

Impact of Socio-Economic Status on Anthropometry and Physiological Variables among Tuberculosis Patients. A Population Based Study in Delhi India.

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ABSTRACT

Relative little known about the socio-economic factors on tuberculosis in metropolitan city among the settled and migrated population. Present aim of the study to examine the socio-economic status of the Tuberculosis patients. To examine the anthropometry measurements and physiological variables according to the Socio-economic-status in settled and migrated TB population of Delhi. Random sampling method was used to collect data. A total of 569 households formed the part of the study and an equal number of respondents were interviewed using various interview schedule developed for the study. Significant difference observed for body mass index at $p < 0.05$ level. The mean value for male is (17.9 ± 2.19) and female i.e. (19.91 ± 2.38) . Mean value of female is higher in comparison to male in SES II. For SES III mean value for male (17.9 ± 2.39) and female (18.97 ± 4.06) . In SES IV mean value of male (34.04 ± 140.68) is higher than female (19.67 ± 5.54) .

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Introduction:

TB is a bacterial infection spread through inhaling tiny droplets from coughs or sneeze of an infected person. The World Health Organization (WHO) estimate that every year TB newly infects 8.6 million people and claims 1.3 million lives globally. TB disproportionately affects the poor as things like crowded livings conditions, poor ventilation and under nutrition all make an individual more likely to develop TB. Present aim of the study to examine the socio-economic status of the Tuberculosis patients. To examine the anthropometry measurements and physiological variables according to the Socio-economic-status in settled and migrated TB population of Delhi.

Materials and Methods:

The present study has been carried out in urban slums of Delhi. The state Delhi is comprised of nine districts. Out of this nine districts south Delhi, North

and East Delhi were chosen for present study. Because of the main reasons, firstly there are abundance of cluster slums, secondly these district claims maximum number of TB Cases. Random sampling method was used to collect data. A total of 569 households formed the part of the study and an equal number of respondents were interviewed using various interview schedule developed for the study.

Study Techniques:

- Quantitative Study-The schedule consist information's on socio-economic conditions, housing living conditions type of fuel used, ventilation type like number of windows and door open and closed, no. of members living in per room, personal income, family income per month, age at marriage, age at menarche, no. of children's below 15 yrs. old in house, does they any own vehicle or they used public transport, does any bed smell from outside of the home littered environment or not,

quantity of consuming liquor and cigarette or chewing tobacco per day in take of nutrition's per day such as milk, green vegetables, pulses, wheat and rice based staples. questions was for cases like persistence of cough, fever, night sweat, loss of appetite, loss of weight, and if any one earlier suffered from TB or any family member suffered or suffering currently from TB. From where and when they have migrated to Delhi, Proforma was filled in front of subjects.

- **Anthropometric measurements**-In order to ascertain the nutritional status of the TB patients as compared to non-TB and TB subjects certain anthropometric measurements were taken as suggested by Weiner & Lourie[1], Lohman et.al., [2]. From stature and weight data body mass index (BMI) was estimated by dividing weight in (kg) by height square in (metre sq.) then index was compared with the standard references. SES socio economic status was calculated by the Kuppu Swamy^[3] method in India. Score for SES was calculated according to Kuppu swamy^[3] parameter 2014 which include the education, occupation and family income per month.
- **Clinical parameters**-For Physiological and metabolic parameters were taken on TB patients. Ethical considerations-The approval of the academic ethics committee of Department has been obtained. The written informed consents of all cases-controlled was obtained prior to enrolment from the subjects. Clinical and vaccines details was noted of general cases-controlled population purely used for the academic research purpose.
- **Data Processing**-After completion of field data collection each proforma was be edited and entered in MS-Excel data sheet, each subject was given code or numbering in order to keep the identity confidential. House-hold data and laboratory data was merged for linking the variables and for obtaining results from raw data.

Results:

Socio-Economic Status Profile:

Table: 1. Represents percentage for socioeconomic status for settled and migrated population. In settled population highest percentage for SES IV i.e. 50.4%, second highest percentage is for SES III i.e. 28.5% and the lowest is found in SES V i.e. only 0.3%. While in migrated population same thing observed that highest percentage in SES IV i.e. 61%, second highest is for SES III i.e. 22.5%, but in SES V it is different found that no one belongs to this category.

