHS-4	2015-16	2	ALL STATES	ALL UT
5	NFHS-5	2019-21	2	ALL STATES	ALL UT including J&K

UT=Union territory; NFHS=National Family Health Survey



Methodology:

The PRISMA guidelines were followed for writing this systematic review.

Search Strategy:

An extensive electronic search of PUBMED, GOOGLE, and GOOGLE SCHOLAR has been conducted to identify published studies on trends in adult height using NFHS India data. The search terms/ keywords used are National family health survey, NFHS, ADULT HEIGHT, and INDIA. Duration of literature study: 6 months (from January 2022 to July 2022).

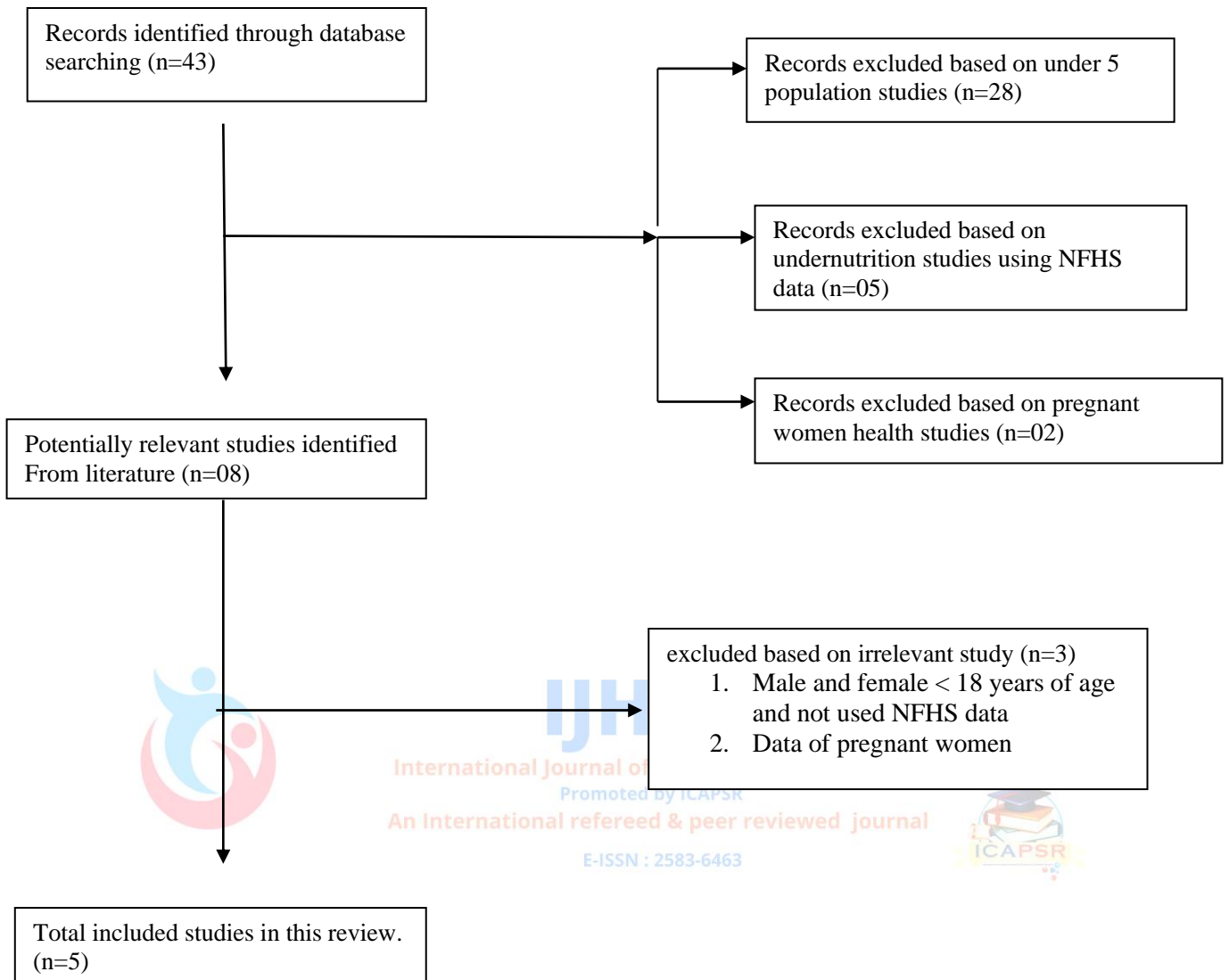
Eligibility Criteria for Selection of Study:

We included studies which used national family health survey to assess thesecular trend and patterns of adult height in India and variables affecting it using NFHS data. Out of 43 studies we excluded 38 studies because of undernutrition, under 5 population study and pregnant women study using NFHS data. Total five eligible studies were included in this review.

