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Research Article

HOW DO DIAGNOSTIC FEES RESPOND TO INFLATION IN INDIA?

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Abstract

Diagnostic tests are fundamental for healthcare management and account for a considerable expenditure on healthcare. Therefore, an insight into the trends of diagnostic test fees and the influence of the inflation on this would be relevant from the economic perspective of healthcare. Diagnostic fees for selected radiology and pathology tests from different commercial diagnostic centres for a period of 5 years (2016-2020) have been collected from internet sources and correlated with the inflation rate during the corresponding years. Regression analysis of the average fees for individual test with inflation rate is carried out. The fees for the selected diagnostic tests showed an average 22.28% reduction during the period of 2016-2020. Regression analysis of the fees of individual tests with inflation rates of the corresponding years has recorded a mixed outcome with 4 tests showing positive relation and another 4 tests showing negative relation with inflation rate. The prices have recorded an average reduction of 22.28% during the five years. Further, it can be concluded that the diagnostic tests turn cheaper over the years and the cost of the tests are not much influenced by the inflation rate. The developments in the technologies for the mass may be a factor that leads to the price decline and this is a welcome note from the societal point of view.

Keywords: Diagnostic tests, Radiology, Pathology, Regression analysis.

1. Introduction

Diagnosis is the first and foremost step in the healthcare service, acting as one of the factors determining the success of the disease management. India has emerged as a major market for the diagnostic service industry with plenty of opportunities, attracting different players to this business domain [1]. Pathology and Radiology tests contribute to the major share of the private diagnostic services in India [2]. In general, Indian diagnostic market has reported 15-20% growth with an estimated worth of ₹40,000 Cr [3] during the recent years. Some factors contributing to this surge in demand for diagnostic services include ageing population, rising income levels, increased levels of health consciousness, and psychological inclination of the people towards preventive healthcare. Most of the market surveys and research on the diagnostic service industry have targeted the analysis of the scope, growth potential and revenue generated by various sectors of diagnostic tests [1,3,4]. However, information on the trends on pricing for individual tests by the diagnostic service providers to the customers and the impact of inflation on diagnostic costs is scanty. Considering the importance of this in terms of societal and economic perspectives, this study has focused on the diagnostic fees variation over a period of 5 years for common radiology and pathology tests across India.

2. Methods

Diagnostic fees for the selected tests from different commercial diagnostic centres for a period of 5 years (2016-2020) has been collected from internet sources and compared with the inflation rate during the corresponding years of the data collected. The diagnostic tests considered in this study include common radiology tests (CT scan brain, MRI brain,

Ultrasound abdomen, Ultrasound pregnancy) and pathology tests (Hemogram, Liver function test, Lipid profile, Thyroid profile - T3,T4,TSH). Regression analysis of the average fees for individual test with inflation rate is carried out using SPSS software.

3. Results

Average fees for the individual diagnostic tests selected for the study during 2016-2020 across India has indicated different tends in the fee variation between radiology and pathology diagnostic tests. All the radiology tests have recorded a notable reduction in the average fees across the five year duration except ultrasound scanning of pregnancy, which has recorded uptrend during the last one year (Fig 1). Unlike the radiology tests, pathology diagnostic tests, except hemogram recorded a hike in the fees during 2016-2020 (Fig 1).

