

## Measuring Impact of Education and Socio-economic Factors on Health for Pakistan

ZAHID ASGHAR, NAZIA ATTIQUE, and AMENA UROOJ

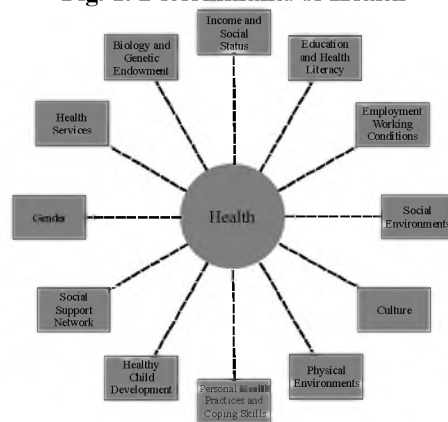
### 1. INTRODUCTION

It is a common understanding that people with higher level of education lead a more healthy life due to their enhanced level of awareness compared to the less educated individuals. Two important prerequisites for an effective health policy are; monitoring and forecasting the population's health and its health determinants. Health of any individual or that of a society or community is not dependent on a particular single factor. In fact it is the product of the interaction of our environments, socio-economic status, psycho-social conditions and cultural norms and beliefs with our genetic inheritance. "The social conditions, in which people live, powerfully influence their chances to be healthy. Indeed factors such as poverty, social exclusion and discrimination, poor housing, unhealthy early childhood conditions and low occupational status are important determinants of most diseases, deaths and health inequalities between and within countries" [WHO (2004)].

The research on the subject reveals that people belonging to different socio-economic groups experience different levels of health, whereas the factors that lead to different health conditions need to be identified. [Wilkinson and Marmot (2003)].

The 'social determinants' are the socio-economic conditions of the people which determine their health. WHO and other health organisations have identified these determinants; which are illustrated in Figure 1.

Fig. 1. Determinants of Health



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Studies reveal that schooling is associated with several non-market outcomes. Among these non-market returns to schooling, there has recently been a growing interest in the health returns and is believed that besides human capital, health capital also emerges from the education. So it is important to analyse whether education policies help to improve health. The subject study is aimed at estimating the effect of education on health in particular and exploring the relation between health and some other social factors in general in Pakistan. The study has two main objectives; first to elucidate and analyse the effect of education, gender, occupation etc. on health; second to understand the mechanism, by which education, gender and other socio-economic factors can profoundly affect the health status of an individual.

Keeping the objectives of the study we focus on the relation from socio-economic factors to health by applying general linear model in multivariate framework. This is of tremendous importance for our understanding of determinants of health as well as for our understanding of how schooling affects and shape individual lives.

The study is outlined as: In Section 2 brief review of the issue is discussed. Section 3 describes the data and the methodological frame work applied in the study. Section 4 consists of the exploratory data analysis of the variables. Section 5 is about the use of ordinal logistic models, along with the empirical analysis of the estimation techniques used, and finally we conclude the study.

## **2. REVIEW OF LITERATURE**

Since long, it has been observed and documented that the educational differences have great impact on health status. Grossman (1972, 1975) has deeply explored the correlation between education and health. Over the decades, a number of important mechanisms are proposed through which direct or indirect influence of schooling on health can be studied. The impact of past health on current health and years of formal schooling is studied by Grossman (1975) where he uses a recursive model to identify the causal relationship between education and health. In his model, health capital is measured in terms of Self-reported Health (SRH) and it is shown that with past health, keeping other variables constant, schooling has a positive and significant effect on present health.

Health disparities between better and less well educated people often increase when a new health technology is introduced. Health disparities between better and less well educated people often increase when a new health technology is introduced [Case (2001)].

Treating schooling as endogenous to health suggests that most of the correlation between schooling and health is attributable to unobserved heterogeneity except possibly at low levels of schooling for individuals with low cognitive ability [Christopher and Sidhu (2005)]. They also identify the role of cognitive ability in the health education relation and shows that both schooling and ability are strongly associated with health at low levels but less related or unrelated at high levels. Arendt (2001) analysed the extent to which heterogeneity in health and endogeneity of education explained the gradient in health. By making use Self-reported Health (SRH), Body Mass Index (BMI) and indicators for high blood pressure and never been smoking, he shows that education is related to SRH when controlling for the three other health measures, which can be interpreted as inputs in health production. The diverse demographic and socio-economic

conditions and the availability of educational facilities affect the extent of heterogeneity in health and health related quality of life. Shumueli (2003) decomposed the demographic and socioeconomic factors to study this heterogeneity.

The complex multidimensional structure of health has been of keen interest for researcher since years. Using the demographic and socio-economic factors, attempts of identifying the complex relation of health and education have been made. Fuchs (2004) observes that there are considerable uncertainties concerning the socio-economic correlates of health, the extent to which they reflect causal chains and their implications for policy and studies the possible reasons for this uncertainty. The inequality in health from the perspective of socio-economic factors is analysed in a study by Syed, *et al.* (2006), in which he has considered two ethnic groups and has found a large diversity of SRH and prevalence of diabetes and distress among the ethnic groups.

The possibility of a causal relationship between education and health is explored by [Arendt (2005)]. Along with SRH, the study includes BMI and an indicator of never been smoking as supplemental outcomes. The study shows that education is associated with better SRH for both men and women. In an attempt to investigate the direct relationship between education and health, Cutler and Lleras (2007) find that better educated individuals have more positive health outcomes even after controlling for job characteristics, income and family background. Ardent (2008) articulates this causal relationship in terms of hospitalisation and finds the significant effect of increase in education on decrease in hospitalisation especially for females. Evidence for a causal relationship running from better schooling to better health can be found in an investigation conducted by Silles (2009). In which by relying on changes in educational participation caused by raising the school the minimum school-leaving age, also provides evidence of the causal effect of schooling on health.

Cutler, *et al.* (2005) described that the link between social status and health as complex, perhaps too complex for a single explanation. Discussing the direct causal mechanisms running from income to health, they have pointed that the link between income and health is a result of the latter causing the former rather than the reverse. There is most likely a direct positive effect of education on health but there are no well stated causal mechanisms.

