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Measuring socio-economic status of an urban squatter settlement in Pakistan using WAMI index

Nousheen Pradhan

Tazeen Saeed Ali

Fauzia Basaria Hasnani

Shireen Shehzad Bhamani

Rozina Karmaliani

ORIGINAL ARTICLE

Measuring socio-economic status of an urban squatter settlement in Pakistan using WAMI Index

Nousheen Akber Pradhan,[1] Tazeen Saeed Ali,[2] Fauzia Basaria Hasnani,[3] Shireen Shehzad Bhamani,[4] Rozina Karmaliani[5]

Abstract

Objective: To determine the socio-economic status of a peri-urban community.

Method: The cross-sectional study was conducted at Deh Chuhar village, Gaddap Town, Karachi from December 2015 to February 2016. The Water/Sanitation, Assets, Maternal Education and Income Index was used. All variables were given a score on the scale of 0-8. The resulting index was illustrated in the form of quintiles.

Results: A total of 254 households were surveyed. Total population was 2117 with mean number of household members being 8±4. Mean index score was 0.39±0.14 and the median score was 0.375. Percentile distribution of the score indicated that 152(60%) households scored below 0.40 whereas, 51 (20%) were in the highest quintile with a score above 0.50.

Conclusion: Water/Sanitation, Assets, Maternal Education and Income index suggested poor socio-economic status of the community studied.

Keywords: Socio-economic status, WAMI index, Health outcomes, Deh Chuhar, Developing SES. (JPMA 68: 709; 2018)

Introduction

Socio-economic status (SES) helps to gauge family's and community's standing in relation to society. SES can be broadly defined as an individual's and community's access to financial, social, cultural and human capital resources.[1] Along with resource accessibility, it serves as an important determinant to assess quality of life at individual, household, community and national levels. In population and public health researches, SES has been linked to assess various health outcomes such as nutritional status, accessibility, acceptability, utilisation of services, morbidity and mortality in the longer run.[2,3] In educational researches, association of SES has been studied to see its effect on development,[4] academic attainment[5] and school attendance[6] of children.In addition, SES has also been linked with maternal health outcomes[7].

There is no single best approach in estimating SES,[8] therefore researchers often get confused in deciding the indicator to use for measuring SES. Literature, however, provides different quantitative approaches such as, using different variables to measure SES at a community level or at a national level.[1,8-10]

Health researches in developed countries have used various indicators to measure SES, including income, education, occupational status, living conditions such as housing, leisure activity and ownership of assets etc.[11] Developing countries, on the other hand, have taken into consideration housing characteristics like wall and roofing material, cooking and lighting fuel, source of drinking water, sewage system, tenure[12] alongside education, occupation and income to measure SES. To develop a SES measure, contextual factors must also be considered such as urban/rural differences accounting for variations between and across the countries.[13]

For collecting information on income, several challenges have been identified due to informal work, monthly fluctuation and reporting biases.[14,15] As an alternative to income, data is collected on different household assets, possessions and infrastructure.[16-19] This has been the most widely used approach of supplementing data on income.[13,16,20] World Bank has pioneered the use of an 'asset index' to estimate household wealth.[17,21] However, debate revolves around the use of 'assets' as a measure of income and their interpretation. Ownership of household possessions, for instance, may not capture the quality of assets. Data collected on ownership of assets, for example a TV set, can also fail to distinguish between affluent and an impoverished household that may own TV sets at economically varied ranges. Nonetheless, this does not alter the overall picture of wealth.[16,19] In addition, Principal Component Analysis (PCA) is the commonly used approach for measuring wealth index on the basis of household assets.[17,22]

Information on parental education attainment is also considered as one of the measures of SES.[1,22,23] In this

[1,3]Department of Community Health Sciences, Aga Khan University, [2,5]School of Nursing and Midwifery and Department of Community Health Sciences, [4]School of Nursing and Midwifery, Aga Khan University, Pakistan.

