SHORT REPORT

Spatial distribution of health consultations in the past two weeks by provider type and district: Pakistan Social and Living Standards Measurement Survey 2014-15

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Abstract

Place is a nexus between epidemiology and Geographic Information System. In this study, the Pakistan Social and Living Standards Measurement survey 2014-15 data on percent distribution of health consultations, in the past 2-weeks by type of healthcare provider were mapped cumulatively, as well as disaggregated by urban and rural areas, using a GIS programme to visualize spatial distribution in the country by district. Private sector is the main and preferred provider for healthcare services when Pakistanis get sick or injured. Differences between and within provinces — at the district level — exist, but in spite of significant investment by the government in public sector health and nutrition services; most people prefer going to private dispensaries and hospitals. Harnessing the visualization power of GIS for better decision making in health sector is contingent upon easy availability of up-to-date GIS shapefiles to analyze and depict health data on maps.

Keywords: GIS, Health, Services, Pakistan.

Introduction

Place, in addition to person and time, is one of the three elements covered in epidemiology to understand distribution and determinants of health related events and conditions.[1-3] While Geographic Information System (GIS) is defined as a system that "captures, stores, analyzes, manages, and presents data that is linked to location".[4] Place forms the nexus between epidemiology and GIS. Applications of GIS in epidemiology include visualization, exploration, and analysis of location based data to help interpret and understand health and disease in place i.e. spatial relationships.[5,6]

The National Health Survey of Pakistan (NHSP) conducted from 1990-94 reported that private sector was the major source of healthcare, while traditional systems of healthcare played "very little" part in the country. And 21% healthcare was provided by public sector physicians.[7] However, NHSP was designed to primarily provide nationally representative estimates. In the fiscal year 2013-2014, the public sector expenditure on health and nutrition was 173.42 billion rupees; as a percent of GDP it was 0.69 percent.[8]

In this study, the Pakistan Social and Living Standards Measurement survey (PSLM) 2014-15 data on percent distribution of health consultations, in the past 2-weeks by type of healthcare provider was mapped cumulatively, as well as disaggregated by urban and rural areas, using a GIS programme to visualize spatial distribution in the country by district.

Methods and Results

The Pakistan Bureau of Statistics, conducted the Pakistan Social and Living Standards Measurement Survey (PSLM) 2014-2015 in all urban and rural parts of districts in every province from October 2014 to June 2015; while excluding the Federally Administered Tribal areas (FATA) region. The PSLM survey details as well as tabular data based are available on the Pakistan Bureau of Statistics website.[9] Using a stratified two-stage sample design with 78,635 households for providing various indices including health; representative at the district level. Urban and rural, district-wise data, for individuals of all ages, who sought health consultations in the past two weeks by type of health provider was also collected by the PSLM 2014-15. The data on type of health providers were collected in eight categories for each district cumulatively, as well as by rural and urban parts. These eight categories were private dispensary/hospital, public dispensary/hospital, Rural Health Center (RHC)/Basic health Unit (BHU), hakeem/herbalist, homeopath, chemist/pharmacy, saina/saini (literally translated as wise man or wise woman), and the last category encompassing all other sources of consultations as 'other'. Data were reported in percentages, for all the individuals who sought consultations in the past weeks, by category and by urban and rural status, as well as cumulatively for each district.

For this study, the district-wise tabular data on percent of consultations by each type of provider, and by urban, rural, and combined urban and rural status were entered

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Table-1: The percent distribution of health consultations in the past two weeks by type of health provider, disaggregated by urban and rural status.

Region	Total	Urban	Rural
Pakistan (Cumulative)			
Private Dispensary/Hospital	70.3	76.5	66.0
*Private, Public Dispensary/Hospital, RHC/BHU (Modern Medicine)	94.0	96.1	92.7
Hakeem/Homeopath, Chemist/Pharmacy, Saina/Saine, Other (Traditional/Alternative Medicine)	6.0	3.9	7.3
Islamabad			
Private Dispensary/Hospital	68.2	57.3	79.6
*Private, Public Dispensary/Hospital, RHC/BHU	99.0	100	98.0
Hakeem/Homeopath, Chemist/Pharmacy, Saina/Saine, Other	1.0	0	2.0
Punjab			
Private Dispensary/Hospital	77.2	76.6	77.6
*Private, Public Dispensary/Hospital, RHC/BHU	95.5	97.1	94.5
Hakeem/Homeopath, Chemist/Pharmacy, Saina/Saine, Other	4.5	2.9	5.5
Sindh			
Private Dispensary/Hospital	75.6	84.1	59.9
*Private, Public Dispensary/Hospital, RHC/BHU	97.3	97.8	96.5
Hakeem/Homeopath, Chemist/Pharmacy, Saina/Saine, Other	2.7	2.2	3.5
Khyber Pakhtunkhwa			
Private Dispensary/Hospital	47.0	52.7	45.2
*Private, Public Dispensary/Hospital, RHC/BHU	86.2	85.3	86.4
Hakeem/Homeopath, Chemist/Pharmacy, Saina/Saine, Other	13.8	14.7	13.6
Balochistan			
Private Dispensary/Hospital	61.2	64.0	59.9
*Private, Public Dispensary/Hospital, RHC/BHU	93.5	96.2	92.2
Hakeem/Homeopath, Chemist/Pharmacy, Saina/Saine, Other	6.5	3.8	7.8

