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# Effect of Education and Socioeconomic Status on Incidence of Diabetes and Hypertension in Pune, India

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## **Disciplines**

Pharmacy and Pharmaceutical Sciences

## **Comments**

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# Effect of Education and Socioeconomic Status on Incidence of Diabetes and Hypertension in Pune, India

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## Objective

To determine if the incidence of diabetes or hypertension in Pune, India can be correlated with higher levels of household income or education completed.

## Background

The incidence of hypertension and diabetes throughout India has increased significantly over the last 20 years.<sup>1-3</sup> Also during this period, individuals throughout the country have encountered significant economic success. Disposable income may allow Indians to consume Western-style food and lead more sedentary lives. India has the largest number of diabetic patients in the world, at 51 million.<sup>2</sup> The average age of diagnosis is 42.5 years, a decade earlier than patients of European descent. It is hypothesized that generations of malnourishment and manual labor have equipped the Indian metabolism for deprivation rather than abundance.<sup>3</sup>

## Design

- Setting: A free medical camp in Pimpri-Chinchwad, Pune, India in partnership with the Koinonia Medical Clinic
- Conducted from January 2-6, 2012
- Blood pressure was evaluated on all patients at least 18 years of age
- Blood glucose recorded for all patients above 40 years.
- Patients over 40 years of age or with a blood pressure  $\geq 140/90$  mmHg received a glucose screen
- Demographics including income and education were voluntarily self-reported at registration.
- Cross-sectional study, not stratified by age or gender
- An automatic cuff was used, a second manual reading was obtained for patients too thin for the automatic cuff or who had a reading  $\geq 160/100$  mmHg
- Patients with a systolic pressure  $\geq 140$  or a diastolic  $\geq 90$  mmHg were classified with perceived hypertension
- Patients with a random glucose  $>200$  mg/dL were classified with perceived diabetic. Patients self-identified as diabetic were included regardless of glucose reading
- Patient profiles were reviewed and data evaluated using a Chi-Squared test for categorical variables.

Table 1: Correlation Between Education and Hypertension/Diabetes

Education	No education	Standards 1-5	Standards 6-8	Standards 9-12	Any university or technical training	P-value <sup>a</sup>
Hypertension n (%)	79 (27.1)	26 (29.4)	37 (21.8)	74 (27.0)	41 (39.1)	0.77
Diabetes n (%)	12 (4.3)	9 (10.6)	6 (4.8)	12 (4.3)	9 (7.0)	0.18
Both n (%)	8 (2.9)	3 (3.5)	5 (4.0)	8 (2.7)	6 (4.3)	0.81

Table 2: Correlation Between Income and Hypertension/Diabetes

Income	Upper class	Upper-middle class	Lower-middle class	Lower class	P-value <sup>a</sup>
Hypertension n (%)	93 (34.3)	35 (26.0)	50 (24.5)	79 (26.7)	0.37
Diabetes n (%)	30 (10.3)	6 (4.7)	5 (3.1)	7 (2.3)	<0.0005*
Both n (%)	20 (7.4)	4 (3.1)	2 (1.2)	4 (0.7)	<0.0005*

<sup>a</sup>P-value for the trend in incidence determined by Chi Squared Test

\* Indicates statistical significance

## Results

### Overall

- 1750 patients treated at the clinic and profiles reviewed
- 861 were voluntarily screened for hypertension, diabetes and provided demographic data.
- 257 (28.6%) patients were perceived as hypertensive
- 48 (5.3%) patients were perceived as diabetic

### Education and Diabetes/Hypertension

- Linear regression analysis between diabetes or hypertension and education demonstrated no correlation and was not significant but demonstrated positive trends.

### Socioeconomic Class and Diabetes/Hypertension

- Linear regression analysis between diabetes incidence and socioeconomic class and both diabetes and hypertension and socioeconomic class showed a strong correlation which was statistically significant (OR, 0.10; 95% CI, 0.09 to 0.16;  $P < 0.0005$ ).
- Linear regression analysis between hypertension and socioeconomic status demonstrated no correlation was not significant but demonstrated positive trends.



Patients lining up for registration then blood pressure check



A patient receiving a blood glucose check

## Conclusions

This study determined that there is a statistically significant positive correlation between increasing socioeconomic status and diabetes incidence; this was also found in those co-diagnosed with diabetes and hypertension. Although an association was identified between the other parameters, the correlations were not statistically significant.

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