Correspondence: Nousheen Pradhan. Email: nousheen.pradhan@aku.edu

regard, 16 years of education is considered for either of the parents or by the head of the household.[22,24] Through Hollingshead measure[24] the SES score is computed by giving a score to formally acquired education starting from 7th grade up to graduate training. Alongside parental education, parental occupation is also used as a measure for SES in Hollingshead system[25] and has also been recommended for estimating SES.[1] Occupation is also considered as a measure of SES in relation to individual's social standing, income and intellect.[8] Within the occupational category, current or longest held occupation of a person is also used by several studies.[13] However, with increasing interest in the role of SES, parental occupation is used as an indicator of childhood socioeconomic position.[26]

Community's access to safe drinking water and better sanitation is a critical component for improved health and socioeconomic development.[27] Therefore, access to improved water and sanitation is taken as an important determinant for improved health outcomes and is thus considered for estimating/constructing SES index.[17,22] In this regard, World Health Organization (WHO) criterion for improved water and sanitation facilities for classification purposes has been referred by the researchers.[27]

Under housing characteristics and overall infrastructure, various aspects are assessed, including housing condition (material of dwelling, overcrowding etc.), ownership status of the house, number of rooms, ownership of farm etc. This also includes household amenities such as availability of hot and cold water, presence of central heating, carpets, use of bathrooms and toilets, location of toilet such as inside or outside the house, ownership of a refrigerator, washing machine or telephone. All of these household amenities are considered markers of material circumstances.[8] Moreover, information can also be obtained on the neighbourhood which may include availability of parks, buildings, and the percentage of population varying in their socio-economic status. This serves to provide a rich construct to SES.[1]

In order to obtain comprehensive socio-economic information, composite measures (with multiple SES indicators) have been widely used and advocated as these capture several aspects of SES.[9,12,19,22,28] To name a few SES indices, Duncan's index[29] takes into account education and income, Living Condition Index assess housing, health, leisure activity and ownership of durables to estimate well-being.[11] Asset Index is a proxy measure of the household wealth and has been used in demographic and health surveys (DHS) to overcome the problem in absence of information on income.[21,30] Lately, Water/Sanitation, Assets, Maternal Education and Income (WAMI) index has been used in multiple developing countries to measure SES.[22]

For measuring SES, young researchers often face problems in coming up with a set of variables and deciding its measurement criteria. To our knowledge, no consolidated SES measure has so far been recommended for use in low-middle income countries (LMIC) setting. The current study was planned to determine the SES of a peri-urban community using the WAMI index.

Subjects and Method

The cross-sectional study was conducted at Deh Chuhar village, Gaddap Town, Karachi, from December 2015 to February 2016. This village has eight union councils with over 400 villages. The Deh Chuhar area is a cluster of 34 villages. The total households in the village were 2,052 with approximately 10,750 population, predominantly Sindhi-speaking.[31]

The sample size was calculated in Open EPI using the formula:

$$[DEFF*Np(1-P)] / [(d2/Z2\ 1-\alpha/2*(N-1)+p*(1-p)]$$

The sample was inflated by about 20 per cent as insufficient data of the enrolled subjects was expected.

After approval was obtained from the ethics review committee of the Aga Khan University, Karachi, we started our household survey among those who furnished written informed consent. Households with women of child-bearing age (15-49 years) were recruited. Houses in >3km range from the local government school and women of child-bearing age not having a child in the household were excluded.

The sample was drawn using a systematic sampling technique. We sampled every Kth house, where K represents the constant sampling interval (every third house) based on the number of households to be sampled from total households in each village. Only one woman of child-bearing age with at least one child was interviewed. All study subjects were interviewed by trained interviewers using pre-tested close-ended survey questionnaire. The questionnaire was adapted from the Pakistan Demographics and Health Survey (PDHS) instrument.[19] The questionnaire collected information on demographics, health status, school enrollment status, maternal health and domestic violence.

The questionnaire was pre-tested in nearby villages on approximately 5-10% of the actual sample to assess the flow and clarity of the questions. Needed modifications were carried out in the questionnaire which was administered in Urdu and Sindhi languages as per the

Table-1: Adapted WAMI Index to measure SES.