Hartong and Osterbeek (1998) have studied the returns to education in terms of health status, financial wealth and happiness, and have concluded that IQ independently affects health status, even after controlling for schooling. Returns to education have also been calculated by relating the value of health gain to the average income per capita [Groot and Brink (2007)]. The effect of education on health is analysed by giving some tests for causality, and control for unobserved heterogeneity; it is found that of gender, the education and the number of years of education have a positive effect on the quality of education.

Cutler and Richardson (1998) measured the change in health capital by age, gender, race and income and concluded that measuring changes in health by income or education is more difficult than by measuring it by race and gender. More insight in the size of the quality of health effect can be obtained by relating the value of the health gain to the average income per capita.

Costa and Uchôa (2004) determined the factors associated with self-rated health among adults, considering five dimensions of socio demographic variables. And it has been observed that self-rated health among older adults is multidimensional in structure, being influenced by socioeconomic conditions, social support, health status (with emphasis on mental health), and access /use of healthcare services but not by the life style.

### 3. DATA DESCRIPTION

The data used in this study is collected under National Health Survey of Pakistan (NHSP 1990-1994). NHSP round II by PMRC is under progress and its data is not available till date. It is a cross sectional survey which comprise of sample of size 19862 collected randomly all over Pakistan. The survey uses three separate questionnaires for children, adult male and adults female simultaneously. It gives detailed Information on several health profile of individual and provides a base for the analysis of determinations of health especially education.

In the NHSP (1990-94), the respondent's health is measured in term of self-reported health (SRH) which is measured on ordinal scale having five categories as excellent, very good, good, fair, and poor. The other variables involved in this study are education level, occupation, social status, age, gender, marital status, residence and province.

SRH is subjective in the medical sense of being a state perceptible to the individual and not to those who observe or examine the individual. It is not subjective in the psychological sense of being moodily introspective or illusory. It reports something real, but directly observable only by the individual reporting [Mirowsky (2003)]. In the last three decades, self-reported health has been used increasingly as a measure in the psychological and gerontological areas, as well as in epidemiological surveys [Lima-Costa and Fernanda Uchao (2004)]. Self-reported health shows good reliability and its validity is equivalent to that of other more complex measures of health status [Idler and Benyamini (1997)]. BMI is a reliable indicator of total body fat, which is related to the risk of diseases and death. It's a useful, indirect measure of body composition because it correlates highly with body fat in most people. Weight in kilograms is divided by height in meters squared ( $\text{kg}/\text{m}^2$ ).

Table 1 gives the description of variables used in this study. The across the sample distribution of the variables used is given in Table 1a which is supported by a detailed descriptive analysis of these variables in Section 4.

It seems that now-a-days, people are better aware off about their health and due to several possible factors majority groups and segmentations of the society are believed to be in weaker conditions. As evident from the whole sample being surveyed, as shown in Figure 2, that most of the people report their health as 'fair' or 'poor'. About 33 percent people report their health as 'good' and only 6 percent (approx) have very good or 'excellent' health. This overall distribution highlights the poor condition of health in the society and emphasises the need of attention in this regard. Hence, it is desired to identify the factors which lead to low health. Therefore, now discussing it in detail, we come across some interesting results related to the relation between education and health.

Table 1

*The Profile of the Study Population (Based on NHSP 1990-94)*

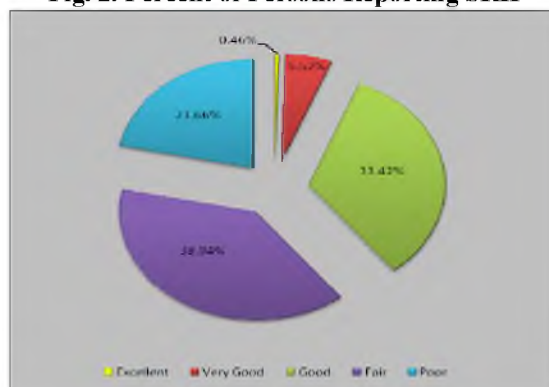
Variables	Description
<b>Health Variables</b>	<b>Subjective Health</b> We take SRH graded as (1:excellent, 2:very good, 3:good, 4:fair, 5:poor) <b>Objective Health</b> Arthritis, asthma, diabetes, hemorrhoids, tuberculosis, heart disease, pain in back, pain in knees, vision problem and dental problem
<b>Schooling Variables</b>	For schooling five different levels of education are taken. i. Less Than Primary ii. Primary But Less Than Middle iii. Middle But Less Than Matric iv. Matric But Less Than Degree v. Degree and Above
<b>Social Status</b>	It is divided into only two categories high and low
<b>Occupation</b>	It includes seven categories employed, self-employed unemployed, work in home, student, disabled and other
<b>Other Background Variables</b>	
Age	Age is defined from 20 up to 90 years
Gender	Gender is classified as males and females
Marital Status	There are three categories, single, married and other
Residence Type	It consists of two categories urban and rural
Provinces	Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan

Table 1a

*Socio-demographic Characteristics of the Sample Population with Descriptive Statistics, NHSP (1990-94)*

Variables	Percentage	Variables	Percentage	Variables	Percentage
<b>Self-reported Health</b>		<b>Education Level</b>		<b>Age Groups</b>	
Excellent	0.5	< primary	7.6	20-29 years	42.7
Very Good	9.2	Primary but < middle	31.4	35-39 years	27.2
Good	37.6	Middle but < matric	20.5	40-49 years	15.4
Fair	35.2	Matric but < degree	31.1	50-59 years	9.4
Poor	17.5	Degree and above	9.4	60 years and above	5.3
<b>Social Status</b>		<b>Gender</b>		<b>Marital Status</b>	
High	57.2	Male	70.6	Single	25
Low	42.8	Female	29.4	Married	72
<b>Occupation</b>		<b>Residence</b>		Others	3
Employed	24.7	Urban	56.5		
Self-employed	28.5	Rural	43.5		
Unemployed	1.7	<b>Provinces</b>			
Student	4.5	Punjab	50.9		
Work in Home/ Sick	22.7	Sindh	22.8		
Disability	3	Khyber Pakhtunkhwa	19.9		
Other	14.9	Balochistan	6.5		