* The percentages presented in these rows provide the total percent of private as well as public western healthcare providers. The total of rows with asterisk and the row with percentages for 'Hakeem/Homeopath, Chemist/Pharmacy, Saina/Saine, Other', add up to one hundred percent.

in the Excel 2016. For creating maps, the geographic (GIS) data/shapefiles for districts were downloaded from the Humanitarian Data Exchange website.[10] The PSLM 2014-15 data were joined with the GIS shapefiles. The shapefiles included the FATA region, and the four districts of Balochistan province i.e. Kech, Lehri, Panjgur, Sohbatpur, but no data were available in the PSLM 2014-15 report for these areas/districts. Hence no data are displayed for these areas in the maps. The eight health provider categories were combined into three groups of private dispensary/hospital, private dispensary/hospital combined with public dispensary/hospital and RHC/BHC, and the final category combining RHC/BHC, hakeem/herbalist, homeopath, chemist/pharmacy, and other. The first category displays use of private health providers i.e. hospitals and dispensaries; second category provides use of private as well as public hospitals and dispensaries i.e. use of Western medicine; last category provides use of non-Western health providers, albeit this also includes consulting chemists or pharmacies but these individuals are not licensed to practice Western medicine.

Using ArcGIS 10.4, choropleth maps - that use colour differences to represent numerical quantity pertaining to areas - were created to visualize district-wise pattern and percentage distribution of health consultations in the past two weeks by type of provider; cumulatively, and by urban and rural status. Three maps in groups of three were created to visualize percent private dispensary/hospital use, percent private/public health facilities use, and percent other health providers use, by urban, rural, and combined.

Table 1 reproduces some of the figures from the PSLM 2014-15 report, for the national and provincial percentages for percent distribution of health consultations by type of providers, and disaggregated by urban and rural areas, in the past two weeks. In the country as a whole, 70.3% of people sought health consultations in the past two weeks from private dispensaries or hospitals; while 94.0% sought such care private, public dispensaries/hospitals or RHC/BHU i.e. cumulative use of care provided by licensed practitioners of modern medicine. Only 6.0% sought health consultations from non-western/traditional/alternative medicine providers or unlicensed practitioners like chemists or pharmacists i.e. cumulative use of alternative

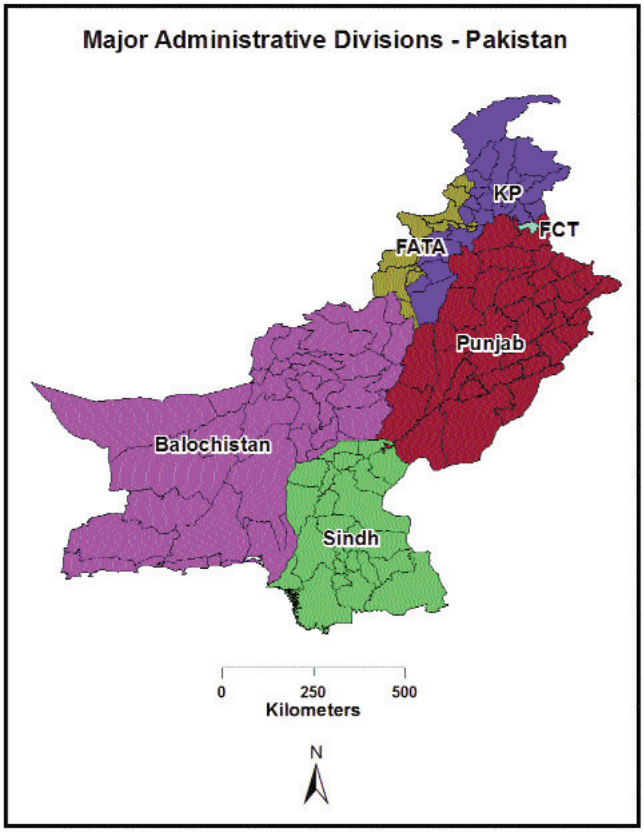

Figure-1: Map showing the four provinces along with district boundaries, FATA region, and the Federal Capital Territory (FCT: Islamabad).