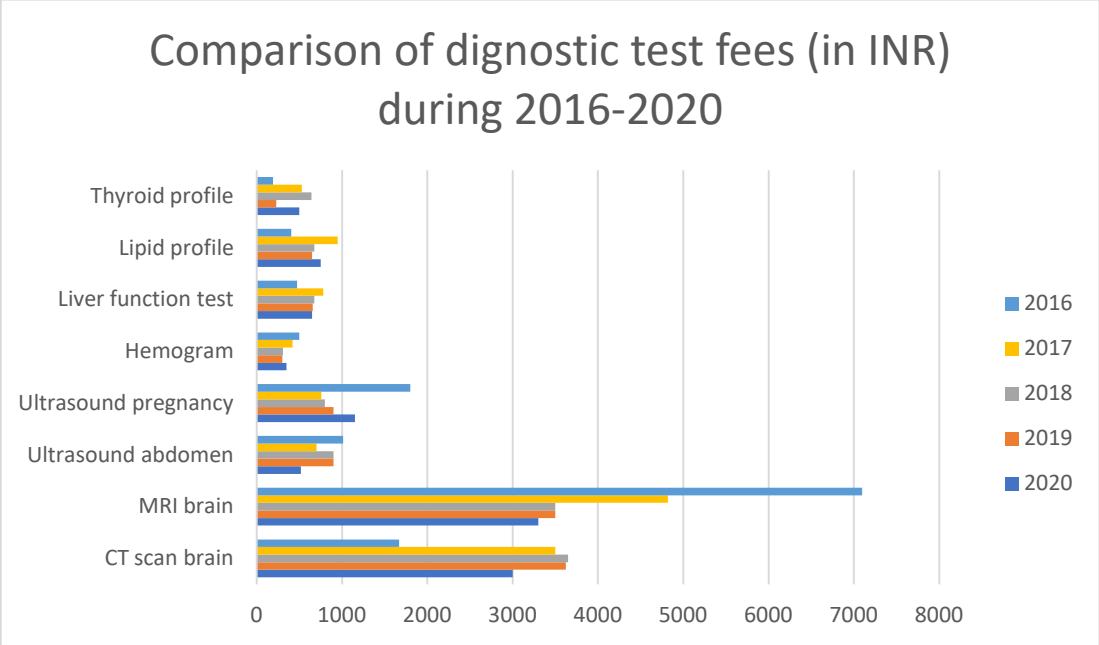

Fig. 1: Comparison of fees for selected diagnostic tests during 2016-2020 [5-15]

The average inflation rate in India during 2016 to 2020 showed fluctuations across the years included in this study (Table 1), with 2019 recording the highest rate of 4.54. Inflation is a very critical factor influencing each and every aspect of the economy and hence selected as the parameter for assessing the fees rise in the diagnostic test service market.

Table1: Inflation rate in India during 2016-2020 [9]

Sl No	Year	Inflation rate
1	2020	3.34
2	2019	4.54
3	2018	3.43
4	2017	3.6
5	2016	4.5

Regression analysis of the selected diagnostic test fees in relation to the inflation rate (Fig. 2a-h and Table 2a-h) has indicated a positive relation between three of the radiology tests except CT scan of the brain, which showed a negative relation with the inflation rate. All the pathology except hemogram . However, a significant level of negative association was recorded in the case of thyroid profile test fees and inflation during the study period.

Fig. 2a: Regression plot for CT scan Brain vs Inflation rate

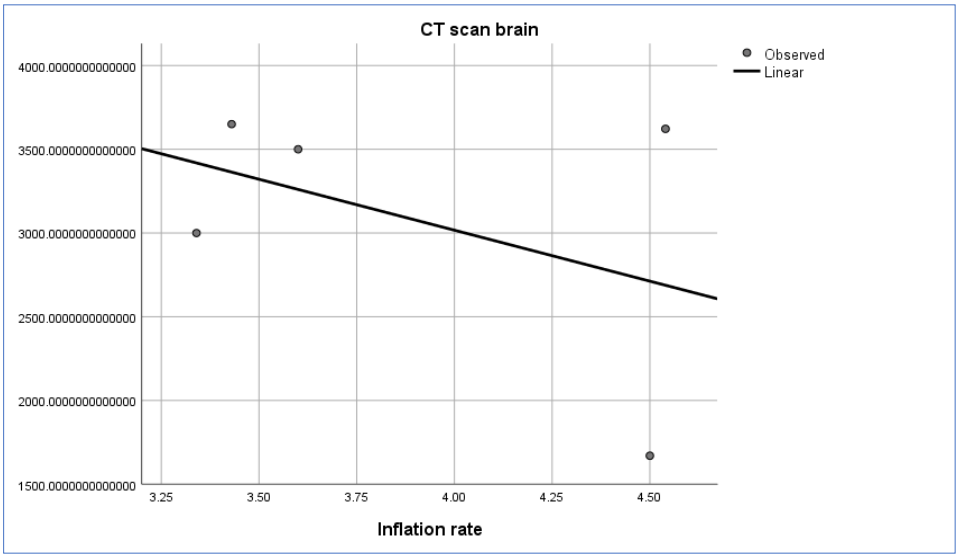

Table 2a: ANOVA (CT scan brain)