Table: 2. Presents the scenario of cross tab for type of house for both mixed population i.e. settled and migrated for socioeconomic status Categorize in SES II, SESIII, SESIV, SESV type of house own, rented, footpath. In this SESIV is highest among the own, rented footpath and lowest SESV only found in own

type houses.

Table: 1. Percentage Distribution for Socio-Economic for Settled and Migrated Population

Variables	Settled (369)		Migrated(200)	
	N	%	N	%
SES I	0	0	0	0
SES II	77	20.8	33	16.5
SESIII	105	28.5	45	22.5
SES IV	186	50.4	122	61
SES V	1	0.3	0	0
Total	369	100	200	100

Table: 2. Type of Houses among Settled Population of different SES

Variables	Own	Rented	Footpath	Total
SES II	72	38	0	110
SESIII	87	62	1	150
SES IV	157	140	11	308
SES V	1	0	0	1
Total	317	240	12	569

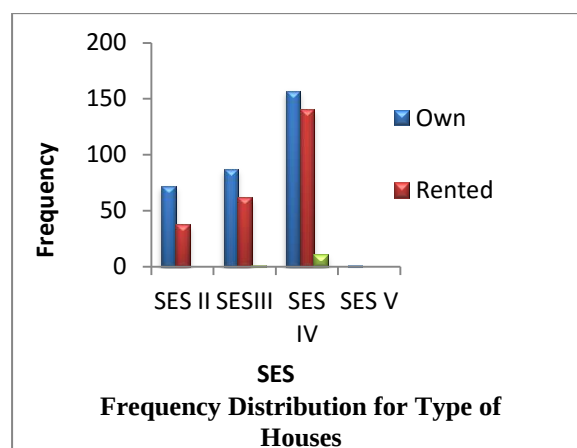


Figure: 1. Showing Frequency Distribution of SES Status in Type of Houses among Settled Population.

Table: 3. Presents mean and SD value for body mass index, Waist Hip Ratio, pulse rate, blood pressure, and random blood sugar level. According to Socio-economic status in settled population of males and females are shown. According to SES for BMI only significant difference observed in SES IV at $p < 0.001$ level between males and females. Mean value for male is (16.41 ± 2.91) and for female (18.49 ± 4.6) . In SES II mean value for male (17.64 ± 2.66) and female (18.22 ± 2.49) here it can be seen that female mean value is higher to male in comparison. While same thing observed in SES III mean value for male (17.51 ± 3.61) and female (18.75 ± 5.19) . Highly difference in mean value can be seen in SES IV as describe in this Para above line. According to SES for WHR significant difference observed at $p < 0.01$, $p < 0.001$

level in SES II mean value for male is (0.9±0.9) and for female (0.84±0.07). In SES III mean value for male (0.89±0.07) and female (0.85±0.07) where as in SES IV for male (0.91±0.17) and female (0.84±0.7) . For pulse rate according to SES significance difference observed at $p<0.05$ level in SES III the mean values for male (99.85±20.93) is higher in comparison to female (82.62±43.6). In SES II mean value for male (102.89±15.37) and female is (105.93±16.61). Whereas for SES IV mean value for male is (101.76±16.74) and female (86.95±39.11). No significant difference observed for SBP and DBP. SBP in SES II mean value for male is (114.28±15.88) higher in

comparison to female (119.74±17.02). In SES III mean value for male (116.36±21.11) and female is (115.17±14.7). For SES IV mean value for male is (113.51±15.18) and female (112.6±16.21). For DBP in SES II mean value for male is (74.88±10.59) and female (77.47±9.58). SES III mean value for male is (79.5±12.31) and female (77.52±10.46). SES IV mean value for male (77.18±11.69) and female (77.48±13.56). SES for RBSL in this significant difference observed at $p<0.05$ level. SES III mean value for male is (116.29±38.08) is higher when compare to female is (102.29±16.22). SES IV mean value for male (117.06±56.47) is higher in compares to female (107.89±39.87).