or traditional health care providers. Among provinces, the highest percent of seeking health consultations from private dispensaries/hospitals in the past two weeks was reported by Punjab i.e. 77.2%, while lowest percent was reported from Khyber Pakhtunkhwa of 47.0%. Cumulatively, highest use of private/public dispensaries/hospitals, or RHC/BHC was reported from Sindh i.e. 97.3%, while lowest percent of 86.2% was reported from Khyber Pakhtunkhwa. Regarding urban rural disparities by provinces; Punjab was the only province where rural population sought more health consultations in the past two weeks from private dispensaries/hospitals than urban population i.e. 77.6% and 76.6%, respectively. In percentage points; the highest disparity between urban and rural population in terms of seeking health consultations from private dispensaries/hospitals was reported from Sindh, where 84.1% urban population sought health consultations in the past two weeks versus 59.9% in rural population.

Figure-1 shows the boundaries of provinces, FATA region, Islamabad, as well as the district boundaries in each province. Figure-2 shows three maps depicting cumulative i.e. urban and rural, district-wise spatial distribution of having sought health consultations in the past two weeks by type of providers. The map on the left shows the percent distribution of private dispensary/hospital use in the past two weeks. Most Punjab districts had over 75% use of private health facilities; some northern, north-eastern Sindh districts and Karachi in the south; some northern and one central districts in Balochistan; while none in KP were in the range of over 75%. The middle map depicts combined use of public and private dispensaries/hospitals in the past two weeks. Most Punjab and Sindh districts fall in the range of 90% to 100%; some northern, north-eastern, and one in southern KP fall in this range. While most central, northern,

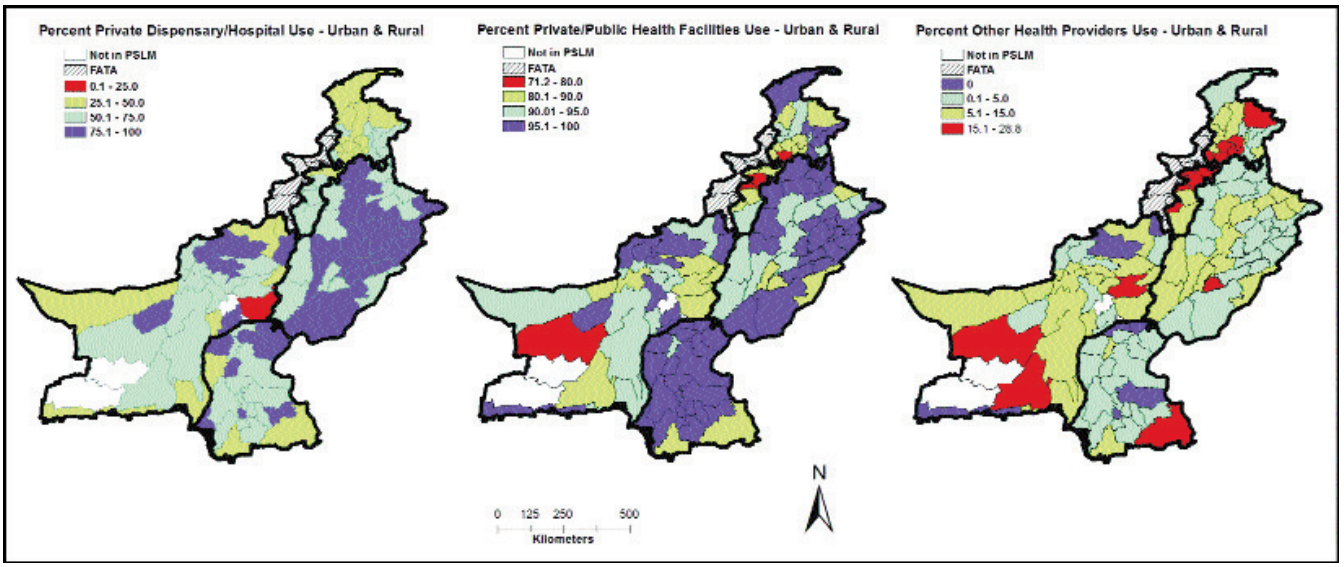

Figure-2: District-wise cumulative spatial distribution of having sought health consultations in the past two weeks by type of providers.

