EVALUATION OF THE SOCIOECONOMIC STATUS OF PATIENTS RECEIVED AT RADIOLOGY DEPARTMENT, HAYATABAD MEDICAL COMPLEX PESHAWAR

Ghazala Wahid, Adnan Ahmad✉, Rabiya Tariq, Naila Tamkeen, Mehreen Samad, Mahnoor Rehman

Department of Radiology, Hayatabad Medical Complex, Medical Teaching Institute, Peshawar-Pakistan.

Address for correspondence:
Adnan Ahmad
Department of Radiology, Hayatabad Medical Complex, Medical Teaching Institute, Peshawar-Pakistan.

E-mail:
afridi980@hotmail.com

■ ABSTRACT

Objectives: To determine the socio-economic status of patients availing Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) at the Radiology Department, Hayatabad Medical Complex.

Methodology: This cross-sectional study was conducted in Hayatabad Medical Complex, Peshawar, between August 2018 and January 2019. The study group included 355 patients availing of CT and MRI facilities in the hospital. A systematic random sampling method was used to collect data. Data was collected through an open-ended questionnaire. The cost & type of the investigation was documented. Modified Kuppuswamy's Scale was used to collect the data and was analyzed appropriately.

Results: The majority of the patients belonged to the lower-middle socio-economic class representing 38.87% of the study population. Second, the highest percentage of patients were from the upper lower stratum constituting 21.69%, while 19.44% were from upper-middle households whereas 11.83% were from lower socioeconomic classes. whereas, 8.17% belonged to the high socio-economic stratum. The average monthly household income in the lower-middle-class group was calculated to be approximately Rs. 15,000/-. 98% of patients used out-of-pocket methods for payment exposing them to the risk of increased expenditure. 5.92% of patients utilized the government-funded facility or 'poor-free' facility for free cost scan; or relied on donations from other sources.

Conclusion: Most of the patients were restricted in terms of their financial resources with the largest percentage of patients belonging to lower-middle-class households. Low socioeconomic status was found to be associated with missed appointments & delays in availing the CT and MRI scans.

Keywords: Socioeconomic Status; Kuppuswamy's SES Scale; Radiology; Computed Tomography; Magnetic Resonance Imaging.

■ INTRODUCTION

Radiological imaging plays a crucial role in health care. In the past decade, there has been a dramatic rise in the utilization of diagnostic imaging in disease management.[1] A review by the Medicare Payment Advisory Commission (MedPAC) to the Centers for Medicare and Medicaid Services (CMS) has provided the report that the increase in the volume of imaging services per Medicare beneficiary has outpaced the services physicians provide.[2] Many factors are contributing to the increased utilization of diagnostic imaging which includes wider availability of technology, increased demand by patients and physicians, favorable reimbursement, and improvements in the technology. This has resulted in a lower threshold for its use. The imaging rates for Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) have increased dramatically over the past years, despite their high costs. One reason for this may be the significant improvement in techniques that have prompted the physicians to increased their use. Other reasons include patient-generated demand, physicians' fear of medical malpractice lawsuits, and repeated surveillance among certain groups of patients (for example, those with cancer).[3]

Based on MedPAC's reports to Congress, Medicare spending for imaging services has been growing rapidly over the past decade.[2] With most of Pakistan's population belonging to the lower and middle class[4], radiological examinations prove to be an expensive component of health care for them.

Pakistan, like other developing countries, faces the problem of low budget allocation to the health sector and thus, struggles with providing quality health care to a plethora of consumers. Providing affordable but good quality essential health services is among the prime is-

sues and goals in the country's health policy agenda.[5]

In Pakistan, there is a large difference in the availability of health services to rich and poor people. The majority of public health facilities are not providing satisfactory care; therefore, people need to go to private facilities which are very expensive and out of reach for the poor people. The government of Pakistan spent 0.75 percent of GDP on the health sector in 2005–06.[6] Majority of the population of low and lower-middle-income countries, due to the lack of health insurance & other such facilities, pay for their health care out-of-pocket.[7-9] This method of payment is considered the weakest method in the health sector, with the greatest chances of financial risk.[10] Out-of-pocket payment is the prevalent method in our country. In such a scenario, if the prices of health facilities are too high, then patients are often hesitant to carry on with the prescribed investigations and treatment, often having to unwillingly go without them or fall into debt for it.[11]

Thus, it is very important to keep a close watch on the affordability of health care in a developing country like ours. This cannot be achieved without surveying the financial status of the patients in different facilities from time to time. This assessment provides the necessary overview which helps in modifying the health policies for the provision of good quality affordable health care to the population. Our study aims to determine the socio-economic status of patients availing Computed Tomography and Magnetic Resonance Imaging at the Radiology Department, Hayatabad Medical Complex.