Fig. 2. Percent of Persons Reporting SRH

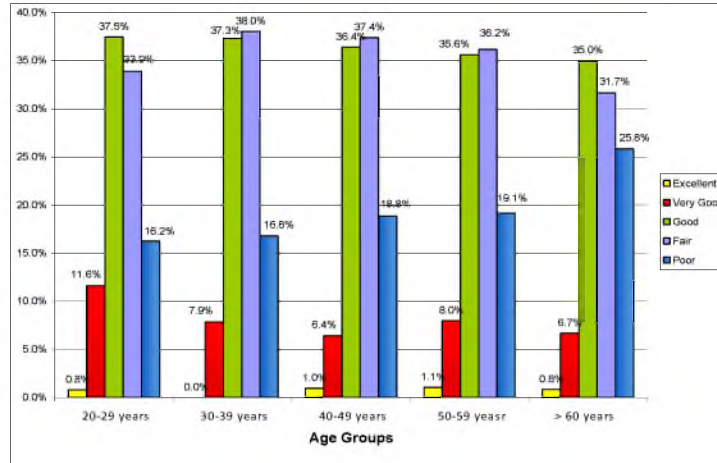


### 4. EXPLORATORY ANALYSIS

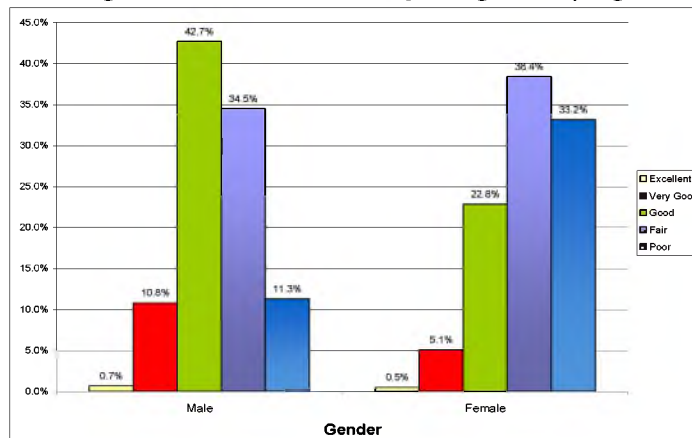
Studying the relationship between the health and education by visually describing the data reveals several interesting aspects. It seems from the graphical display that education, gender play significant role in determining health. There is large variation in the categories of SRH.

According to Figure 3, there is quite large variation among the five categories of SRH over all age groups. However, the category of ‘good’ and ‘fair’ remain stable and almost similar for all age groups. Most of the people from the sample report their health as ‘good’ and ‘fair’. The share of reporting health as ‘poor’ only rises significantly for the people above 60 years of age. From Figure 4, the response of men and women to the SRH reveals significant the gender differentials. The high bars of ‘fair’ and ‘poor’ categories in SRH of females indicate that women report themselves to be in a worse health condition as compared to the men. This may be due to several possible factors/ reasons need to be identified with strong evidence.

**Fig. 3. Percent of Persons Reporting SRH by Gender**

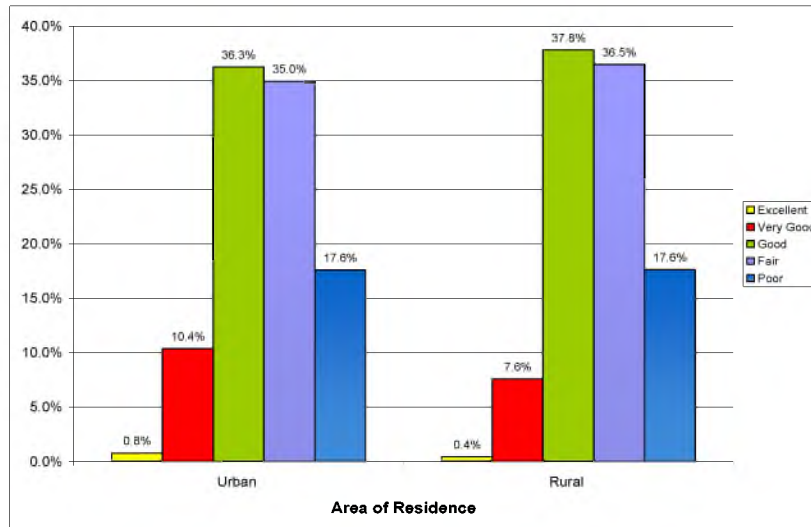


**Fig. 4. Percent of Persons Reporting SRH by Age**

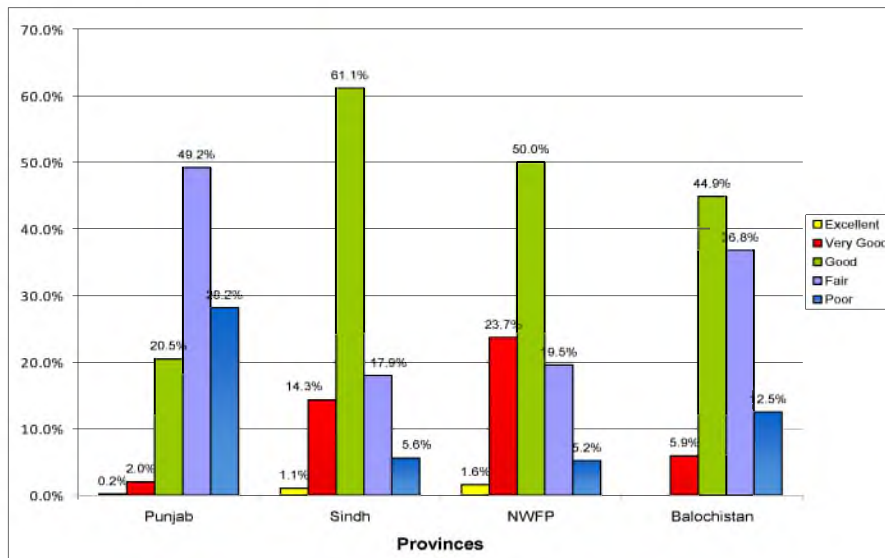


There is a lot of economic and social disparity in urban and rural population but here we do not find any significant pattern in urban-rural area. However, the response pattern is entirely different across the provinces as evident from Figures 5 and 6. It might be due to the lack of awareness about health that a large proportion of sample from Sindh declare them to be in good health. While, major proportion of people from Punjab identifies them to be in the low categories of health. However, evidence is needed to justify this argument.