Table: 3. Mean Value for Anthropometry Measurements and Physiological Variables according to Socio-Economic Status in Settled Population

Socio-economic status	Male	Female	t-value
	Mean SD	Mean SD	
Body Mass index (kg/m2)			
SESII	17.64±2.66	18.22±2.49	-0.827
SESIII	17.51±3.61	18.75±5.19	-1.37
SESIV	16.41±2.91	18.49±4.6	3.7***
<lower 5	0±0	13.7±1.2	0.42
WHR (in cms)			
SESII	0.91±0.9	0.84±0.07	2.56**
SESIII	0.89±0.07	0.85±0.07	2.48**
SESIV	0.91±0.17	0.84±0.7	3.22***
<lower 5	0±0	0.7±0.2	0.02
Pulse Rate (p/m)			
SESII	102.89±15.37	105.93±16.61	-0.618
SESIII	99.85±20.93	82.62±43.6	2.19*
SESIV	101.76±16.74	86.95±39.11	2.85
<lower 5	0±0	94±21.03	0.41
SBP (mm Hg)			
SESII	114.28±15.88	119.74±17.02	-1.27
SESIII	116.36±21.11	115.17±14.7	0.277
SESIV	113.51±15.18	112.6±16.21	0.394
<lower 5	0±0	121±18.01	0.41
DBP (mm Hg)			
SESII	74.88±10.59	77.47±9.58	0.94
SESIII	79.5±12.31	77.52±10.46	0.76
SESIV	77.18±11.69	77.48±13.56	0.15
<lower 5	0±0	84±16.62	0.22
RBSL (mg/dl)			
SESII	109.76±44.51	123.08±84.98	-0.72
SESIII	116.29±38.08	102.29±16.22	1.62*
SESIV	117.06±56.47	107.89±39.87	1.02
<lower 5	0±0	88±17.02	

* $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table: 4. Presents mean value of anthropometry, physiological and RBSL (random blood sugar level) according to the socio-economic status among males and females in migrated population. Significant difference observed for body mass index at $p < 0.05$ level. The mean value for males is (17.9 ± 2.19) and females i.e. (19.91 ± 2.38) . Mean value of female is higher in comparison to males in SES II. For SES III mean value for males (17.9 ± 2.39) and females (18.97 ± 4.06) . In SES IV mean value of males (34.04 ± 140.68) is higher than females (19.67 ± 5.54) .

Significant difference observed at $p < 0.01$, $p < 0.001$ level for WHR. In SES II the mean value for males is (0.9 ± 0.05) and females (0.86 ± 0.08) . SES III mean value for males (0.9 ± 0.07) and females is (0.84 ± 0.06) . Mean value for males is (0.89 ± 0.06) and females (0.83 ± 0.07) in SES IV. Similarly the significant differences observed in Pulse rate in SES III. The mean value of males (104.26 ± 13.92) and females is (107 ± 12) in SES II. Mean value for males is (91.29 ± 12.7) and females is (102.83 ± 12.56) in SES III and in SES IV the mean value for males is (99.96 ± 17.98) and Females is (102.11 ± 14.9) . No significant difference observed for SBP, DBP and RBSL.

Table: 4. Mean Value for anthropometry Measurements and Physiological Variables according to Socio-Economic Status in Migrated Population

	Male	Female	t-value
Variables	Mean ± SD	Mean ± SD	
Body Mass index (kg/m2)			
SESII	17.9±2.19	19.91±2.38	2.28*
SESIII	17.9±2.39	18.97±4.06	-1.1
SESIV	34.04±140.68	19.67±5.54	0.75
<lower 5	0±0	0±0	0
WHR (in cms)			
SESII	0.9±0.05	0.86±0.08	1.4
SESIII	0.9±0.07	0.84±0.06	2.51**
SESIV	0.89±0.06	0.83±0.07	4.52***
<lower 5			
Pulse Rate (p/m)			
SESII	104.26±13.92	107±12	-0.4
SESIII	91.29±12.7	102.83±12.56	2.52*
SESIV	99.96±17.98	102.11±14.9	-0.6
SBP (mm/ Hg)			
SESII	116.88±10.87	111.11±6.5	1.48
SESIII	120.57±12.12	119.93±14.03	0.15
SESIV	115.6±11.56	114.98±13.7	0.26
DBP (mm/Hg)			
SESII	77.74±8.23	72.89±5.75	1.61
SESIII	76.37±10.33	80.64±8.74	-1.3
SESIV	74.83±9.28	75.98±101.18	0.64
RBSL (mm/dl)			
SESII	107.53±14.78	96±21.09	1.12
SESIII	107.05±25.25	102.1±27.58	0.39
SESIV	112.27±38.99	75.98±101.18	0.95