	Sum of squares	df	Mean square	F	Sig
Regression	515811.996	1	515811.996	0.681	0.470
Residual	2273339.252	3	757779.751		
Total	2789151.247	4			

The independent variable is inflation rate

Fig. 2b: Regression plot for MRI Brain vs Inflation rate

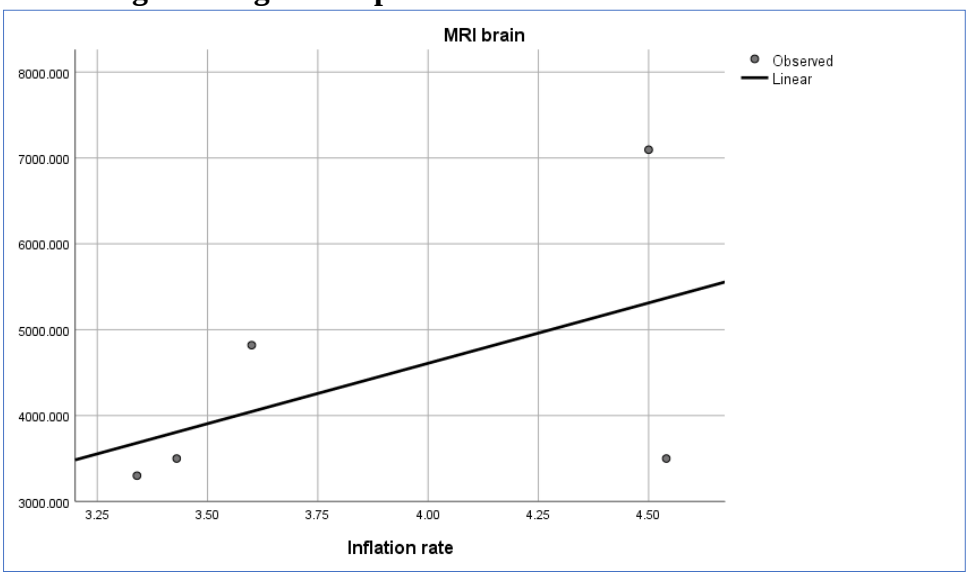

Table 2b: ANOVA (MRI brain)

	Sum of squares	df	Mean square	F	Sig
Regression	2753912.114	1	2753912.114	1.100	0.371
Residual	7509583.198	3	2503194.399		
Total	10263495.313	4			

The independent variable is inflation rate

Fig. 2c: Regression plot Ultrasoud scan abdomen vs Inflation rate

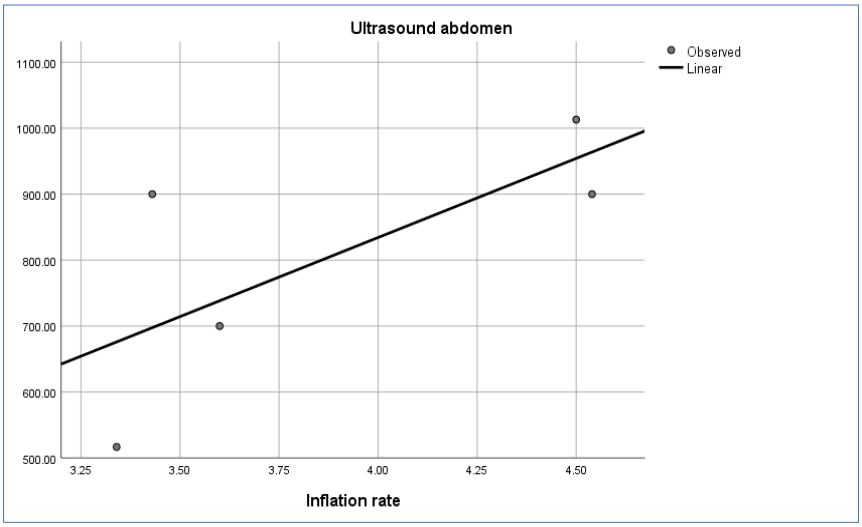

Table 2c: ANOVA (Ultrasound abdomen)