METHODOLOGY

The study used a cross-sectional survey technique, which was conducted in the Radiology Department of Hayatabad Medical Complex, Peshawar. The study population included patients availing of CT and MRI facilities. Systematic random (interval) sampling method was used to collect data. Data was collected through an open-ended questionnaire which was developed after a considerable amount of literature review from Pakistan and other developing countries. A pilot study was conducted, and necessary changes were made to the questionnaire to ensure all questions were intelligible and validated. Questions were asked concerning the occupation, education & monthly household income of the patient. The cost of radiological investigation utilized was documented. This study was conducted between August 2018 and January 2019. The sample size was calculated using a 95% confidence level with a 5% of margin of error. Data was collected from 355 patients. Verbal informed consent was obtained from the study participants. Anonymity and confidentiality of the participants were maintained throughout the research process. Socio-Economic Classification means information about education, occupation & monthly household income was collected to estimate the socioeconomic class of the patients. They were then divided into 5 socioeconomic classes according to the Kuppuswamy's socio-economic status (SES) scale(12) which is a widely used scale for measuring the socioeconomic status of an individual in the urban community.[13,14]

The occupational category of the profession includes persons who are having higher positions and are involved in the decision-making process. Most of them have received high education. This category includes doctors, administrative officers, lecturers, principles, and managers. The semi-professional group includes occupations that involve college education such as engineers, junior doctors, junior assistants, etc. To the semi-skilled group belong all those persons who need some training to do their routine job efficiently for example Labourer, attendant, and cleaner. Extracted data was analyzed using descriptive and analytical analysis

Practice questions were asked before the questions on knowledge, to reduce bias. Each question in the questionnaire had a range of 2-5 options and each response was assigned a score of 0-2. The responses to each question were compared with the predefined score. The ideal practices were scored as 2, good practices as 1, and poor practices as 0. Based on this, the total score was calculated for each respondent. SPSS version 21 was used to analyze the data and presented in the form of frequency and percentage tables Spearman test was used to find the correlation between knowledge and practice among undergraduate dental students

RESULTS

A total of 355 patients were assessed. Among them 215 were males (60.56%) & 140 were females (39.43%). According to our study, 307 out of 355 patients were 18 years or above in age comprising 86.5% of the study population, whereas only 48 patients were below 18 years of age (13.5%). Approximately 41% of patients were from urban areas, 32% from semi-urban whereas 27% were from rural areas. Patients were classified into the upper, upper-middle, lower-middle, upper-lower & lower socioeconomic classes based on the socioeconomic status scale of Kuppuswamy's. Modified Kuppuswamy's scale was used according to the updated CPI (IW) for the year 2018(15). According to this scale, patients were scored on the basis of occupation, education, and monthly household income, as shown in Table 1. Monthly income values in tables 1 and 2 are given in Pakistani rupees after they were converted from Indian rupees and rounded to the nearest 100.

Majority of the patients i.e., 138 out of 355 scored between 11 to 15 on the scale, and were belonging to the lower-middle socio-economic class and represented a 38.87% of the study population. Second,

Table 1: Scorecard of socioeconomic status scale of kuppuswamy (1976).

Variable		Score
Education	Professional or honours	7
	Graduate or postgraduate	6
	Intermediate or post-high-school diploma	5
	High school certificate	4
	Middle school certificate	3
	Primary school or literate	2
	Illiterate	1
Occupation	Profession	10
	Semi-profession	6
	Clerical, shop-owner, farmer	5
	Skilled worker	4
	Semi-skilled worker	3
	Unskilled worker	2
	Unemployed	1
Family income per month (in PKR)*	>2000	12
	1000 - 1999	10
	750 - 999	6
	500 - 749	4
	300 - 499	3
	101 - 299	2
	<100	1

Upper (1) 26 - 29
Middle, Upper middle (2) 16 - 25
Lower middle (3) 11 - 15
Lower, Upper lower (4) 5 - 10
Lower (5) < 5

Table 2: Modified family income groups in Pakistani Rupee (PKR)

Family income per month (in PKR)*	Score
>131101	12
65501 – 131100	10
49201 – 65500	6
32801 – 49200	4
19701 – 32800	3
6601 – 19700	2
<6600	1

Table 3: Socio-Economic class of patients

Kuppuswamy's score	SES	CT	MRI
26 - 29	Upper	15	14
16 - 25	Upper middle	45	24
11 - 15	Lower middle	100	38
5 – 10	Upper lower	50	27
<5	Lower	30	12

the highest percentage of patients were from the upper lower stratum, with a score between 5 – 10, constituting 21.69% (77 out of 355). 19.44% were from upper-middle households whereas 11.83% were from lower socioeconomic classes. The least i.e., 8.17% belonged to the high socio-economic stratum; as shown in table 3. The average monthly household income in the lower-middle-income group was calculated to be approximately Rs. 15,000/-.