**Fig. 5. Percent of Persons Reporting SRH by Residence**



**Fig. 6. Percent of Persons Reporting SRH by Province**



The cross tabulation of SRH with respect to education and gender reveals some interesting behaviour patterns. It is evident from the Table 2 that majority of men reported good to excellent health. However, the majority of females lie in the category of fair and poor.

Now we consider the association between education and some more objective measures of health; the self-reported number of chronic conditions. The percentages are shown in Table 3.

Table 2

*Subjective Quality of Health by Education and Gender*

Education	Self-reported Health				
	Excellent (%)	Very Good (%)	Good (%)	Fair (%)	Poor (%)
<b>Women</b>					
< Primary	–	–	27.7	34	38.3
Primary but < Middle	–	1.9	14.6	36.8	46.7
Middle but < Matric	0.9	3.4	21.4	42.7	31.6
Matric but < degree	–	9.8	29.9	37.4	23
Degree and Above	4.9	12.2	34.1	43.9	4.9
Total	0.5	5.1	22.8	38.4	33.2
<b>Men</b>					
< Primary	–	2.8	52.8	31.1	13.2
Primary but < Middle	–	8.5	38	39.2	14.3
Middle but < Matric	0.3	5.3	43.9	38.6	11.9
Matric but < degree	1.6	12.8	41.7	34.3	9.6
Degree and Above	1.2	27	49.1	17.2	5.5
Total	0.7	10.9	42.8	34.3	11.3

Note: the estimates are based on using study sample (I).

Table 3

*Objective of Health Status by Education*

Objective Health	Education (Values are in %)				
	< Primary >	Primary but < Middle	Middle but < Matric	Matric but < degree	Degree and Above
Arthritis	9.9	45.6	19.8	19.8	4.8
Asthma	9.3	33.3	16.0	32.0	9.3
Diabetes	8.2	26.5	20.4	36.7	8.2
Hemorrhoids	5.5	38.4	23.2	24.4	8.5
Tuberculosis	18.8	28.1	15.6	37.5	0.0
Heart Disease	7.3	29.3	19.5	29.3	14.6
Pain in Back	10.2	41.9	18.6	23.8	5.4
Pain in Knees	9.8	42.9	20.9	21.2	5.3
Vision Problem	6.0	35.8	22.0	26.8	9.4
Dental Problem	9.0	33.6	20.1	29.4	7.8



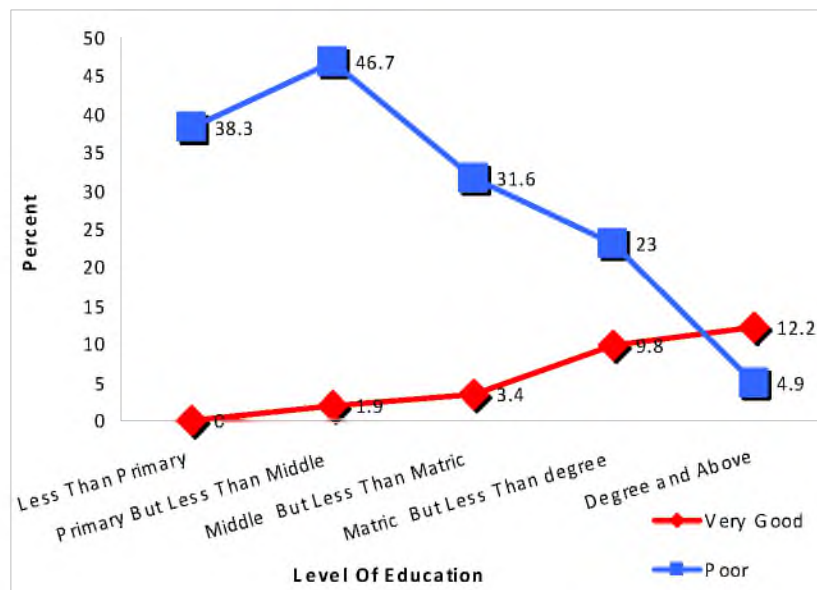
It seems prevalence of the disease or conditions is not same for different levels of education. From the table it can be seen that the individuals having education up to degree level or above have reported lesser diseases as compared to the less educated.

On the other hand, we observe that the ratio of reporting different diseases by individuals having primary or less education is comparatively lower than the other education levels till matric. This may be due to the reason that due to less education and lack of awareness they fail to understand or realise the health problems they face. Some other reasons e.g. financial factors may also play their underlying role here. In general educated persons report the chronic conditions less frequently than less educated persons.

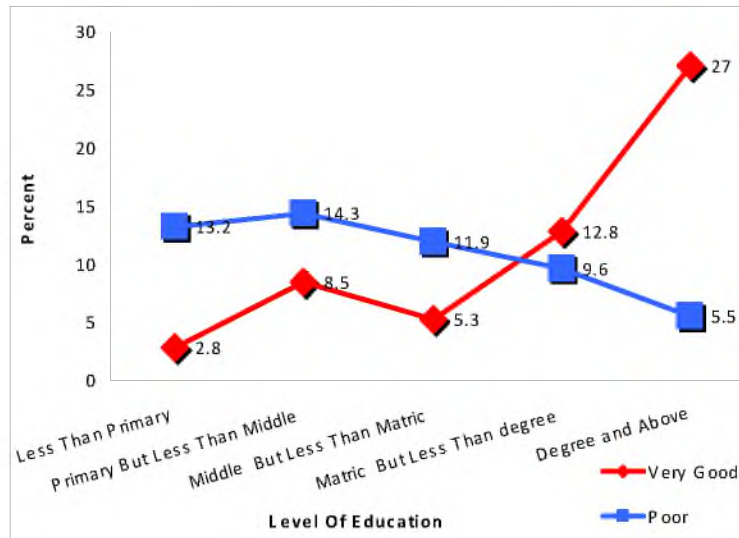
#### 4.1. Comparison of Different Patterns of Self-reported Health by Education and Social Status

Now in order to study the effect of education on health status, we make comparison by analysing the pattern of SRH across educational levels. But as noted earlier the response behaviour of men and women are entirely different suggesting that the gender differentials impart a significant effect on health. On comparing the patterns of SRH at different health status, we observe that with the increase in education women are getting more awareness about health as indicated from the decreasing percentage of females under poor social status reporting to be in very good health. However, the pattern is not similar in case of men. The pattern is clear from the Figures 8 and 9 respectively.