	Sum of squares	df	Mean square	F	sig
Regression	80115.233	1	80115.233	3.189	0.172
Residual	75359.380	3	25119.793		
Total	155474.612	4			

The independent variable is inflation rate

Fig. 2d: Regression plot for Ultrasound pregnancy scan vs Inflation rate

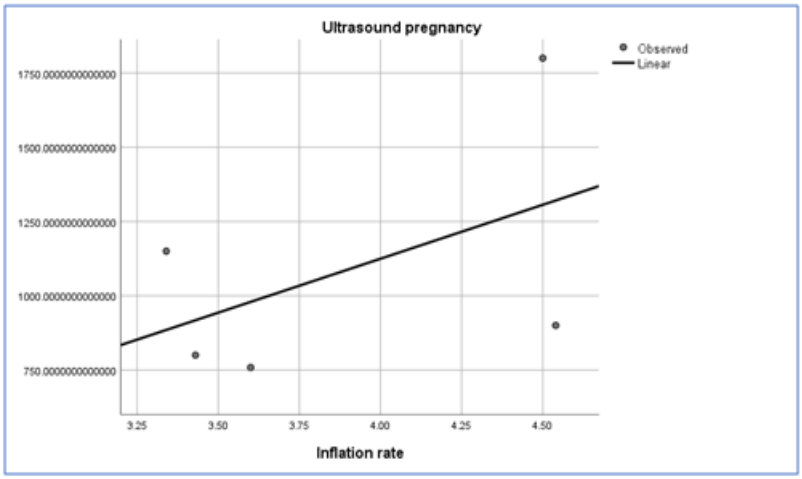

Table 2d: ANOVA (Ultrasound pregnancy)

	Sum of squares	df	Mean square	F	Sig
Regression	183712.727	1	183712.727	0.995	0.392
Residual	553688.905	3	184562.968		
Total	737401.633	4			

The independent variable is inflation rate

Fig. 2e: Regression plot for Hemogram vs Inflation rate

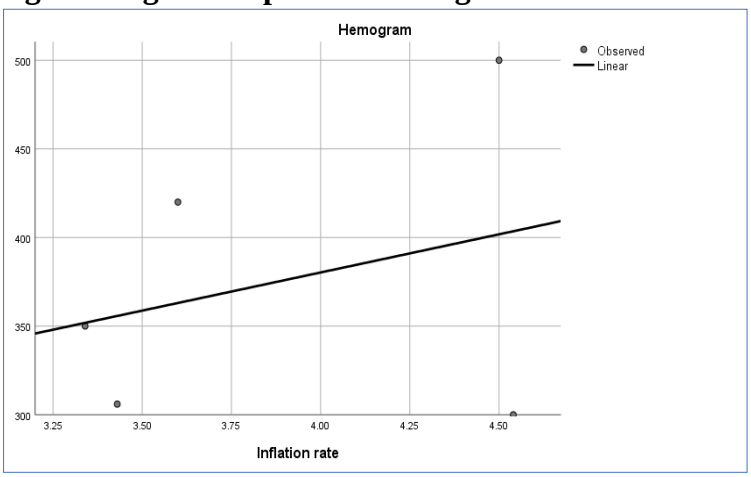

Table 2e: ANOVA (Hemogram)

	Sum of squares	df	Mean square	F	sig
Regression	2580.836	1	2580.836	0.297	0.624
Residual	26079.964	3	8693.321		
Total	28660.800	4			