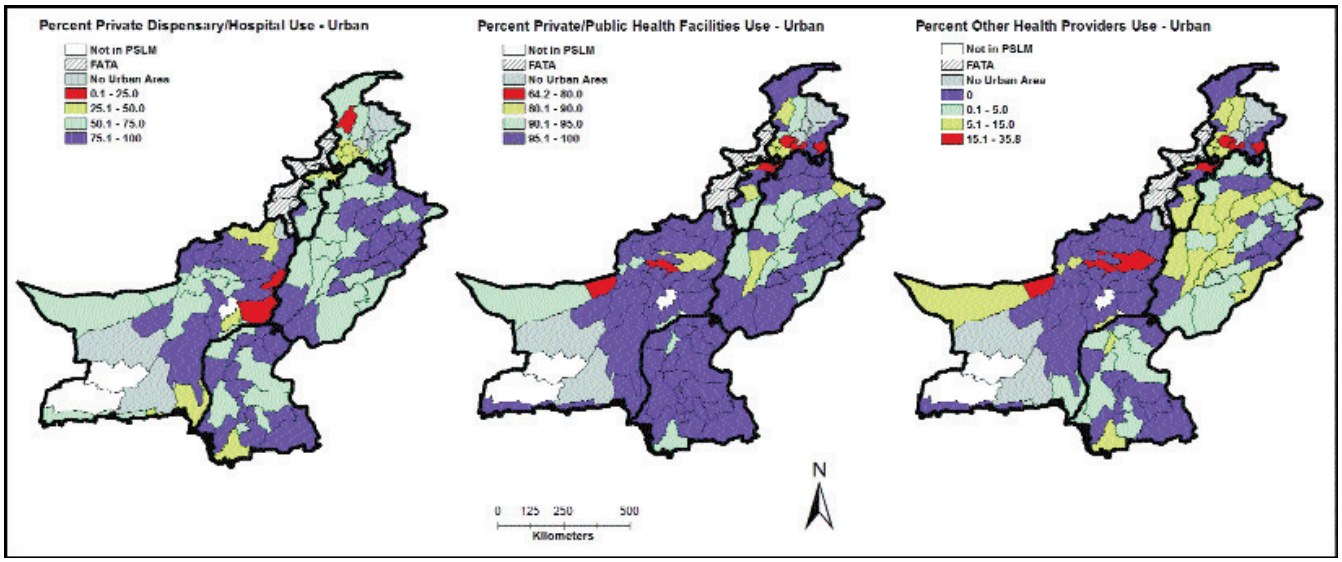

Figure-3: Urban district-wise spatial distribution of having sought health consultations in the past two weeks by type of providers.