**Fig. 8. Pattern of SRH Very Good vs. Poor for Women**

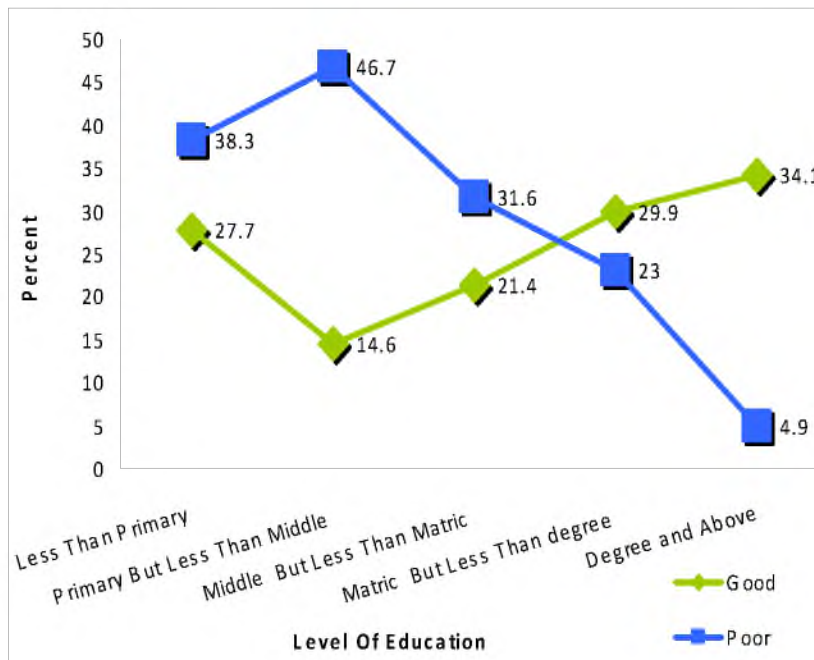


**Fig. 9. Pattern of SRH Very Good vs. Poor for Men**

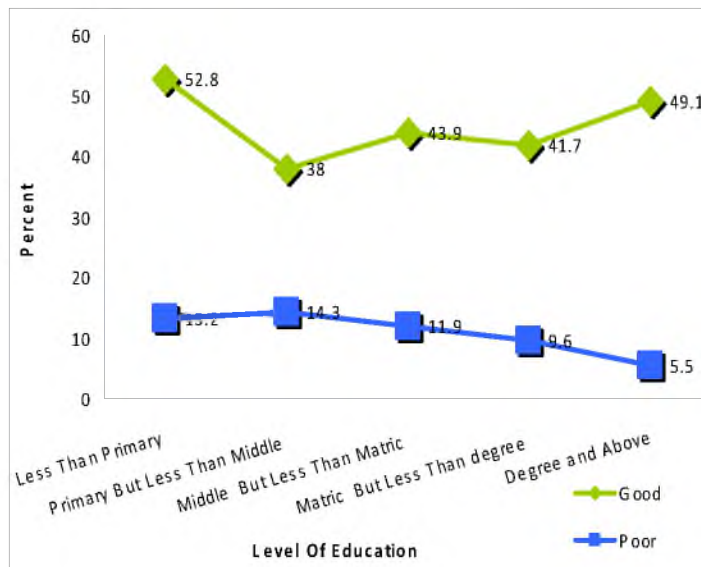


In Figures 10 and 11 we find that as the level of education increases especially above middle there is a very sharp decline in reporting poor health, this decline is steeper in females than in men. However, the increase in reporting very good health is quite gradual for women but is very sharp for men having matric or higher education.

**Fig. 10. Pattern of SRH Good vs. Poor for Women**

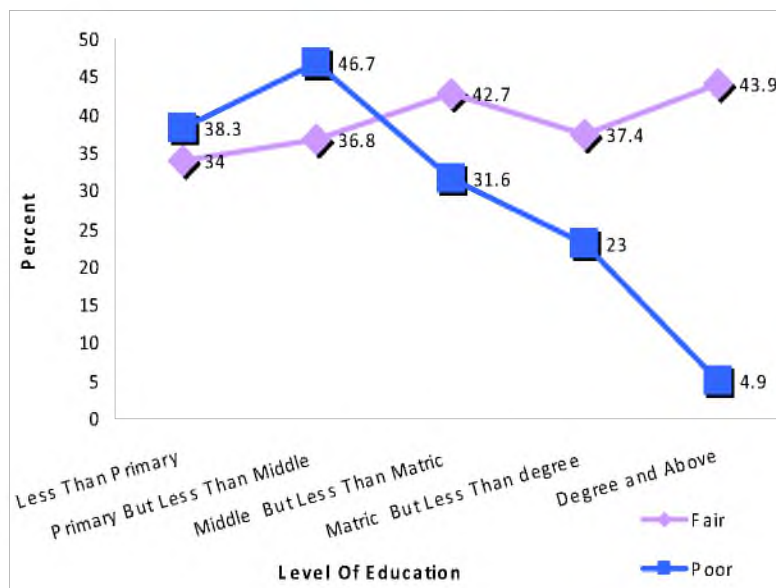


**Fig. 11. Pattern of SRH Good vs. Poor for Men**

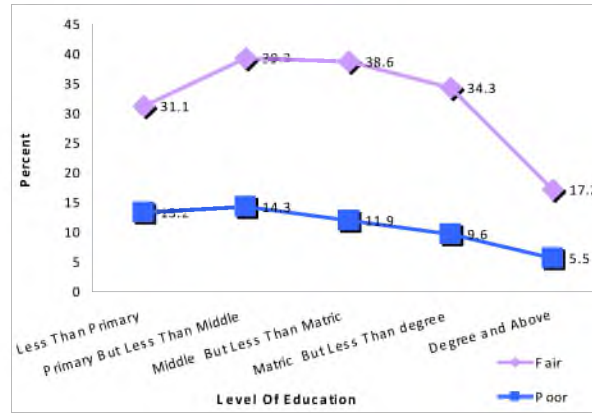


Even in case of declaring their health as good improves with the increase in education. In Figures 10 and 11, on comparing the categories of good vs. poor in SRH, we find very significant role of education in women indicated by sharp increase in good health supported by a sharp decline in reporting poor health among females having middle or higher education. However, the behaviour in men here remains quite stable and the role of education generating awareness etc. is not evident here.

