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## PUBLIC HEALTH CARE SERVICES IN PAKISTAN: AN EMPIRICAL ANALYSIS OF DRIVERS OF UTILISATION

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### ABSTRACT

Pakistan is currently making substantial efforts to attain sustainable health facilities. However, progress in this endeavour constraint by the relatively low level of health expenditure as a percentage of the Gross Domestic Product. The health expenditure, over the last two decades remain stalled in the range of 2 to 3 per cent of GDP, which is lower than low-income economies. This lower level of health expenditure ultimately affects the public healthcare utilisation of individuals. Extensive research has been conducted in the existing literature to examine the impact of health outcomes on macroeconomic indicators. The micro-level investigation of public healthcare services, particularly utilisation, is unexplored in Pakistan. This study aims to investigate the factors that influence the utilisation of public health care services in Pakistan. The utilisation of the public health care services was determined in this study by incorporating socio-economic, demographic, and regional covariates. Data was sourced from the Pakistan Social and Living Standard Measurement (PSLM) survey (2019-2020) for the empirical analysis. The empirical evidence is based on the Ordered Logit model. The findings of the OLogit model indicate a positive association between literacy rate and household income with a higher likelihood of frequent and consistent utilisation of public health care services. The study confirms the existence of urban-rural disparity in utilising public health services. The findings of this study reveal a notable difference regarding the participation of the poor household in using the health care services frequently or regularly. This study's findings hold considerable implications concerning the urban-rural disparity, equitable distribution of health care, and the enhancement of health care accessibility through increased purchasing power.

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### INTRODUCTION

The provision of health care services is widely acknowledged as an essential requirement for the overall welfare and survival of the human population. Medical care is the process by which an individual is sustained following their illness. In recent years, there has been a notable improvement in life expectancy. The increase in human life expectancy can be attributed to various factors, including enhanced living conditions, advancements in healthcare technology, and other relevant factors (Tang et al., 2012). The contemporary landscape of work and lifestyle choices has resulted in decreased physical activity among individuals, leading to a rise in healthcare demands (Boachie et al., 2014). However, regarding the supply of health care services, according to the United Nations High Commissioner for Human Rights, States are responsible for delivering a variety of services to their populations, including education, health and social welfare services. Providing these services is essential to protecting human rights such as the right to housing, health, education, etc. Providing access to public health care services is critical to ensuring a population's well-being and health. Public health care refers to the system in which health care services are funded and provided by the government, intending to support human capital

formation. Developing strategic policies in all health care systems requires a foundation rooted in comprehensive information about health promotion, seeking, and utilisation behaviours and the underlying factors that influence these behaviours. These behaviours manifest themselves within various institutional frameworks, including but not limited to familial, communal, and healthcare settings. The determinants of health behaviours can be observed across multiple contexts, including physical, socio-economic, cultural, and political realms (Kroeger, 1983). Hence, the utilisation of a health care system, regardless of its nature (public or private) or formality (formal or non-formal), is contingent upon various socio-demographic factors, social structures, educational attainment, cultural beliefs and practices, gender disparities, women's status, economic and political frameworks, environmental circumstances, as well as the prevailing disease pattern and the health care system's characteristics (Katung, 2001; Navaneetham and Dharmalingam, 2002; Fatmi and Avan, 2002; Stephenson and Hennink, 2005). Health typically represents a primary focus within the realm of government endeavours. The association between health expenditure and productivity in developing countries, such as

Pakistan, underscores the significance of providing adequate healthcare services to stimulate economic growth (Toor and Butt, 2005). The optimal allocation of health expenditure is crucial to give and enhance health care facilities within a country effectively. Furthermore, it is essential to acknowledge that socio-economic conditions play a significant role in shaping healthcare expenditure distribution. Pakistan is currently making substantial efforts to attain sustainable health facilities. However, progress in this endeavour is constrained by the relatively low level of economic activities. This can be attributed to the fact that over the past two decades, health expenditure as a percentage of the Gross Domestic Product (GDP) has remained stagnant, fluctuating within the range of 2 to 3 percent, as depicted in Figure 1. The expenditure-to-GDP ratio is significantly lower when compared to the expenditure levels observed in economies categorized as low-income, middle-income, and high-income (such as OECD). The expenditure-to-GDP ratio in high-income economies exceeds 10 percent of their GDP.