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5. Presents the socioeconomic status components like education, occupation and income percentage of the settled and migrated population. In education 23.9% male and 16.3% female obtained senior secondary education 11.7% male and 15.6% female obtained primary education. No male and female are post graduate in settled population. While in migrated population highest percentage is 21.5% of male and 38.5% females are illiterate. 20.7% male, 11.5% female were obtained senior secondary level education. 19.8% males and 10.3% female were primary level educated. Only females of migrated obtained post-graduate level education i.e. 1.3%. No male had seen obtained postgraduate level education.

Occupation 48.6% males are engaged in private job which is highest percentage and only 6.8% females are engaged in private job. 26.1% males and 5.4% females are self-employed. 15.3% males and 24.5 % females, only 4.5% males. 0.7% females are doing govt. job in settled population. Whereas in migrated population it's seen that 58.7% males are engaged in private job and it's also highest percentage when compare to the males of the settled population. 5.1% females are engaged in private job its slightly low when compare to the settled females. It's also clearly seen that 26.4% males are students highest from settled male i.e. 15.3% . It means 26.4% males migrated in Delhi for education purpose and only 15.4% females are students. The percentage of the unemployed is highest in migrated males i.e. 4.2% when compared to settled males and only 6.4% females are unemployed in migrated. In SES it seen that 39.5 % males and 66.7% females are in SES IV category, 34.5% males and 31% females are in SES III category. Only 0.7% females are in SES V in settled populations. Where as in migrated 54.9% males and 70.6% females are in SES IV category which is again highest percentage in compare to settled population. In SES III 25.4% males and 17.9% females are in migrated is lowest then settled in comparison. Personal Income its seen that in settled population 27.5% males income are between (60001-8000 Rs.) per month and 2.1% females. 6.8% males and 1.5% females personal income are between 1(2001-15000 Rs.). Only 0.5% males personal income per month is 50,000 Rs. per month. Whereas in migrated 10.1% males per month income between (8001-10,000 Rs).

Discussion:

Few studies have been carried out in India and abroad. . According to SES for BMI only significant difference observed in SES IV at $p < 0.001$ level between males and females. Mean value for male is (16.41 ± 2.91) and for female (18.49 ± 4.6) . Highly difference in mean value can be seen in SES IV as describe in this Para above line. According to SES for WHR significant difference observed at $p < 0.01$, $p < 0.001$ level in SES II mean value for male is (0.9 ± 0.9) and for female (0.84 ± 0.07) . For pulse rate according to SES significance difference observed at $p < 0.05$ level in SES III the mean values for male

(99.85±20.93) is higher in comparison to female (102.29±16.22). SES IV mean value for male (82.62±43.6). SES for RBSL in this significant difference (117.06±56.47) is higher in compares to female observed at $p < 0.05$ level. SES III mean value for male is (107.89±39.87). (116.29±38.08) is higher when compare to female is

Table: 5. Percentage of SES components among Settled and Migrated Populations.