**Fig. 12. Pattern of SRH Fair vs. Poor for Women**



**Fig. 13. Pattern of SRH Fair vs. Poor for Men**



Similarly, reporting health as fair increases with the increase in education among female as evident from Figure 12 and Figure 13. But remarkably, it declines among men. Hence, we may conclude that education plays a significant role in generating awareness about health.

**4.2. Self-reported Health by Body Mass Index**

Now the percentage distribution of the respondents for SRH by body mass index is given as under:

**Fig. 14. SRH Reporting of Persons Belonging to Four Categories of BMI**

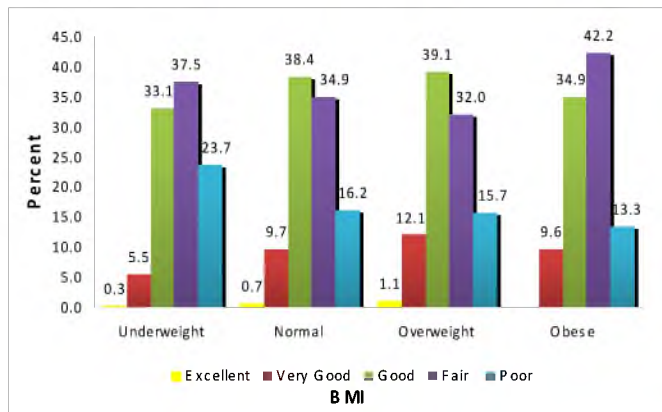


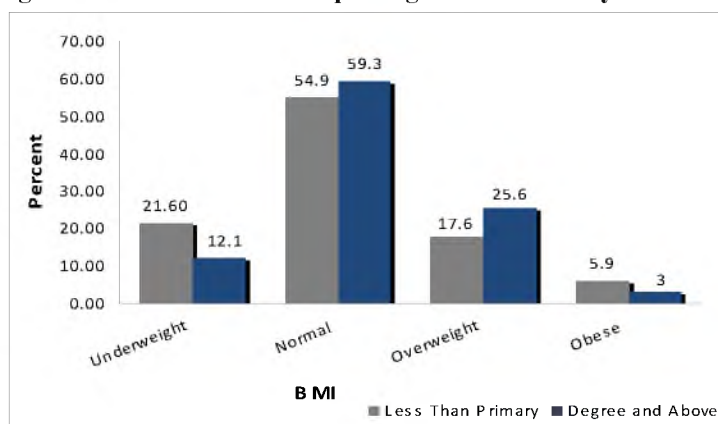
Figure 14 shows the percentage distribution of SRH for each level of BMI. The first thing we observe that though response to an “excellent” health status is at minimal level i.e. 0.3 percent, 0.7 percent and 1.1 percent, but it exist from under weight to over weight respectively. At the same time among obese nobody reports the state of excellent health. Further it seems that there is a gradual increase in the percentage response in favour of “very good” health status. But for the obese it again declines. The overweight

category shows the maximum response of the individuals (39.1 percent), of having “good” health. Again we see that this response increases from underweight up to overweight but again for obese it decrease. So, without the loss of generality, we can conclude here that on the basis of BMI vs. SRH, we can say that reporting different categories of health is close to reality and the general awareness about health has improved. The interesting point here is that people do not consider obesity a disease as evident by the highest bar of ‘fair’ health at the state of obese under BMI.

#### 4.3. Body Mass Index by Education

Now we see the distribution of BMI for only two groups, one is highly educated in our sample and other is poorly educated.

**Fig. 15. Percent of Persons Reporting on BMI Scale by Education**



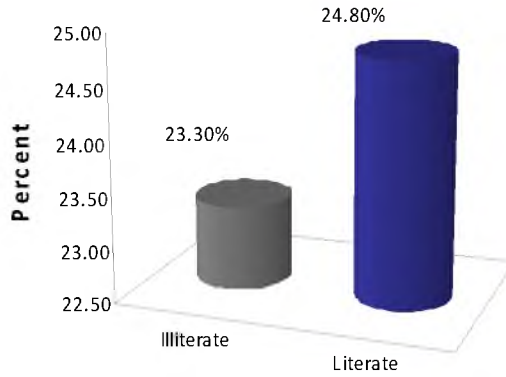
From the Figure15 it is clear that usually less educated appears to report high level of underweight conditions as compared to more educated people. Moreover they are also more obese than the educated persons. About 60 percent of the highly educated persons are healthy. Ignoring some fluctuations these patterns suggest almost negative relationship exist between SRH and BMI, and in BMI and education i.e. with the increase in education people become more aware of their health and hence, we can observe significant change in reporting BMI and health status.

Hence, not only has the general awareness about health had improved enabling them report much better about their health but it also has improved the health conditions as indicated by BMI, that educated people are more concerned about their health and physic.

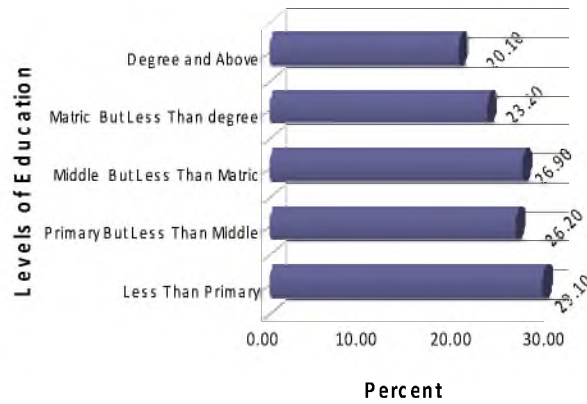
#### 4.4. Health Care Utilisation and Education

We also investigate whether there is any link between health care behaviours and education or not. So for this purpose we make comparison between literates and illiterates. We also illustrate in Figure 16 the behaviour of individuals with in the literate category only. This is based on the response of the persons when they are asked at the time of interview that whether they seek any medical care in the last two weeks before the survey.

**Fig.16. Percent of Persons Seeking Medical Care by Levels of Education**



**Fig. 17. Percent of Persons Seeking Medical Care by Literacy**



From Figure 17, we see that with the increase in level of education, the frequency of seeking any medical care decreases. 29 percent people with education level less than primary seek the medical care, the percentage reduces gradually with an increase in education level and 20 percent with education degree and above seek the medical care.