The impact of health expenditure on macroeconomic variables has been extensively explored in the existing literature. The micro-level result of public health services utilisation at the household level still needs to be explored in Pakistan. The recent studies as a literature in the context of Pakistan, according to the best of our knowledge, are Toor and Butt (2005), Callen et al. (2013), Punjani et al. (2014), Ullah et al. (2022), and Mir et al. (2023). These studies, either at the macro level, impact health outcomes or are based on primary data or related to issues of opportunities in public health. The literature on utilization of the health care service in the context of Pakistan is sparse. The current study is based on nationally representative microdata to explore the determinants of utilisation of public health services at the household level.

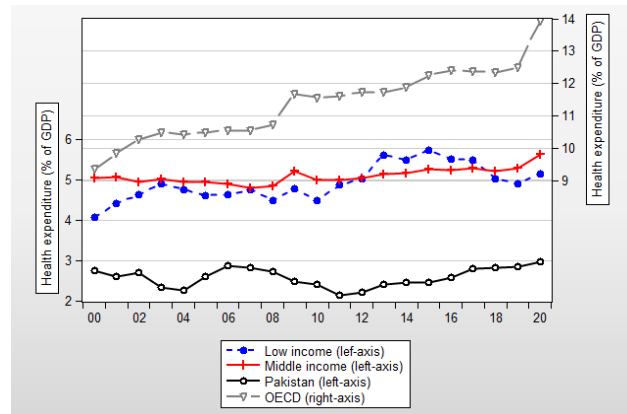


Figure 1. Dynamic pattern of health expenditure as % of GDP for the Pakistan, OECD, and low-income and middle-income economies; Source: WDI (2022).

The government's lower level of health expenditure is associated with a correspondingly low level of medical facilities, which has the potential to impact the utilisation of health care services. Against the aforementioned contextual backdrop, the primary objective of this study is to investigate the factors that influence the utilisation of public health services at the household level. While previous studies have explored the demand for health services, this particular investigation expands upon the existing literature by examining the demand and delving into the frequency of healthcare utilisation within a year. The study's findings will provide valuable insights for researchers and health economists in their efforts to model the utilisation of health services based on ordinal categories. Additionally, these findings will contribute to predicting the inclusiveness of public health

facilities. Furthermore, this study will serve as a valuable tool for the government to enhance individuals' economic well-being by providing essential services.

According to Grossman's (1972) seminal work, health can be viewed as an integral component of human capital. This perspective posits that individuals derive various advantages in consumption and production due to their health status. The allocation of sufficient time for engaging in leisure activities is crucial for maintaining overall well-being and promoting a healthy lifestyle. Such dedicated time allows individuals to derive direct utility from these activities, akin to the satisfaction of consuming goods and services. Time allocation towards maintaining good health is a contributing factor to income generation. According to him, health is generated through the utilisation of medical care and can be either consumed or produced through various lifestyle choices. Subsequent to the seminal work of Grossman, various theoretical advancements have emerged in the field of health determinants. These contributions have expanded the scope of factors influencing health outcomes beyond those initially identified by Grossman (1972). Scholars have incorporated additional determinants such as the decision to retire, early childhood investments and endowments, stress, social capital, and socio-economic status into the existing framework (Bolin et al., 2003; Galama and van Kippersluis, 2013).

There is a contention that many individuals are compelled to endure severe poverty due to the overwhelming financial obligations associated with seeking access to healthcare services (WBG, 2016). According to the extant body of literature, poverty, unemployment, and inequality have been identified as the primary challenges that necessitate attention to foster prosperity within the nation (WBG, 2018). However, it is essential to note that poverty is not addressed in an isolated manner. Many policies adopt a comprehensive approach that considers various dimensions of poverty, including but not limited to access to health care (Davis, 2014). In developing nations, it is observed that both private and public health systems coexist, functioning in parallel to cater to the diverse healthcare needs of the population. These systems collectively offer a comprehensive spectrum of medical services, encompassing acute, convalescent, and terminal care.

