

SUBJECTIVE AND OBJECTIVE MEASURES OF SOCIOECONOMIC STATUS: PREDICTORS OF CARDIOVASCULAR RISK IN COLLEGE STUDENTS IN MUMBAI, INDIA

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The relationship between socioeconomic status (SES) and health changes as a society develops. In developed countries, high SES is associated with better health, but in developing countries, high SES is associated with poorer health. However, measuring SES is difficult in countries like India, where the traditional class and caste system are interwoven and complex. The current study explored the relationship between subjective and objective indices of SES and between SES and the metabolic syndrome among Asian Indians residing in Mumbai, India. Participants were a subset of young adults ($N=112$, median age 19 years, 24% male) who were part of larger study assessing psychosocial correlates of the metabolic syndrome. SES was assessed through objective (father's education) and subjective (SES ladder) indices. Data indicated that high subjective SES was correlated with fasting blood sugar ($r=.28$, $P<.003$), and father's education was correlated with high cholesterol ($r=.32$, $P<.005$). Subjective and objective indices of SES were also correlated with each other ($r=.24$, $P<.04$). These data reiterate that the link between SES and health is obvious from an early age, regardless of the measures used to assess SES. Given the complexity of assessing SES in developing countries, objective subjective indices should be used in assessing SES. (*Ethn Dis.* 2008;18[Suppl 2]:S2-235-S2-237)

Key Words: Socioeconomic Status (SES), India, Class, Caste, Metabolic Syndrome

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INTRODUCTION

Socioeconomic status (SES) plays a causal role in the incidence and prevalence of diseases such as coronary heart disease, diabetes mellitus, essential hypertension, and stroke in the developed world, including the United States¹ and the United Kingdom². The relationship between SES and the developmental status of a country is complex and dynamic; the relationship between SES and health is positive in developed countries and negative in developing countries.^{1,3,4} The metabolic syndrome, which consists of elevated blood pressure, abdominal obesity, dyslipidemia, and insulin resistance, is a preclinical marker and a risk factor for all of these lifestyle-related disorders.⁵

The relationship between SES and health is particularly interesting in India, which is globalizing at an accelerated pace in urban and industrialized areas, while rural areas lag behind. This difference creates significant economic disparity between rural and urban areas. Also, within urban areas, where poverty and wealth have always coexisted, economic prosperity worsens the existing disparity. Globalization is superimposing a class system (based on economic considerations) on an existing caste system (based on family membership in hierarchical cultural groups). Thus, the relationship between SES and health is complex and not easily understood.

The prevalence of the metabolic syndrome, has been rising significantly since the early 1990s in India, particularly in urban areas.⁶⁻⁸ Urban life in India is characterized by low activity levels and high caloric intake, which may lead to elevated risk for hypertension, coronary heart disease, and diabe-

tes. Rapid globalization and concomitant changes in social infrastructure are also a source of stress, particularly in urban areas. Stress may be a mediating pathway between SES and health. Given the complexity of SES variables within the Indian sociopolitical system, measurement of SES is key to understanding the SES-health relationship.

Preliminary data from India on SES and health indicate that high SES is correlated with an increased incidence of hypertension, coronary heart disease, and diabetes.^{9,10} Early indicators in recent data also show the transition to a SES-health pattern among urban Indians that is similar to that seen in the United States, in which high SES is associated with better health.^{6,11} When a comprehensive assessment of complex indicators of SES was used, the rates of diabetes mellitus were almost twice as high in high-SES groups in urban settings (25.5%) compared to low-SES groups (12.6%).¹² Hence, data indicate that the appropriate assessment of SES is a key element in establishing the SES-health relationship.

This relationship must be measured among younger people, since the link between SES and health is apparent from a very young age,¹³ and prevention efforts among younger people may help prevent health disparities in the future. The aims of the current study were to assess the link between subjective and objective indices of SES and between SES and the metabolic syndrome.

METHODS

Participants were undergraduates ($N=112$, median age 19 years, SD 1.23 years, 24% male) enrolled at a liberal arts college in Mumbai, India,

Table 1. Demographic characteristics of undergraduate students enrolled in a study of the metabolic syndrome, Mumbai, India

Characteristic	Sex		
	Men (n=27)	Women (n=85)	Total (N=112)
Age, years (standard deviation)	19.3 (1.73)	18.9 (1.02)	19
Religion			
Catholic	10	41	51
Protestant	0	6	6
Islam	2	4	6
Buddhist	1	0	1
Hindu	14	26	40
Zoroastrian	0	2	2
Christian	0	1	1
Sikh	0	1	1
Jain	0	2	2
Father's Employment Status			
Employed	20	69	89
Unemployed	7	13	20
Father's Education			
Less than high school	6	9	15
High school certificate	3	7	10
Bachelor's degree	3	36	39
Graduate degree	3	10	13

who were part of a larger study assessing psychosocial correlates of the metabolic syndrome. Detailed demographic information is presented in Table 1.