The independent variable is inflation rate

Fig. 2f: Regression plot for Lipid profile vs Inflation rate

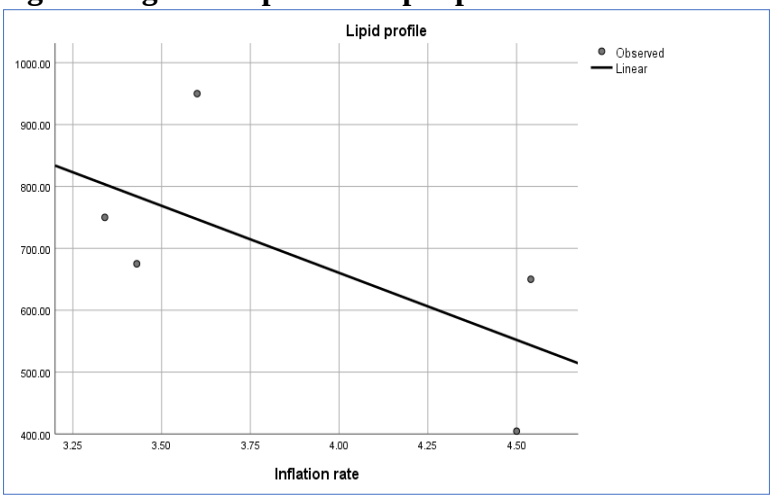

Table 2f: ANOVA (lipid profile)

	Sum of squares	df	Mean square	F	sig
Regression	2580.836	1	2580.836	0.297	0.624
Residual	26079.964	3	8693.321		
Total	28660.800	4			

The independent variable is inflation rate

Fig. 2g: Regression plot for Livers fuction test vs Inflation rate

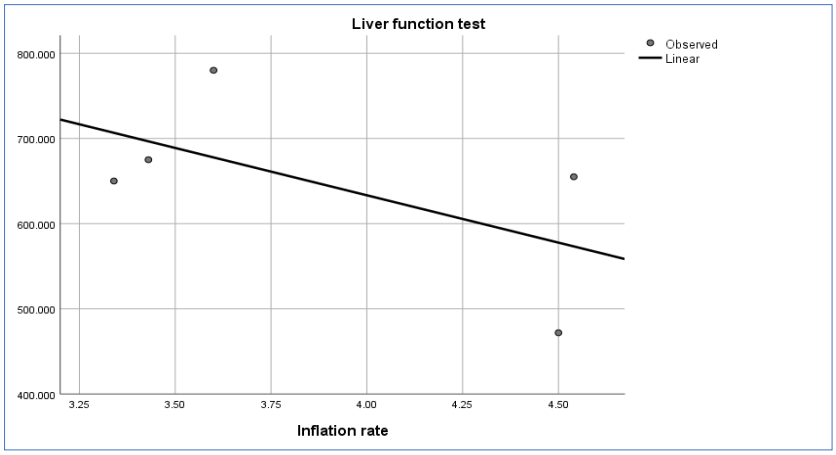

Table 2g: ANOVA (Liver function test)

	Sum of squares	df	Mean square	F	sig
Regression	17196.133	1	17196.133	1.612	0.294
Residual	32011.793	3	10670.598		
Total	49207.927	4			

The independent variable is inflation rate

Fig. 2g: Regression plot for Thyroid profile vs Inflation rate

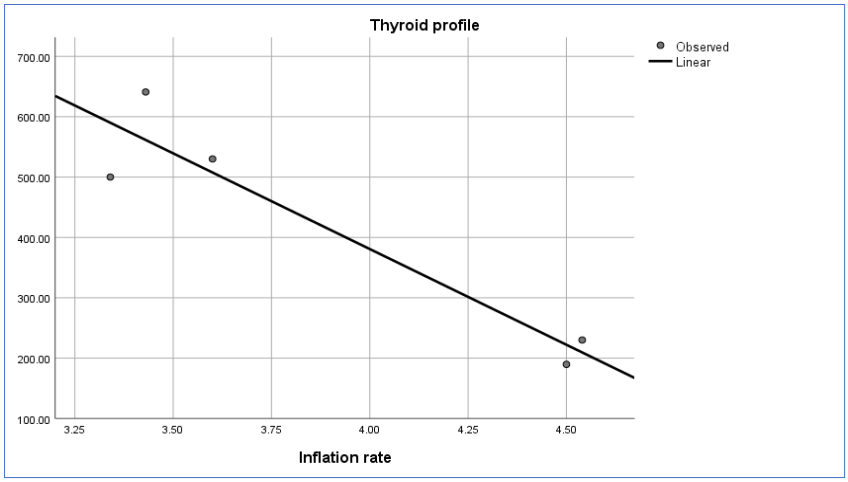

Table 2g. ANOVA (thyroid profile)