In their study, Mir et al. (2023) assert that individuals typically only actively select a healthcare facility for their medical needs if it is an urgent situation or they have been specifically referred to a particular center. According to Dixon-Woods et al. (2006), it has been observed that individuals tend to place a higher degree of trust in the guidance and recommendations provided by their family members and friends when it comes to matters of medical concern. In the preceding century, individuals' inclination to seek advice from alternative interested parties was driven by a need for more information and a lack of awareness (Gulliford et al., 2002). In contemporary times, the advent of digital technology has brought about a significant transformation in both the market landscape and the cognitive processes of individuals. The proliferation of digital technology has significantly increased the reach and visibility of various forms of media. As a result, patients are now more inclined to seek out high-quality information, treatment options, and personalized services (Phillimore et al., 2019).

The predictors of healthcare utilisation are age, educational attainment, household size, residence status, chronic ailment among household members (Chavez-Lindell, 2022); household income such as wages, remittance, pension, and grants (Mhlanga and Hassan, 2022) and behavioural risk factors like consumption

of smoking or alcohol (Megbowon et al., 2022). The utilisation of healthcare services is a significant measure of healthcare access, with the accessibility being distinguished by a disparity between urban and rural areas (Cohen et al., 2017). The observed differences between urban and rural areas are frequently encountered and can be primarily attributed to socio-economic factors, notably lower levels of education and living standards. According to the findings of Doogan et al. (2018), it has been observed that a significant proportion of the global rural population, approximately 56%, experiences a lack of health coverage as a result of healthcare access gaps. This percentage is notably higher than the urban population, where only 22% face similar challenges. Healthcare access discrepancies can be attributed to various factors, including but not limited to race, class, and ethnicity, as highlighted by James et al. (2017). The literature highlights the notable disparity in access to health services among individuals or households with disabilities, as documented by Bright and Kuper (2018). Disabled individuals often encounter various challenges when seeking health care services. These challenges can be attributed to attitudinal barriers exhibited by healthcare professionals, societal stigma and prejudice, and limited physical accessibility to healthcare facilities.

**METHODOLOGY**

**Ordered Logit model**

The study's first objective is to examine the determinants of utilization of the public health care service. In the microdata setting, the choice of appropriate model is solely depending upon the nature of the dependent variable. In our case, the nature of the variable is ordinal categories related to the use of public health units. The use of public health follows not at all, once in a while, often, and always. The variable follows the trend of no or less frequent to more frequent use, which gives intuition to use the Ordered logit model (Long and Freese, 2014). Ordered logit models are used to estimate relationships between an ordinal dependent variable and a set of independent variables developed by McCullagh (1980). An ordinal variable is a variable that is categorical and ordered, for instance, "poor", "good", and "excellent", which might indicate a person's current health status or the repair record of a car. This entry is concerned only with more than two outcomes. The baseline econometric model is as follows:

$$y = x' \beta + u \tag{1}$$

where  $y$  is a dependent variable that comprises the usage frequency of public health service;  $x$  is the vector of independent variables;  $u$  is the error term, assumed to follow a standard logistic distribution; and  $\beta$  is the vector of regression coefficients which we wish to estimate.

In ordered logit, an underlying score is estimated as a linear function of the independent variables and a set of cutpoints. The probability of observing outcome  $i$  corresponds to the probability that the estimated linear function, plus random error, is within the range of the cutpoints estimated for the outcome:

$$\Pr(\text{outcome}_j = i) = \Pr(k_i - 1 < \beta_1 x_{1j} + \beta_2 x_{2j} + \dots + \beta_k x_{kj} + u_j \leq k_i) \tag{2}$$

$u_j$  is assumed to be logistically distributed in ordered logit. In either case, we estimate the coefficients  $\beta_1, \beta_2, \dots, \beta_k$  together with the cutpoints  $k_1, k_2, \dots, k_{k-1}$ , where  $k$  is the number of possible outcomes.  $k_0$  is taken as  $-\infty$ , and  $k_k$  is taken as  $+\infty$ . All of this is a direct generalization of the ordinary two-outcome logit model.