**5. EMPIRICAL MODEL AND ESTIMATION**

After having descriptive analysis we use ordinal logistic regression models in order to assess the impact of several variables on SRH. We assume that the latent health variable is measured by education,<sup>1</sup> objective health<sup>2</sup> and by some other individual characteristics in the following way:

$$H^* = \beta_0 + H^o\beta_1 + X\beta_2 + \varepsilon$$

<sup>1</sup> Generally the education is included in the model by years of schooling but for this study we use it as dummy variable.

<sup>2</sup> Objective health is also considered as past health.

Where  $\beta$ 's are the vectors of the coefficients and  $\epsilon$  is random term capturing unmeasured and immeasurable effects on the true health status. And  $X$  contains the variables i.e. education, occupation or personal characteristic. The subjective health status is taken as dependent variable in the model. As the response variable is measured on ordinal scale, so it is going to be treated as ordinal under the assumption that the levels of SRH have natural ordering ranges from 'excellent' to 'poor', but the distance between adjacent levels are unknown. So for this purpose we have again recoded the data in the following way; "5 excellent, 4 good, 3 fair, 2 poor and 1 very poor" for response variable.

### 5.1. Estimation Results

Specifically, our objective is to estimate the effect of education on health, holding other factors constant. Therefore, taking a closer look at the possible factors and identifying whether they play any significant role in determining the health status. Table 4 presents the results from the estimation of model I to III, model I contains schooling variables, age and gender. Beside education at all levels, gender and age also play a significant role. However, it is interesting to note that the only age group significant here is of 20-29 years old respondents.

Model II contains education, employment level, and social status indicating that the employment level and the socio-economic status play a significant role in determining the subjective health status. Model III is an extension of the model II by including additional individual characteristics i.e. age, gender, marital status, residence type and province. Although controlling for these variables does not alter the significance of education in determining the self-reported health (SRH) but nevertheless the significance of employment status and socio-economic status has changed. Purpose of adding more socio-economic variables in the model II and model III is to make sure that our model should not be misperceived. The marital status and residence type are statistically significant.

Table 5 presents the results from the estimations of model IV where education level and past health are included as regressors. Model IV excludes the insignificant variables and include the objective health measures i.e. disease and conditions, to study their role in determining the self-reported health status. All diseases included as the objective measure of health are significant except the knee pain. It is interesting to note that including the objective health status measure (all diseases) has not hampered the significance of the levels of employment. In model IV the various forms of employment status except the disability are significantly affecting the self-reported health measure. However, the Pseudo  $R^2$  is now reduced. In each of the above considered models we see that by adding more variables the effect of education on SRH remains significant.

Model V contains all socio-economic, past health and education variables. We note that Pseudo  $R^2$  improves in model V as compared to other four possible models. Log likelihood and chi square also support this model over other models. Table 6 presents the results of model V from the estimations of an extensive model containing a large set of potential variables. It can be observed that significance of the category having less than primary education is almost on border line but rests of the categories are highly significant. *As the subjective health variable runs from excellent to poor, a negative sign of the estimate of the coefficients of the explanatory variables indicates that a decrease in the level of the variable is associated with a decrease in the quality of health.*

Table 4

*Ordered Logit Estimates for Health Status*

Explanatory Variables	Model I		Model II		Model III	
	Coefficients (Std. error)	p-value	Coefficients (Std. error)	p-value	Coefficients (Std. error)	p-value
< primary	-1.275 (.213)	.000	-1.142 (.219)	.000	-.868 (.231)	.000
Primary but < middle	-1.487 (.166)	.000	-1.331 (.173)	.000	-.925 (.183)	.000
Middle but < matric	-1.330 (.174)	.000	-1.207 (.178)	.000	-.671 (.187)	.000
Matric but < degree	-.933 (.164)	.000	-.858 (.165)	.000	-.483 (.172)	.005
Employed			-.534 (.143)	.000	.035 (.164)	.832
Self-employed			-.525 (.139)	.000	.016 (.164)	.924
Unemployed			-.920 (.346)	.008	-.790 (.366)	.031
Student			-.581 (.234)	.013	.209 (.250)	.404
Work in Home/ Sick			-1.729 (.150)	.000	.005 (.232)	.983
Disability			-.770 (.270)	.004	-.118 (.335)	.725
Social-economic Status			.211 (.090)	.019	.209 (.100)	.036
Higher						
Urban					-.038 (.100)	.702
Punjab					-1.062 (.189)	.000
Sindh					1.227 (.201)	.000
Khyber Pakhtunkhwa					1.526 (.209)	.000
Male	-1.301 (0.1)	0.000			-1.501 (.186)	.000
Single					.231 (.305)	.450
Married					.285 (.276)	.301
Age 20 - 29 Years	-.557 (.200)	.005			.589 (.256)	.021
Age 35 - 39 Years	-.247 (.205)	.227			.234 (.249)	.348
Age 40 - 49 Years	-.014 (.216)	.947			-.146 (.258)	.571
Age 50 - 59 Years	0.163 (.233)	.483			-.178 (.264)	.499
-2 Log Likelihood	580.095		706.581		2775.392	
Chi Square	287.654		268.913		866.303	
Sig.	0.000		0.000		0.000	
Pseudo R-square	0.154		0.144		0.4	



Table 5

*Ordered Logit Estimates for Health Status*

Explanatory Variables	Model-IV		
	Coefficients	S.E	p-value
< primary	-0.952	0.224	0
Primary but <middle	-1.141	0.176	0
Middle but < matric	-1.142	0.18	0
Matric but < degree	-0.826	0.167	0
Employed	-0.296	0.146	0.043
Self-employed	-0.336	0.142	0.018
Unemployed	-0.958	0.352	0.007
Student	-0.524	0.238	0.028
Economically Inactive	-1.476	0.158	0
Disability	-0.233	0.281	0.406
SES Higher	0.206	0.092	0.026
Urban			
Punjab			
Sindh			
Khyber Pakhtunkhwa			
Male			
Single			
Married			
Age 20 - 29 Years			
Age 35 - 39 Years			
Age 40 - 49 Years			
Age 50 - 59 Years			
Disease and Conditions			
Arthritis	-0.895	0.149	0
Asthma	-1.013	0.24	0
Diabetes	-0.82	0.286	0
Hemorrhoids	-0.543	0.17	.001
Tuberculosis	-0.946	0.366	0.01
Heart Disease	-0.562	0.312	0.072
Pain in back	-0.508	0.11	0
Pain in knees	0.165	0.148	0.267
Vision Problem	-0.836	0.111	0
Dental Problem	-0.554	0.096	0
-2Log Likelihood		2624.119	
Chi Square		504.825	
Sig.		0	
Pseudo R-sq		0.271	