S.No	Variables	Description	Range
1.	**Water and sanitation**	Households with improved water and improved sanitation were given a score of 4 each and those without improved water and improved sanitation source were given score of 0 for each. These scores were summed. ***Improved Water*** Using WHO definition of improved water, households with improved water include; 1. Municipal network 2. Private well (but should be protected- we have not looked for protection part so this needs discussion) 3. Bottled Water (bottled water is considered improved only when the household use another improved source for cooking and personal hygiene) 4. Boring ***Improved Sanitation*** Using WHO definition of improved sanitation below categorization was considered as improved sanitation. 1. Flush to piped sewer system 2. Ventilated improved pit latrine 3. Flush to septic tank 4. Pit latrine with slab	0-8
2.	**Assets**	A total of eight priority assets* out of 25 were selected depicting SES standing in the local context. For each asset, households were assigned 1 if they have the asset and 0 if they do not have the asset. These scores were then summed. 1. TV 2. Refrigerator 3. Air conditioner 4. Computer 5. Net connection 6. Possession of land 7. Any pet animal (goat or cow) 8. Car//truck	0-8
3.	**Maternal education**	Mother's year of schooling from 0 to 16 years are considered. Total year of schooling was divided by 2. If mother have completed the education till elementary they were given score of 1.	0-8
4.	**Income**	Monthly household income in Rupees was obtained in form of range. Scoring was assigned as below. Range Score <10,000 1 10, 000 to 20,000 2 20,000 to 30,000 3 >30,000 4 This score was multiplied by 2.	0-8
	WAMI index	Scores in water and sanitation, assets, mother education and income were summed and divided by 32.	0-1

*reflecting the higher SES of a household.
WAMI: Water/Sanitation, Assets, Maternal education and Income
SES: Socio-Economic Status. WHO: World Health Organisation.

convenience of the participant.

For measuring SES, we adapted the WAMI index which has been used earlier across multiple sites in resource-limited settings.[22] The choice of the index depended upon several factors. Firstly, the index has been applied in multiple countries, including Pakistan. Secondly, WAMI index could be used for comparison purpose in the country because of the available estimates of the SES in a peri-urban site. Thirdly, the construct validity of the index has been established by an earlier study.[22]

Our adapted index also comprised four variables. This included access to improved water and sanitation, presence of eight priority assets, mother's year of schooling up to 16 years, and monthly household income (Table-1).

WHO standards on improved water and sanitation source were used.[27] Each variable was measured on a scale of 0-8. All four scores once obtained were summed up and divided by 32 to get WAMI index range from 0 to 1, with 0 representing poor SES, and 1 representing high SES.

For the purpose of analysis, WAMI scores were converted into quintiles.

Results

A total of 254 households were surveyed. The total population was 2117 with the mean number of household members being 8±4. Children under the age of five years numbered 318(15%), while there were 486(22.9%) women. Demographic details were all noted down (Table-2).

Table-2: Background characteristics of the surveyed households (n=254).

Particulars	n (%)
Gender distribution	
Male	1075(50.8)
Female	1042 (49.2)
Household headship	
Male	244(96.1)
Female	10 (3.9)
Mother tongue	
Sindhi	199 (78.3)
Balouchi	52 (20.5)
Gaboli	3 (1.2)
Family structure	
Nuclear	155(61)
Extended	99 (39)
Household construction	
Pacca	144 (57)
Semi-pacca	100 (39)
Kaccha	10 (4)
Available rooms in the household	
One	135 (53.1)
Two	67 (26.4)
Three	28 (11)
More than four	24 (9.4)
Type of cooking fuel (n=251)	
Wood	248(99)
Others (LPG &Charcol)	3 (1)
Availability of households possessing a bank account	
Available	42 (16.5)
Unavailable	212 (83.5)
Types of health service utilization (n=252)	
Private	246 (98)
Public	6 (2)

LPG: Liquefied Petroleum Gas.
World Bank definition of housing is used as mentioned below:
Pacca: A pacca house is one built with permanent materials like oven-burned bricks, concrete, iron, or other metal sheets and timber.
Kaccha: A kaccha house is one built with nondurable materials like unburned bricks, mud, thatches,leaves, and either timber or bamboo.
Semi-pacca: A semi-pacca is a hybrid of kaccha and pucca construction materials.

Table-3: Percentile distribution for WAMI Scores.

Quintiles	WAMI scores
20	.2813
40	.3438
60	.4063
80	.5000

WAMI: Water/Sanitation, Assets, Maternal education and Income.