**Data Sources**

The empirical analysis in this study utilises data from the Pakistan Social and Living Standards Measurements (PSLM) survey conducted in the year 2019-20. The data utilised in this study was obtained from the official website of the Pakistan Bureau of Statistics (PBS). The PSLM survey for the year 2019-20 marks the twelfth round of a series of surveys that was first initiated in 2004. The latest version of the PSLM district-level survey encompassed a total of 5,893 blocks and 176,790 households. The survey aimed to gather data on various district-level indicators pertaining to Education, Health, Housing, Water Sanitation and Hygiene, Information Communication and Technology (ICT), Food Insecurity Experience Scale (FIES), Functional Limitation (Disability), and lifetime Migration. The primary objective of this survey was to monitor 21 Sustainable Development Goal (SDG) indicators.

We processed the data to make it possible for the regression analysis. In the analysis, some variables are continuous, while others are dichotomous, nominal categorical, ordinal categorical, and discrete. The definitions of the variables used in the study are given in Table 1.

Table 1. Definition of the variables.

Variables	Description
<i>Dependent variable</i>	
Public health use	An ordinal categorical variable comprises the four categories of the use of public services over the last year. The outcomes related to utilization are: not at all, once a while, often, and always.
<i>Independent variables</i>	
Disable	A dichotomous variable coded 1 if the household responds to the presence of the disabled in the household.
Literacy rate	A ratio variable comprises the literate person to total household size. The illiterate person is defined as having no year of education.
Employed rate	A ratio variable comprises the employed person to the total working-age person in the household. The working-age person does not include children, students, retirees, and the disabled.
Urban	A dichotomous variable coded 1 if a household is from an urban area, 0 otherwise.
Poor	A dichotomous variable coded 1 if the household is poor, 0 otherwise. The poverty line is defined as the one dollar per day per capita income. The average dollar during the reference period of the survey was 160 PKR/1 USD.
Remittance Province	A dichotomous variable coded 1 if the household receives remittance, 0 otherwise.
Province	A nominal categorical variable comprises four categories. These categories consist of Sindh, Punjab, Balochistan, and Khyber Pakhtunkhwa (KPK).
HHincome	A continuous variable consists of all sources of household income. These sources include the labor income and nonlabor income. The nonlabor income comprises remittances, rental income, and pension.
Male	A dichotomous variable coded 1 if the head of the household is male, 0 otherwise.

## RESULTS AND DISCUSSION

### Descriptive Analysis

The descriptive statistics of the variables used in the study are depicted in Table 2. The sample of the study comprises 160,653 households. Amongst the households, a relatively lower proportion of households responded to the no or less frequent use of public health units. 1 out of 10 households responded that they had not used all public health services since the last year. Most of them (32 percent) responded that public health care services are far away, 10 percent responded that services are very costly, 10 percent responded that they do not suit, 3 percent responded the lack of tools/staff, 10 percent responded no enough facilities, while 35 percent mentioned other reason for not using the public health services (see Figure 2).

On the contrary, 15 percent of households responded 'once a while', 57 percent responded 'often', and 18 percent responded 'always' use the public health services. In the sample, 38 percent of households responded to the presence of a disabled person. However, low proportion of households with disabled persons are in the not at all use group, while a higher proportion of households use often and always public health services. The average literacy rate in the household is 55 percent, which varies from 41 percent to 62 percent, following the no or less use to more frequent use of public health services. On the contrary, the higher the employment rate in households, the more frequent to less or no use of public health services. In the sample, 3 out of 10 households are from the urban area, while the proportion of the households from urban areas increases (24 percent to 40 percent) following the no or less use to more frequent use of public health. The poor households are 49 percent, while the proportion of the poor households decreases (51 percent to 42 percent) following the no or less use to more frequent use of public health. The remittance-receiving households are 6 percent, while a relatively higher proportion of households are the more frequent users of public health services. Remittance as a source of nonlabor income increases the socio-economic status of the household (Shair and Anwar, 2023; Shair et al., 2023a). The higher socio-economic status, in turn, supports the access to public health care. It is important to note that the household's average income is higher in the sample of more frequent users of public health.