Procedure

The protocol was approved by the committee on clinical investigations of the Albert Einstein College of Medicine/Yeshiva University in the United States and by appropriate authorities in India. Participants were recruited for the study during physics, math, sociology, and psychology classes. After informed consent was obtained, participants completed a series of questionnaires assessing their socioeconomic status and general demographic information. A subset of participants had blood sample collected and anthropometric measurements after an overnight fast.

Measures

Objective SES was coded by asking about father's education. Less than a high school degree was coded as 1, a high school degree was coded as 2 (this category included some college but no terminal degree), a bachelor's degree

was coded as 3, and any graduate degree, including masters and doctoral degrees, was coded as 4.

Subjective SES was assessed with the MacArthur Subjective Social Status Scale.¹⁴⁻¹⁶ The scale consists of a drawing of a ladder. The top step (number 10) represents the best possible social standing or SES as defined by the subject; the bottom step (number 1) represents the worst. Participants were asked to mark an "X" on the rung of the ladder that best described their social status in reference to two groups: their own community (SSS-community) and everybody else in India. (SSS-India). A summary SSS score was obtained by calculating a mean of the SSS-community and SSS-India scores.

Blood samples were collected and analyzed by using standard procedures to obtain a lipid panel, blood glucose, and serum insulin levels. Anthropometric measures included hip and waist measures and were obtained by trained laboratory technicians, along with height and weight. Blood pressure and pulse rate were measured by the oscillometric method by using an Omron blood pressure machine.

RESULTS

Thirty-five participants did not report father's educational level; *t* tests were performed to assess differences between participants who reported father's educational level and participants who did not. No differences were seen between the two groups.

A positive correlation was seen between subjective experience of SES and father's education ($r=.24, P<.04$). Subjective SES correlated positively with fasting blood glucose ($r=.28, P<.003$), indicating that high subjective SES was associated with high fasting blood sugar. A one-way analysis of variance was performed to determine differences between the four categories comprising father's education. Data indicated that the four groups differed with regard to total cholesterol ($F[df=3,1] 3.99, P<.01$). Follow-up tests revealed that participants who reported that their fathers had a less than high school education had a lower mean cholesterol level (mean 132.73 mg/dL, standard deviation [SD] 32.55 mg/dL) compared to participants who reported that their fathers had a bachelor's degree (mean 166.60 mg/dL, SD 31.87 mg/dL) or those whose fathers had a graduate degree (mean 168.54 mg/dL, SD 48.59 mg/dL).

DISCUSSION

Although subjective and objective indices of SES are correlated with each other, the correlation is modest, which indicates that these two indices assess differing aspects of SES. The missing data on father's education alludes to the need for multiple indices to assess SES in future studies.

Similar to earlier data,¹² high SES was correlated with poorer health than was low SES. This finding was true for both objective and subjective indices of SES, although the relationship between

SES and health was only apparent in cholesterol and blood glucose levels. Therefore, caution needs to be exercised in the interpretation of these data. The lack of correlation between the other indices of the metabolic syndrome and SES may indicate that the other markers are less associated with the SES-health relationship in this group of college students.

Longitudinal studies that consider the interaction between SES, demographic and lifestyle variables, and metabolic measures should control for genetic factors (eg, family history) and secondary causes (accidents, organ dysfunction etc.). Such studies would improve insight into health disparities and disease patterns in India and may help in the development of class-specific intervention strategies.

Limitations

The primary limitation of the study is that it was a small convenience sample of students from one liberal arts college in Mumbai, India. As such this sample may not be representative of the rest of India. The relationship between SES and health may also not have been apparent in this sample because it was a relatively healthy sample. Another limitation is the missing data for father's educational level. Anecdotal reports indicate that participants may have been uncomfortable reporting father's educational level.

Previous data indicate that the usefulness of education as a measure of SES differs across generations.³ Hence,

father's educational level may not be an appropriate index in a culture where the parameters of SES are rapidly changing.

Implications for Improving Health Disparities

Given the complexities of understanding SES in developing cultures like India, perceived SES enables us to understand how SES is experienced by people. The moderate correlation between perceived SES and father's education indicates that both indicators may provide information on the SES-health relationship and may help eliminate health disparities in India.

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