Table 6

*Ordered Logit Estimates for Health Status*

Explanatory Variables	Coefficients		Explanatory Variables	Coefficients	
	(Std. error)	p-value		(Std. error)	p-value
Urban	-.044 (0.103)	0.670	Employed	+.035 (0.166)	0.835
Punjab	-1.249 (0.196)	0.000	Self Employed	-.025 (0.166)	0.883
Sindh	.976 (0.208)	0.000	Unemployed	-.862 (0.372)	0.020
Khyber Pakhtunkhwa	1.114 (0.217)	0.000	Student	.168 (0.253)	0.507
Male	1.387 (0.195)	0.000	work in home/ Sick	-.009 (0.237)	0.968
Single	.256 (0.315)	0.416	Disabled	.070 (0.343)	0.838
<b>Health Conditions</b>					
Married	.422 (0.285)	0.139	Arthritis	-.775 (0.155)	0.000
Age 20-29 years	.305 (0.265)	0.250	Asthma	-1.154 (0.251)	0.000
Age 35-39 years	.032 (0.258)	0.902	Diabetes	-.725 (0.304)	0.017
Age 40-49 years	-.215 (0.265)	0.416	Hemorrhoids	-.358 (0.178)	0.045
Age 50-59 years	-.155 (0.270)	0.565	Tuberculosis	-1.187 (0.388)	0.002
SES higher	-.200 (0.101)	0.048	Heart disease	-.674 (0.326)	0.039
Less than primary	.751 (0.235)	0.001	Pain back	-.438 (0.116)	0.000
Primary but less than middle	.805 (0.185)	0.000	Pain knee	+.067 (0.155)	0.665
Middle but less than matric	.640 (0.189)	0.001	Vision problem	-.554 (0.118)	0.000
Matric but less than degree	.452 (0.173)	0.009	dental problem	-.314 (0.101)	0.002
<b>-2Log Likelihood</b>	3501.102	Chi square	1030.974		
P value	.000	Pseudo R sq	0.457		

**6. CONCLUSION**

The existing literature documents extensively on the existence of the educational differences in health. The need for investigating whether any causal component lies in the observed relationship between health and education has been emphasised since long. Often reported literature largely reflects a causal effect of schooling and education on health. By analysing the responses to self-reported health, we get a body of empirical evidence that a variety of socioeconomic and socio-demographic characteristics lead to perception of health, among individuals, in a varied manner. Among several socioeconomic variables, schooling, gender, occupation, economic status and provinces are the significant determinants of self-reported health. However, schooling (education) seems to have the most significant impact on health status. Moreover, the association both between health and education is not very sensitive to either including or excluding the other

variables. As the level of education increases the health of the individuals seems to be affected in a positive way. It is likely that these health differences are the result of the differences in behaviour across education groups. An exogenous increase in education causes better health among individuals. Hence, those with more years of education can take care of the risks factors leading to health. Thus, health policy researchers and analysts should emphasize that health and education represent a mutual approach in improving population health.

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## Comments

The paper analyses the socio-economic determinants of health with special focus on education. There is ample evidence to support the notion that educational level and health status are positively correlated and the findings of the study endorse and reinforce this viewpoint. To begin with, the authors give a brief account of the literature explaining that educational differences have great impact on health status and describe that education has a direct effect on health but there are no well stated causal mechanisms to explain the relationship.

The authors have used self reported health (SRH) as an indicator of health status measured on ordinal scale with five categories reflecting the respondents' perceptions of health status and not of those who observe or examine the individual. Using data from National Health Survey of Pakistan (NHSP, 1990-94), exploratory data analysis and ordinal logistic regression models are used to assess relationship between health, education and other socio-economic variables.

I would like to appreciate the authors' effort to undertake a comprehensive analysis of data on pattern of SRH and relate them to educational differences. The results, however are questionable as individuals with less than primary education have reported lower prevalence of diseases than those with middle, matric and degree levels of education—a finding contrary to our expectation which needs further exploration.

My comments pertain to three major areas—the methodology; the data set used, and the results and analysis—which all have limitations and interpretation biases. First the methodology used specifies self-reported health (SRH) as dependent variable ordered in five response categories as excellent, very good, good, fair, and poor. One major limitation to use ordinal logistic regression is the difficulty to quantify and interpret the distance between categories of responses which in turn are subjective perceptions of respondents about their health status. The data set used is the National Health Survey of 1990-94 which is about 15-20 years old. Since that time, tremendous changes in health related perceptions and disease patterns have occurred, and the results may not be reflective of the current situation of the relationship studied.

Looking at the characteristics of respondents (as shown in Table 1a), it appears that the sampled population has a young age structure (70 percent between ages 20-39 years), of which 70 percent are males, has education mostly between primary and matric levels, and the majority has reported health status between good and fair categories, thereby reflecting the biases of the self reported health status.

As for the results and its analysis, the education categories used are not precise but indicate a range such as primary < middle; middle < matric; matric < degree—etc. It would be more appropriate to make more precise categories of education since education as predictor of health is the main focus of the study.

Looking at the ordered logit estimates in Table 4, there are some contradictory results that need further explanation. For example, among age categories, the coefficient is significant only for age group of 20-29 years and has a negative sign, implying that

younger people have lower self-reported health status than the older age groups—a finding contrary to one’s expectations. Similar is the situation with male and urban residence indicating lower self-reported health than the corresponding category in comparison which needs further investigation.

Overall, the results of the study reinforce the fact that increase in level of education is positively related to health status of individuals, but the analysis raises questions about the usefulness and efficacy of using self-reported health perceptions as best indicators of health status. The question needs to be addressed for further research with a more recent and precise data set on health related matters.

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