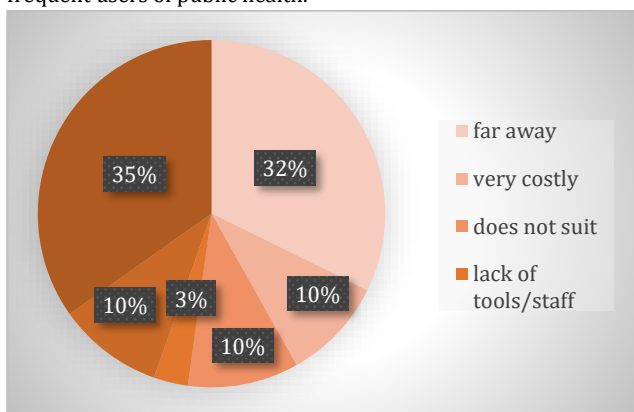


Figure 2. Reasons for not using public health service; Source: Authors' calculation based on PSLM-2020.

### Determinants of Public Health Utilisation

The findings of our study are presented in Table 3, where we provide an analysis of the outcomes observed after implementing the Ologit model. The estimated coefficients of the Ologit model,

which accounts for the discrete nature of public health utilisation, are presented in the second column of the table. Within the discrete framework of utilisation, the classification of utilisation is denoted by an ordinal scale comprising the following values: 'not at all use' is assigned a value of 1, 'once in a while' is assigned a value of 2, 'often' is assigned a value of 3, and 'always' is assigned a value of 4. From an alternative perspective, the frequency of utilisation exhibits a range of variations, spanning from infrequent to more frequent.

The findings indicate that households with disabled individuals exhibit a slightly higher level of utilisation of public health services, as a measure 0.03 scale higher vis-à-vis households with no disabled person. From an alternative perspective, households with disabled persons exhibit a lower likelihood of utilising public health services altogether or on an infrequent basis (see third and fourth columns). Conversely, there is a higher likelihood of frequently and consistently availing public health services (see fifth and sixth columns). The presence of disability has been found to significantly impact the likelihood of experiencing poverty. This is primarily due to the increased health expenditure that individuals with disabilities often face and the decreased consumption expenditure they can engage in. Chronic disability shifts the household's preferences towards the public health setting, characterized by a relatively subsidized structure.

The households residing in urban areas exhibit a slightly higher level of public health care services utilisation than households in rural areas, with a difference of 0.325 scale points. Similarly, households residing in urban areas demonstrate a greater propensity to utilise public health services occasionally. Conversely, they also exhibit a higher probability of regularly and consistently accessing public health services. Urban households show a notable inclination towards health care-seeking behaviour, which can be attributed to several key factors. These factors include the extensive availability and accessibility of healthcare services, better infrastructure, and the presence of a skilled and proficient medical workforce. On the other hand, it has been observed that households headed by males tend to exhibit a higher propensity for regularly accessing and utilising public health services. Similarly, households with foreign migrants are more inclined to exhibit healthcare-seeking behaviour than those without migrants.

The research indicates that a higher proportion of employed individuals within a household is linked to a reduced reliance on public health services. This relationship holds true even when considering the frequency and consistency of utilisation. The presence of a relatively higher employed individual within a household may suggest the availability of employer-provided health insurance or the income effect. This income effect could result in a greater pool of financial resources from all earning members, potentially leading to a preference for private healthcare services over public alternatives. On the other hand, it is observed that poor households exhibit a lower propensity to utilise public health services. The observed phenomenon of lower participation of poor household in terms of regular and consistent utilisation of public health care services suggests a potential lack of inclusiveness within the system. In the provided data, it is observed that approximately 49 percent of households fall under the category of poverty. It is worth noting that the lack of adequate healthcare facilities plays a significant role in driving the vicious circle of poverty.

Table 2. Descriptive analysis of the variables.