	Sum of squares	df	Mean square	F	sig
Regression	140072.218	1	140072.218	25.611	0.015
Residual	16407.850	3	5469.283		
Total	156480.068	4			

The independent Variable is inflation rate

Interestingly, average of the fees of all the eight tests, has recorded a 22.28% decline during the last five years (Table 3), indicating a declining trend of the diagnostic fees over the years.

Table 3: Overall trend of diagnostic fees during 2016-2020

Year	Average fees for the 8 diagnostic tests*	Overall % decline in diagnostic test fees
2020	1277.083	22.28
2019	1344.618	
2018	1393.375	
2017	1557.321	
2016	1643.089	

*CTB: CT Scan Brain; MRIB: MRI Brain; USAB: Ultrasound Abdomen; USP: Ultrasound Pregnancy; HGM: Hemogram ; LF: Liver Function; LP: Lipid Profile; TP: Thyroid Profile.

4. Discussion

Diagnostic service industry has attained the vital status with complications related to human health, emerging new diseases, and advancement of technologies for diagnosis. In fact, cost of diagnosis accounts for a considerable share of the healthcare expenditure [16]. Therefore, knowing the trends of cost for common diagnostic tests in the market will be useful for the takers as well the service providers. The diagnostic service industry has recorded a phenomenal growth during the recent years [1,3,4]. The rising number of infectious diseases, upward trend in the lifestyle-related diseases, remarkable increase in Indian population enhanced budget for healthcare, and societal preference towards preventive health check-ups are the major factors driving the growth of diagnosis service industry [1,3,6]. Wide variation in the cost of diagnostic tests across different service providers is a common phenomenon throughout the world [19]. Hence knowing the cost of specific tests is important in budgeting for health care expenses. The trend in the average cost of eight common diagnostic tests in India during a 5 year period has confirmed a general decline in the cost from 2016 to 2020. Regression analysis of the 8 diagnostic test prices with inflation rate has yielded negative association for 4 tests and positive association for another 4 tests. A significant negative association has been confirmed for thyroid profile test. Therefore, it can be concluded that the diagnostic tests turn cheaper over the years and the cost of the tests are not much influenced by the inflation rate.

5. Conclusion

Diagnostic service industry has attained the vital status with complications related to human health, emerging new diseases, and advancement of technologies for diagnosis. In fact, diagnostic tests account for a considerable share of the healthcare cost. Therefore, knowing the trends of cost for common diagnostic tests in the market will be useful for the takers as well the service providers. The diagnostic service industry has recorded a phenomenal growth during the recent years. The rising number of infectious diseases, upward trend in the lifestyle-related diseases, remarkable increase in Indian population enhanced budget for healthcare, and societal preference towards preventive health check-ups are the major factors contributing to the growth of diagnosis service industry. Wide variation in the cost of diagnostic tests across different service providers is a common phenomenon throughout the world. Hence knowing the cost of specific tests is important preparing a budget for health care expenses. The trend in the average cost of eight common diagnostic tests in India during a 5 year period has confirmed a general decline in the cost from 2016 to 2020. Regression analysis of the 8 diagnostic test prices with inflation rate has yielded negative relation for 4 tests and positive relation for another 4 tests, but a negative significant relation has been confirmed only between thyroid profile test and inflation rate. Therefore, it can be concluded that the diagnostic tests turn cheaper over the years and the cost of the tests are not much influenced by the inflation rate. The developments in the technologies for the mass may be a factor that leads to the price decline and this is a welcome note from the societal angle.

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