Approximately 153 (43%) of the patients assessed, either were themselves the sole earner of the family or were from a household with a single earner. 174 out of 355 (49%) patients were found to be dependent on someone else's income; they came under one of the following categories: unemployed (n=12), minor (n=20), student (n=21), retired(n=31), unable to work due to disability, or housewives (n=90).

A total of 347 (98%) patients paid for the investigation using the out-of-pocket method. Approximately 21 (6%) patients utilized the government Zakat fund, Sehat Insaaf card, or 'poor-free' facility for free of cost scan, once they were determined to be eligible for it or relied on donations from other sources. Out of the 355 booked patients, 21 failed to show up for their CT or MRI scans. Out of these, 17 (80.95%) belonged to the lower socioeconomic class whereas the rest i.e., 4 out of 21 (19.04%) belonged to the middle socioeconomic stratum. 35 out of 355 (9.86%) patients reported that they had previously delayed availing of the prescribed scans due to financial constraints or lack of knowledge. Among them, 30 belonged to low SES whereas 5 belonged to middle SES households. In 4 out of 355 patients, the delay had been due to other reasons.

DISCUSSION

The financial aspect of health care is a sensitive subject in developing countries

like Pakistan. There is a lack of health insurance policies and significant financial support from the government. As a result, in terms of health care, low-income and lower-middle-income populations are bearing the brunt of the ongoing financial crisis. These income groups comprise the majority of our overall population.[4] In our study population, the majority of patients were from lower-middle socio-economic groups. These figures coincide with findings from previous local research and surveys.[16-19]

Our data showed that the majority of our study population availing CT and MRI scans were from lower-middle socio-economic class; making up 38.87% of the study population. The average monthly household income in this group was approx. Rs. 15,000/. Second, the highest percentage of patients were from the upper lower class constituting 21.69%, whereas the least belonged to the high socio-economic stratum i.e., 8.17%. Pearce et al in their study revealed that social inequalities exist in the numbers of young people undergoing CT scans with those from deprived areas more likely to do so.[20] Shah et al in their study demonstrated that higher SES is associated with greater diagnostic imaging in NSCLC patients.[21]

Ninety-eight percent of the patients used the out-of-pocket method for payment exposing them to the risk of catastrophic expenditure. Six percent of patients utilized the government Zakat fund, Sehat Insaaf card, or 'poor-free' facility for free cost scan; or relied on donations from other sources. These patients had to suffer from delays in their scans because of the extra time required for the necessary procedure in these 'free of cost methods. Okara et al in a cross-sectional study of almost 50,000 non-institutionalized older adults, costs were cited as a major reason for not obtaining needed care.[22] In studies by Dey et al and Doetsch et al financial instability factors like pension cuts, increased medical care fees and increased

out-of-pocket costs are considered among the main barriers to access to care.[23-24]

Socio-economic status has been linked to health-seeking behaviour and multiple researchers have found a correlation between low socioeconomic status and delay in health seeking[25-27] & missed appointments.[28-29] Our findings seem to further support this association. Out of the 355 booked patients, 21 failed to show up for their CT or MRI scans. Out of these, 17 (80.95%) belonged to the lower socioeconomic class whereas the rest i.e., 4 out of 21 (19.04%) belonged to the middle socioeconomic stratum. 35 out of 355 (9.86%) patients reported that they had previously delayed availing of the prescribed scans due to financial constraints or lack of knowledge. Among them, 30 belonged to low SES whereas 5 belonged to middle SES households. In 4 out of 355 patients, the delay had been due to other reasons.