Variables	Settled				Migrated			
	Male		Female		Male		Female	
	Education							
	N	%	N	%	N	%	N	%
Illiterate	50	22.5	35	23.8	26	21.5	30	38.5
Literate	26	11.7	20	13.6	14	11.6	14	17.9
Primary	37	16.7	23	15.6	24	19.8	8	10.3
Higher secondary	26	11.7	23	15.6	12	9.9	7	9.0
Senior Secondary	53	23.9	24	16.3	25	20.7	9	11.5
Graduate	30	13.5	22	15.0	20	16.5	9	11.5
Post-Graduate							1	1.3
Occupation								
Govt. Job	10	4.5	1	0.7	1	0.8	0	0.0
Pvt. Job	107	48.6	10	6.8	72	58.7	4	5.1
Self employed	58	26.1	8	5.4	12	9.9	2	2.6
House wife	0	0	82	55.8	0	0	55	70.5
Student	35	15.3	36	24.5	32	26.4	12	15.4
Auto Driver	8	3.7	0	0	0	0	0	0.0
Unemployed	4	1.8	10	6.8	5	4.2	5	6.4
Socio economics Status								
SES- II	58	26.1	19	12.9	24	19.7	9	11.5
SES- III	76	34.2	29	19.7	31	25.4	14	17.9
SES-IV	88	39.5	98	66.7	67	54.9	55	70.6
<Lower V	0	0	1	0.7	0	0	0	0
Personal Income (in rupees)								
0 Rs.	37	16.7	123	86.1	31	25.4	68	87.2
2000-4000 Rs.	5	2.3	5	3.5	9	7.4	0	0
4001-6000 Rs.	20	9	4	2.0	6	4.9	2	2.5
6001-8000 Rs.	61	27.5	3	2.1	39	32	4	5.1
8001-10,0001 Rs.	56	25.2	5	3.4	22	18.1	0	0
10001-12000 Rs.	13	5.7	2	1.4	12	9.8	1	1.3
12001-15000 Rs.	15	6.8	2	1.4	1	0.8	2	2.6
15001-20000 Rs.	4	1.8	2	1.4	2	1.6	1	1.3
20,001 Rs. above	10	4.5	1	0.7	0	0	0	0
50,000 Rs.	1	0.5	0	0	0	0	0	0

Gupta et.al. [4] study PTB was significantly more common in blue collars, white collars, workers and household workers students and retired and unemployed people. Shetty et.al.,[12] TB was associated with low education level, kitchen type and diabetes, reflecting the complex interaction between non-communicable disease, urbanisation and a changing economic climate in Bangalore. A.K. Kapoor & Kiran Singh[13] studies found that TB patients don't get proper meal because of money constrain. They live in unhygienic conditions. Used to sleep near public toilet.

Hawker et al., [5] in his finding it was poverty was significantly associated with tuberculosis in white population and tuberculosis. In single variable analyses for white residents the only variables significantly associated with tuberculosis rates were the proportion

of households with more than 1.5 people per room ($P = 0.0036$) and the proportions of residents in such households ($P = 0.0085$), both of which were positively associated with tuberculosis rates. In multiple regressions analysis the only variable independently associated with tuberculosis was the proportion of households with more than 1.5 people per room. For the Asian population, no single variable was significantly associated with tuberculosis for example the proportion of households with more than 1.5 people per room had a regression coefficient. The only covariate approaching significance was the proportion of households not owning their own home, which was marginally positively associated. Hawker et al., [5] in his finding it was poverty was significantly associated with tuberculosis in white population and tuberculosis. In single variable analyses for white residents the only

variables significantly associated with tuberculosis rates were the proportion of households with more than 1.5 people per room ($P = 0.0036$) and the proportions of residents in such households ($P = 0.0085$), both of which were positively associated with tuberculosis rates. In multiple regressions analysis the only variable independently associated with tuberculosis was the proportion of households with more than 1.5 people per room. For the Asian population, no single variable was significantly associated with tuberculosis for example the proportion of households with more than 1.5 people per room had a regression coefficient. The only covariate approaching significance was the proportion of households not owning their own home, which was marginally positively associated. In study from India, monthly income per capita family income was found to be statically significant in comparison to adherence and non-adherence as in their findings.

In our study significance difference observe in SESIV for BMI, for WHR in SES II, SES III, SES IV. For Random Blood sugar level in SES III in settled population of Delhi. While in migrated population of Delhi. Significance difference observed in SES II for BMI, for WHR SES III, SES IV, and for pulse rate observed in SES III. There is no association of Socio-economic status with BMI and physiological parameter studies found in TB patients in India till date and my knowledge. We have found a strong association between SES for BMI and TB incidence in our studies.

Finally it can be said that TB is not only found in migrant population. It is also infected in the settled population. It can be say that person suffering from TB and migrated to Delhi and living in overcrowded area. These peoples are not taking precaution and care then he/she affecting others to. And people think it can be cure throw the medicines of local healer because they consider the bad sprit attack on the person body. People who are migrated to Delhi they spend less money on alcohol, smoking and party they live in bad conditions like environment is not littered. Most of the student migrated to Delhi for higher education and preparing for competitive exams. Females who migrated are mostly married and doing some of them doing jobs in private. Further research is also needed to establish the socio-economic with BMI and biological mechanism linking SES with BMI risk of TB.

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