Mean WAMI score was 0.39±0.14 with a median score of 0.375. Of all the households surveyed, 152(60%) were below the score of 0.40, whereas 51 (20%) were with a score above 0.50. (Table-3).

Discussion

The current study used a comprehensive approach by constructing an index for measuring SES. Our SES index comprised of water and sanitation, assets, maternal education and household income in the community residing in a peri-urban area of Karachi. The study showed that 60% of the households fell under the lowest quintile and only 20% in the highest. Likewise, the national level survey has also reported poor SES, particularly in the rural areas of the country.[19] According to the World Bank, majority of the population in Pakistan is clustered around the poverty line.[32]

The mean WAMI score obtained in our study is very low. Its mean being 0.39 indicates very poor social standing of the community. Poverty, as determined by SES, continues to be the root cause of other proximate correlates such as access to education, healthcare, nutrition, housing and large family size.[33,34] In this regard, association of SES with health and education is widely documented in literature.[20-26,28-30,34,35] Various studies have examined the relationship between student's academic performance with their social and economic background, where low SES proved to be one of the contributors towards students' low academic performance.[36,37] On the other hand, health outcomes are largely shaped and affected by SES.[9] Importantly, but not exclusively, maternal and child health outcomes are widely studied in the context of developing countries and its adverse health effects on mother and child is linked to parental education, family income etc.[38,39] Deh Chuhar, being a disadvantaged community due to poor SES, will be at high risk of facing these issues. This, therefore, calls for the attention of local non-government organisations (NGOs) and government authorities to plan risk protection

strategies as well as a sustainable development programme for the community.

Inability to compare our findings with other studies at the national level is a big limitation of the current study due to variation in the approaches to measure SES which exists not only at the country level but also at the regional and international levels. For instance, PDHS2012-13[19] used the Wealth Index which mainly takes into consideration household ownership of assets. On the other hand, use of varied indicators in SES index used in different studies doesn't allow researchers to draw comparisons among different countries. This poses a big challenge to the researchers and the stakeholders interested in drawing comparisons on the basis of SES. In the absence of a standard measurement of SES, researchers in the past have typically used their own socioeconomic indicators. This approach has made comparisons very difficult and implausible.[9]

Economic evaluations are instrumental in informing resource allocation for comparisons across sites, groups and communities. Lack of standard measurement of SES will open avenues for subjective decision making to judge SES parameters for resource allocation.[40]

As a way forward, we recommend systematic research to be conducted on different measures of SES being used in health researches both at national and regional levels. In the absence of a recommended SES measure, WAMI Index would be helpful to researchers in selecting a set of SES measures according to their study's requirements. Further, there is a dire need for a recommended comprehensive SES index which can be safely used for comparison purposes within and among countries. A need for an SES index, instead of individual variables, is stressed as there is always a need for multi-dimensional perspective to measure SES.[9-22]

In the context of developing countries especially in rural areas where multiple factors influence social determinants of health, there is a need for a comprehensive measure to assess SES; which was well taken care of in this study. In general, information on SES is not readily available for peri-urban locations; therefore, SES of this study can serve as an estimate for similar socio-geographic locations. Another major strength of the study is the use of a validated SES index and the validity of the WAMI index is also carefully and appropriately documented.[22] Additionally, WHO and the United Nations International Children's Emergency Fund (UNICEF) defined criteria for measuring improved water and sanitation were used in the study.[27]

Our approach in estimating SES has few limitations. Though occupation is also one of the measures of estimating SES, its use has mainly been cited in the context of developed countries.29 In the absence of any objectively established criteria for occupational category, we could not incorporate occupation in our SES index. This, however can be used as a measure of SES estimate in LMICs with a well-defined criteria to facilitate researchers in rating the occupational rank. We did not take into consideration paternal education in our index. In future studies, along with maternal education status, paternal education can also be given due attention for inclusion in the comprehensive SES index.

Conclusion

The study comprehensively measured SES of a peri-urban settlement in Karachi using WAMI index. It indicated poor SES of the community studied. Poverty significantly affects social determinants of health and the poor SES status should draw the attention of all concerned.

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Conflict of Interests: None.

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