Keeping a close watch on the affordability of different health commodities is essential to ensure the proper provision of health care to the general population. In our facility, prices of CT & MRI scans currently range from 2500/- to 9500/-, & 4000/- to 7000/- PKR respectively. Additional prices of contrast agents that are required for many of these scans range from 1160/- to 2400/- PKR in the hospital pharmacy. Daye et al in their study showed that increased wait days for advanced imaging significantly increase the likelihood of missed appointments. This effect is most pronounced in patients with lower socioeconomic status.[30] Studies by Harvey et al, Cronin et al and Glover M et al have reported that patients of lower socioeconomic status are an increased likelihood of imaging missed care opportunities.[31-33]

The limiting aspect of our study is that we collected data from a single government hospital which is not representative of all hospitals in the region. Therefore, the demographic and socioeconomic features of pa-

tients assessed in this study may differ from the nationwide data.

This research will contribute to the current knowledge about the relation between socioeconomic status and utilization of health care services. It can aid in policy making concerning diagnostic imaging utilization. Further research on the potential influence of socioeconomic status on the utilization of diagnostic imaging is needed.

◼ CONCLUSION

The socio-economic status of the patients received at our department gives a glimpse of the current general situation of our region. It was found that most of the patients were restricted in terms of their financial resources. The majority of the patients were found to be from lower-middle-class households. Low socioeconomic status was found to be associated with missed appointments & delays in availing the CT and MRI scans.

◼ REFERENCES

1. Health Care Spending and the Medicare Program. [Internet 2016]. [cited 2021 Jun 15]; Available from: www.medpac.gov.

2. Data Book-Rates of low-value service use and spending in Medicare [Internet 2016]. [cited 2021 Jun 23]. Available from URL: https://www.medpac.gov/document-type/data-book/

3. Smith BR, Miglioretti DL, Larson EB. Rising use of diagnostic medical imaging in a large integrated health system. Health Aff (Millwood). 2008;27(6):1491-502. DOI: 10.1377/hlthaff.27.6.1491.

4. World bank data help desk- World bank country and lending groups [Internet 2021]. [cited 2020 Jun 23]. Available from URL:https://datahelpdesk.worldbank.org/knowledgebase/articles/90659-world-bank-country-and-lending-groups

5. Manzoor I, Hashmi NR, Mukhtar F. Determinants And Pattern Of Health Care Services Utilisation In Post Graduate Students. J Ayub Med Coll Abbottabad. 2009;21(3):100-5.

6. Shaikh BT, Hatcher J. Health seeking behaviour and health service utilization in Pakistan: challenging the policy makers. J Public Health (Oxf). 2005;27(1):49-54. DOI: 10.1093/pubmed/fdh207.

7. Home|Pakistan Bureau of Statistics [Internet]. [cited 2021 Jun 15]. Available from: https://www.pbs.gov.pk/

8. Gottret P, Schieber G. Health financing revisited: A practitioner's guide. World Bank Publications; 2006.

9. Health expenditure comparisons: low, middle and high income countries. [cited 2022 Jun 15]. Available from URL: https://espace.curtin.edu.au/handle/20.500.11937/5184

10. McIntyre D, Thiede M, Dahlgren G, Whitehead M. What are the economic consequences for households of illness and of paying for health care in low-and middle-income country contexts? Soc Sci Med. 2006;62(4):858-65. DOI:10.1016/j.socscimed.2005.07.001.

11. Kurji Z, Premani ZS, Mithani Y. analysis of the health care system of Pakistan: Lessons learnt and way forward. J Ayub Med Coll Abbottabad. 2016;28(3):601-604.

12. Sharma R. Revised Kuppuswamy's Socioeconomic Status Scale: explained and updated. Indian Pediatr. 2017;54(10):867-70.

13. Kumar G, Panda N, Roy R, Bhattacharjee G. An observational study to assess the socioeconomic status and demographic profile of advanced cancer patients receiving palliative care in a tertiary-level cancer hospital of eastern India. Indian J Palliat Care. 2018;24(4):496-9. DOI: 10.4103/IJPC.IJPC_72_18.

14. Mughal AR, Sadiq M, Hyder SN, Qureshi AU, A Shah SS, Khan MA, Nasir JA. Socioeconomic status and impact of treatment on families of children with congenital heart disease. J Coll Physicians Surg Pak. 2011;21(7):398-402.

15. Saleem SM. Modified Kuppuswamy scale updated for Year 2018. Indian J Appl Res. 2018;7(3)1-2.

16. Khan N, Nadeem RA, Hussain M. Influence of Education and Socio-Economic Factors on Stage of Cancer Diagnosis: A Study in Pakistani Population. Ann Pak Inst Med Sci. 2016;1815:225-28.

17. Chiragh S, Rehman A, Ahmad S. View of financial toxicity of cancer treatment and its impact on quality of life in tertiary care public sector hospital. J Med Sci. 2017;25(3):313-8.