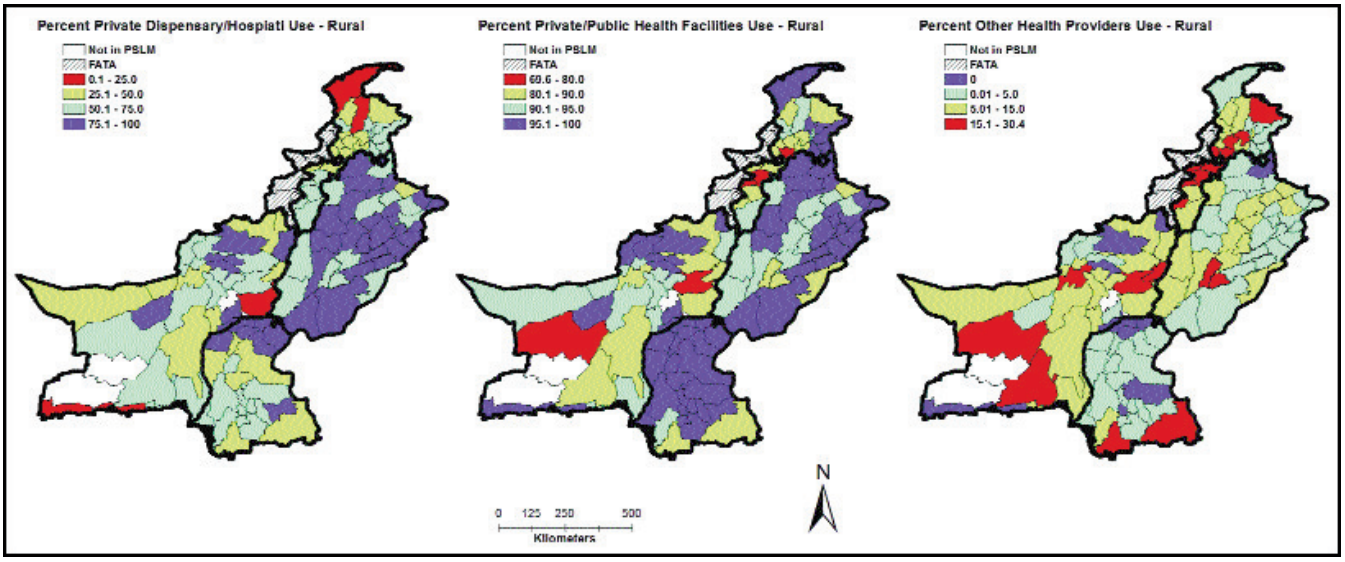

Figure-4: Rural district-wise spatial distribution of having sought health consultations in the past two weeks by type of providers.

and southern districts fall in this range in Balochistan. The map on the right depicts the percent use of non-western, traditional/alternative health care providers. Only one district in Punjab and Sindh each, three districts of Balochistan fall in the 15% to 28.8% range. While some central, and north-eastern, southern districts fall in this range in KP. Figure 3 shows three maps depicting district-wise urban spatial distribution of having sought health consultations in the past two weeks by type of providers. The map on the left shows the percent, distribution of private dispensary/hospital use in the past two weeks in urban areas. In Punjab, northern, north-eastern, and southern districts show over 75% use of private health facilities; in Sindh, some northern, southern, and western districts show over 75% use; KP only shows one district in this range; while in Balochistan, some central and northern districts show this range. The middle map depicts combined use of public and private dispensaries/hospitals in the past two weeks in urban district areas. Most Punjab districts and all of Sindh districts fall in the range of 90% to 100%. In KP, southern, and northern fall in this range; with few exceptions in Balochistan, all districts fall in this range.

The map on the right depicts the percent use of non-western, traditional/alternative health care providers in the urban district areas. None of the districts in either Punjab or Sindh fall in the range of above 15%. While few districts in Balochistan and KP fall in this range. Figure 4 shows three maps depicting district-wise rural spatial distribution of having sought health consultations in the past two weeks by type of providers. The map on the left shows the percent, distribution of private dispensary/hospital use in the past two weeks in rural areas. In Punjab, most districts show over 75% use of private health facilities; in Sindh, northern districts and one south-eastern districts show over 75% use; KP none in this range; while in Balochistan, some northern and one central districts show this range. The middle map depicts combined use of public and private dispensaries/hospitals in the past two weeks in rural district areas. Most Punjab and Sindh districts fall in the range of 90% to 100%. In KP, northern and some north-eastern districts fall in this range; whereas in Balochistan, several northern, north-eastern and southern districts fall in this range. The map on the right depicts the percent use of non-western, traditional/alternative health care providers in the rural district areas. Two districts, each, in Punjab and Sindh fall in the range of above 15%. Some southern and central districts in Balochistan, and several central districts in KP fall in this range.

Discussion

In this study GIS was used to summarize and visualize health consultations behaviour, in terms of private, public, and traditional/alternative healthcare providers in the country to better understand the spatial distribution at the district level. Over two decades now, the findings from the NHSP 1990-1994 resonate with the results from the PSLM 2014-2015. Private sector is the main and preferred provider for healthcare services when Pakistanis get sick or injured. Differences between and within provinces — at the district level — exist, but in spite of significant investment by the government in public sector health and nutrition services; most people prefer going to private dispensaries and hospitals. However, as maps in figures 2 to 4 clearly show, public and private dispensaries and hospitals are the primary source of healthcare providers at the district level; with a small — albeit sizeable minority — seeking healthcare from traditional or alternative medicine practitioners in the country. The spatial pattern of seeking traditional/alternative healthcare providers, augurs the need for more focused understanding of this preference as well as targeted health promotion campaigns at the district level. As figures 2 to 4, each with three maps, presents tabular data spanning from several pages into form that is more readily understandable for public health policymakers and health planners at the provincial and district levels to address urban rural differentials in the type of health providers sought for consultations.

Harnessing the visualization power of GIS for better decision making in health sector is contingent upon easy availability of up-to-date GIS shapefiles i.e. vector data files based on coordinate geometry to analyze and depict health data on maps. Academic institutes in the country in collaboration with federal and provincial government authorities need to ensure provision of free and easy access to basic GIS data/shapefiles for the country.

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Conflict of Interest: None.

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