Variable	Whole sample N=160,653	Utilisation			
		Not at all N=16,384	Once a while N=24,595	Often N=91,358	Always N=91,358
Not at all	0.102				
Once in a while	0.153				
Often	0.569				
Always	0.176				
Disable (=1)	0.38	0.317	0.376	0.397	0.364
Literacy rate	0.552	0.465	0.483	0.566	0.615
Employed rate	0.403	0.435	0.438	0.392	0.391
Urban (=1)	0.311	0.237	0.253	0.313	0.398
Poor (=1)	0.488	0.514	0.557	0.486	0.42
Remittance (=1)	0.056	0.028	0.038	0.067	0.055
KPK	0.178	0.115	0.161	0.212	0.12
Punjab	0.496	0.453	0.439	0.517	0.504
Sindh	0.231	0.324	0.251	0.196	0.271
Balochistan	0.095	0.108	0.149	0.075	0.105
Ln (hhincome)	10.096	9.926	9.984	10.121	10.211
Male	0.916	0.928	0.925	0.91	0.921

Table 3. Estimates of the OLogit model for the use of public health.

Variables	Coefficient	Not at all Mfx	Once in a while Mfx	Often Mfx	Always Mfx
Disable	0.03*** (0.01)	-0.003*** (0.001)	-0.003*** (0.001)	0.001*** (0.000)	0.004*** (0.001)
Literacy rate	0.496*** (0.017)	-0.043*** (0.001)	-0.05*** (0.002)	0.023*** (0.001)	0.07*** (0.002)
Employed ratio	-0.372*** (0.023)	0.032*** (0.002)	0.038*** (0.002)	-0.017*** (0.001)	-0.053*** (0.003)
Urban (=1)	0.325*** (0.012)	-0.027*** (0.001)	-0.032*** (0.001)	0.011*** (0.000)	0.048*** (0.002)
Poor (=1)	-0.028** (0.013)	0.002** (0.001)	0.003** (0.001)	-0.001** (0.001)	-0.004** (0.002)
Remittance (=1)	0.126*** (0.022)	-0.01*** (0.002)	-0.013*** (0.002)	0.005*** (0.001)	0.019*** (0.003)
KPK (=1)	0.149*** (0.02)	-0.012*** (0.002)	-0.015*** (0.002)	0.006*** (0.001)	0.022*** (0.003)
Punjab (=1)	0.15*** (0.018)	-0.013*** (0.002)	-0.015*** (0.002)	0.007*** (0.001)	0.021*** (0.003)
Sindh (=1)	-0.049** (0.02)	0.004** (0.002)	0.005** (0.002)	-0.002** (0.001)	-0.007** (0.003)
Ln (hhincome)	0.117*** (0.008)	-0.01*** (0.001)	-0.012*** (0.001)	0.005*** (0.000)	0.017*** (0.001)
Male (=1)	0.039** (0.019)	-0.003** (0.002)	-0.004** (0.002)	0.002* (0.001)	0.005** (0.003)
/cut1	-0.701 (0.079)				
/cut2	0.447 (0.079)				
/cut3	3.122 (0.08)				
Log-likelihood	-176560.1				
Wald chi <sup>2</sup>	5117.85				
Prob > chi <sup>2</sup>	0.0000				
Pseudo R <sup>2</sup>	0.0143				
Number of obs	156,034				
Frequency		15,658	24,190	88,528	27,658

Note: Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; Source: Authors' calculation based on PSLM-2020.

The analysis of household income reveals a significant positive association with the extent of utilisation of public health care services (see Figure 3a). In a parallel vein, a rise in income is

positively associated with the probability of engaging in regular and persistent utilisation of public health services. Conversely, a decrease in income is associated with a diminished likelihood of

infrequent or occasional utilisation of public health services. Household income is a crucial indicator of purchasing power, influencing the affordability of Medicare services. While public health is a subsidized product, it remains subject to resource constraints that may be alleviated through increased income. The aftermath of the OLogit model suggests a positive relationship between the literacy rate within households and the frequency of utilising public health services (see Figure 3b). The implication arises that individuals with higher literacy levels possess an increased capacity to access information (Shair et al., 2022), thereby influencing their health-seeking behaviour and reducing the likelihood of engaging in self-medication practices.