18. Beg DA, Younas DM, Asma C. DT. Rheumatic heart disease (RHD); Socio-economic and environmental risk factors for acute rheumatic fever (ARF) and rheumatic heart disease (RHD) patients in Pakistan. Prof Med J. 2016;23(03):324-7.

19. S Hashmi. Socio-economic evaluation of the parents of patients under treatment at the oncology unit of the National Institute of Child Health (NICH). Pak Paed J. 2006;30(4):179-83.

20. Pearce MS, Salotti JA, McHugh K, Pyo Kim K, Craft AW, Lubin J, et al. Socio-economic variation in CT scanning in Northern England, 1990-2002. BMC Health Serv Res. 2012;12(1):1-6. DOI:10.1186/1472-6963-12-24.

21. Shah M, Parmar A, Chan KKW. Socioeconomic disparity trends in diagnostic imaging, treatments, and survival for non-small cell lung cancer 2007-2016. Cancer Med. 2020;9(10):3407-16. DOI:10.1002/cam4.2978.

22. Okoro CA, Strine TW, Young SL, Balluz LS, Mokdad AH. Access to health care among older adults and receipt of preventive services. Results from the Behavioral Risk Factor Surveillance System, 2002. Prev Med. 2005;40(3):337-43. DOI: 10.1016/j.ypmed.2004.06.009.

23. Dey S, Nambiar D, Lakshmi JK, Sheikh K, Srinath Reddy K. Health of the elderly in India: Challenges of access and affordability. Washington, D.C. National Academies Press; 2012.

24. Doetsch J, Pilot E, Santana P, Krafft T. Potential barriers in healthcare access of the elderly population influenced by the economic crisis and the troika agreement: a qualitative case study in Lisbon, Portugal. Int J Equity Health. 2017;16(1):184-201. DOI:10.1186/s12939-017-0679-7.

25. Wang N, Cao F, Liu F, Jia Y, Wang J, Bao C, et al. The effect of socioeconomic status on health-care delay and treatment of esophageal cancer. J Transl Med. 2015;13(1):1-5. DOI:10.1186/s12967-015-0579-9.

26. Ouasmani F, Hanchi Z, Haddou Rahou B, Bekkali R, Ahid S, Mesfioui A. Determinants of patient delay in seeking diagnosis and treatment among Moroccan women with cervical cancer. Obstet Gynecol Int. 2016:4840762. DOI: 10.1155/2016/4840762.

27. Ma J, Zhu Q, Han S, Zhang Y, Ou W, Wang H, et al. Effect of socio-economic factors on delayed access to health care among Chinese cervical cancer patients with late rectal complications after radiotherapy. Gynecol Oncol. 2012;124(3):395-8. DOI:10.1016/j.ygyno.2011.11.040.

28. Dougherty B, Cooley S, Deffler R, Davidorf F. Socioeconomic status and missed clinical appointments in age-related macular degeneration. Innov Aging. 2018;2:500-1.

29. Alhamad Z. Reasons for missing appointments in general clinics of primary health care center in Riyadh Military Hospital, Saudi Arabia. Int J Med Sci Public Heal. 2013;2(2):258-67.

30. Daye D, Carrodeguas E, Glover M 4th, Guerrier CE, Harvey HB, Flores EJ. Impact of delayed time to advanced

imaging on missed appointments across different demographic and socioeconomic factors. J Am Coll Radiol. 2018;15(5):713-20. DOI: 10.1016/j.jacr.2018.01.023.

31. Harvey HB, Liu C, Ai J, Jaworsky C, Guerrier CE, Flores E, Pianykh O. Predicting no-shows in radiology using regression modeling of data available in the electronic medical record. J Am Coll Radiol. 2017;14(10):1303-9. DOI: 10.1016/j.jacr.2017.05.007.

32. Cronin PR, DeCoste L, Kimball AB. A multivariate analysis of dermatology missed appointment predictors. JAMA Dermatology. 2013;149(12):1435-7.

33. Glover M 4th, Daye D, Khalilzadeh O, Pianykh O, Rosenthal DI, Brink JA, Flores EJ. Socioeconomic and demographic predictors of missed opportunities to provide advanced imaging services. J Am Coll Radiol. 2017;14(11):1403-11. DOI: 10.1016/j.jacr.2017.05.015.

Author's Contribution

GW conceived the idea, acquired the data, and revised the manuscript. AA contributed to interpreting the data. RT contributed to writing the draft of the manuscript NT, MS helped in acquiring the data. MR helped in data analysis. Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.