Consort chart given below:

Frequency: Half Yearly

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Review of Reported Studies:

Chaudhary KK et al assessed the trends in adult height and variables affecting it between two consecutive surveys of NHFS. They used the NFHS-2, 3 and 4 survey for analysis (all three for the women and NFHS 3 and 4 for men) for the average adult height. They studied the comparison between the two age groups of 15-25 and 26-50 years for both men and women to assess the adult height trends. Their results of comparison between the data of NFHS-3 and NFHS-4 showed a decline in the average adult height of women by 0.12 cm in the age group of 15-25 years. On the other hand, there is a significant improvement in the mean adult height of the women by 0.13 cm in the age group of 26-50 years. Among men, the comparison

between the two surveys, there results showed a significant decline in the mean adult height of men by 1.10 cm in the age group of 15-25 years and 0.86 cm in the age group of 26-50 years. Despite the genetic factors now the trends of adult height of both the genders from India clearly required to study the non-genetic causal factors like, nutritional, social and environmental.²

Kim R et al assessed variation in adult height and BMI by two variable of their interest i.e. wealth and education, and they evaluated their variation over a period in India. They used the data of 768,130 women and 180,691 men from Indian NFHS 3 and 4 survey for the analysis. Using linear regression models, they studied the average association between wealth and education with anthropometry data of men and women. There results showed no significant pattern of variation in height for both men and women but they have found a potential reversal in BMI variability in India among the least educated and poorest populations.³

Mamidi RS et al assessed the average and the secular trends in adult height in different states of India in relation to socioeconomic characteristics and dietary intakes using the national family health survey 3. The average heights and secular trends were analysed for each state where the survey was conducted in relation to socioeconomic variables. To study the association of socioeconomic factors and consumption of animal-source foods with height They analysed the NFHS 3 data using Bivariate and multiple regression. They used the anthropometry data for 69,245 men and 118,796 women in the 20 to 49 years age group. According to their results the average adult height of men is 165 cm and women is 152 cm, respectively, with huge variation among states. Also, there study showed that In higher socioeconomic status there is a greater adult height and secular increase in height. Milk consumption also had a positive association with height in both the genders in different states. The pattern of Milk Consumption in different states may be related to the regional differences in height among both the genders.⁴

Perkins JM et al assessed the differences in height among men and women with variables like wealth, education, caste, geography, and birth years using the Indian National Family Health Survey 3. There results showed a positive association between socioeconomic position and

height across all the 29 Indian states in lower Socioeconomic position individuals being shorter in height in comparison to higher socioeconomic position.⁵

Som S et al assessed the effect of socioeconomic variables on the heights and weights of adults aged 15-49 years using the India National Family Health Survey-3 data and they analysed the data using multiple linear regression analyses. Their study showed a clear positive association for height and BMI with socioeconomic level of the individuals except for the BMI of overweight females.⁶

Table 3: overall summary of reported studies on Adult Height using NFHS data

s.no	Study Reference	Variable of interest	NFHS data used	Sample size (N)	Age Group	Results
1.	Chaudhary KK et al, 2021 ²	Age, religion, caste, residence, state, wealth index	NFHS 2, NFHS 3, NFHS 4	83876 (women NFHS 2) 121728 (women NFHS 3) 700602 (women NFHS 4) 66468 (Men NFHS-3) 105783 (men	Two age strata used: 15-25 years (Women and men) 26-50 years (women and men)	There results showed a decrease in height of women in between NFHS 3 and 4 in the age group 15-25 years. Though, there is a significant improvement in the mean height among the age group 26-50 years. They concluded that despite of genetic factors, non genetic factors like nutritional, social and environmental factors also play an important role in adult height.

				NFHS-4)		
2.	Kim R et al, 2020 ³	Age, residence, education, wealth, marital status	NFHS 3 and NFHS 4	768130 (women) 180691 (men)	15-54 years (women and men)	There results showed no significant difference in the pattern of adult height among both men and women.
3.	Mamidi RS et al, 2011 ⁴	State, residence, education, religion, wealth index, caste, nutrition	NFHS 3	118796 (women) 69245 (men)	20-49 years (women and men)	There results showed significant regional differences in the average height in higher socioeconomic status and milk consumption.
4.	Perkins JM et al, 2011 ⁵	Gender, wealth, education, caste, religion, occupation, residence, state	NFHS 3	124385 (women) 74369 (men)	15-49 years (women) 15-54 years (men)	There results showed inequalities in height among lower socioeconomic position individuals as compare to higher one.
5.	Som S et al, 2014 ⁶	Age, wealth index, zone, residence, education, caste, religion	NFHS 3	118781 (women) 64984 (men)	15-49 years for both women and men	There results showed a clear positive association in height and BMI with socioeconomic level of the participants.

NFHS= National Family Health Survey;

REFERENCES:

1. Accessed online from <http://rchiips.org/nfhs/> on 2-10-2021.
2. Accessed online from <http://rchiips.org/nfhs/data/india1/iachap2.pdf> on 09-02-2023.
3. Choudhary KK, Das S, Ghodajkar P. Trends of adult height in India from 1998 to 2015: Evidence from the National Family and Health Survey. PLoS One. 2021;16(9):e0255676.
4. Kim R, Kumar Pathak P, Tripathi N, Subramanian SV. Heterogeneity in adult anthropometry by socioeconomic factors: Indian National Family Health Survey 2006 and 2016. Eur J Clin Nutr. 2020;74(6):953-960.
5. Mamidi RS, Kulkarni B, Singh A. Secular trends in height in different states of India in relation to socioeconomic characteristics and dietary intakes. Food Nutr Bull. 2011;32(1):23-34.
6. Perkins JM, Khan KT, Smith GD, Subramanian SV. Patterns and trends of adult height in India in 2005-2006. Econ Hum Biol. 2011;9(2):184-93.
7. Som S, Ulijaszek S, Pal M, Bharati S, Bharati P. Variation in height and BMI of adult Indians. J Biosoc Sci. 2014;46(1):47-65.

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