engaging in frequent and consistent utilisation of public health care services. On the other hand, there is a negative association between the employment ratio and the frequency of utilisation of public health care services, with evidence suggesting that household tend to either refrain from or only occasionally avail of such services. The present study reveals a notable disparity regarding the participation of the poor household in utilising health care services frequently or regularly. The implications derived from the study's findings suggest the presence of an urban-rural disparity in the utilisation of public health services. In pursuit of this objective, it is imperative to acknowledge that any endeavour aimed at bridging the divide between urban and rural areas has the potential to significantly enhance the accessibility of public health care services. Furthermore, it is imperative to emphasize expanding health coverage to all regions. This can be achieved by prioritizing the health sector when allocating limited resources. The present study underscores the lower participation of the poor in the utilisation of public health care services. This observation raises pertinent concerns regarding the inclusiveness of the healthcare system. To achieve this objective, it is imperative to establish a comprehensive health coverage system that encompasses all households, regardless of their socio-economic status. This can be accomplished by implementing a social security programme that guarantees fair and equitable access to health care services across various income groups (Shair et al., 2023b). Research indicates a positive association exists between higher household income and increased utilisation of health care services. The implication can be made that the level of purchasing power held by individuals significantly influences the patterns and extent of healthcare utilisation. The increase in household purchasing power is a dynamic process requiring the implementation of a raft of long-term policy measures to fully exploit the country's economic potential.

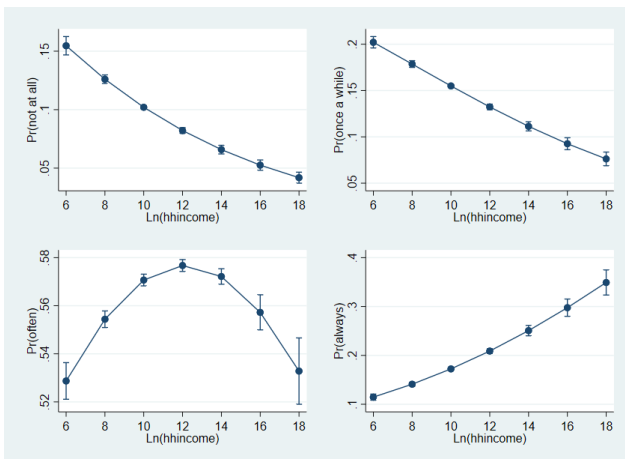


Figure 3a. Predicted probability of household income across the public health use outcome; Source: Authors' calculation based on PSLM-2020.

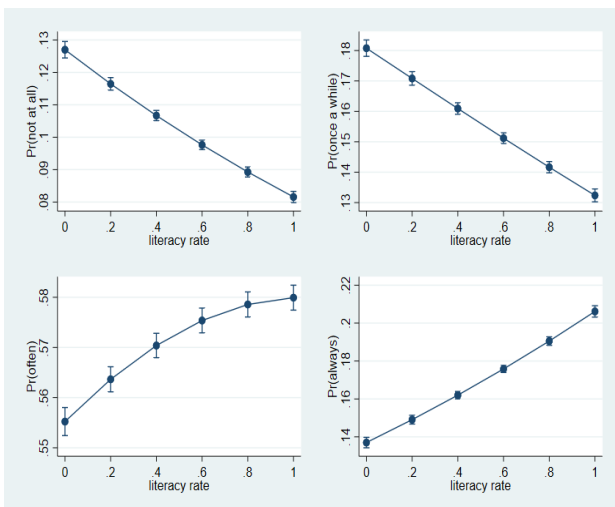


Figure 3b. Predicted probability of literacy rate at household level across the public health use outcome; Source: Authors' calculation based on PSLM-2020.

**CONCLUSIONS**

The objective of this study is to investigate the factors that influence the utilisation of public health care services in Pakistan. The utilisation of public health care services was determined in this study by incorporating socio-economic, demographic, and regional covariates. The findings of the OLogit model indicate a positive association between literacy rate and household income with the likelihood of frequent and consistent utilisation of public health care services. In a parallel manner, it has been observed that households residing in urban areas within advanced provinces, particularly those headed by male individuals, and reporting external migration, exhibit a higher propensity for

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