

Clinical Utility and Cost Effectiveness of Complement 3 and Complement 4 in Different Clinical Subspecialties in Hamad Medical Corporation

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BACKGROUND

Complement proteins 3 (C3) and 4 (C4) are key biomarkers of disease activity, commonly done in clinical immunology laboratory at Hamad Medical Corporation (HMC).

INTRODUCTION

C3 and C4 are core plasma proteins activated in numerous diseases including autoimmune diseases [1], sepsis [2], and many others.

Correct medical decisions are based on laboratory results. However, appropriate utilization of C3/C4 by clinicians is essential in maintaining laboratory and financial resources of HMC.

OBJECTIVES

- To study the clinical utility of C3 and C4 in different clinical subspecialties in HMC.
- To study the cost effectiveness of C3 and C4 among different clinical subspecialties HMC.

METHODS

A retrospective study, on electronic medical records of 326 patients tested between 1st January and 31 March 2017 in clinical immunology laboratory at HMC, Doha-Qatar.

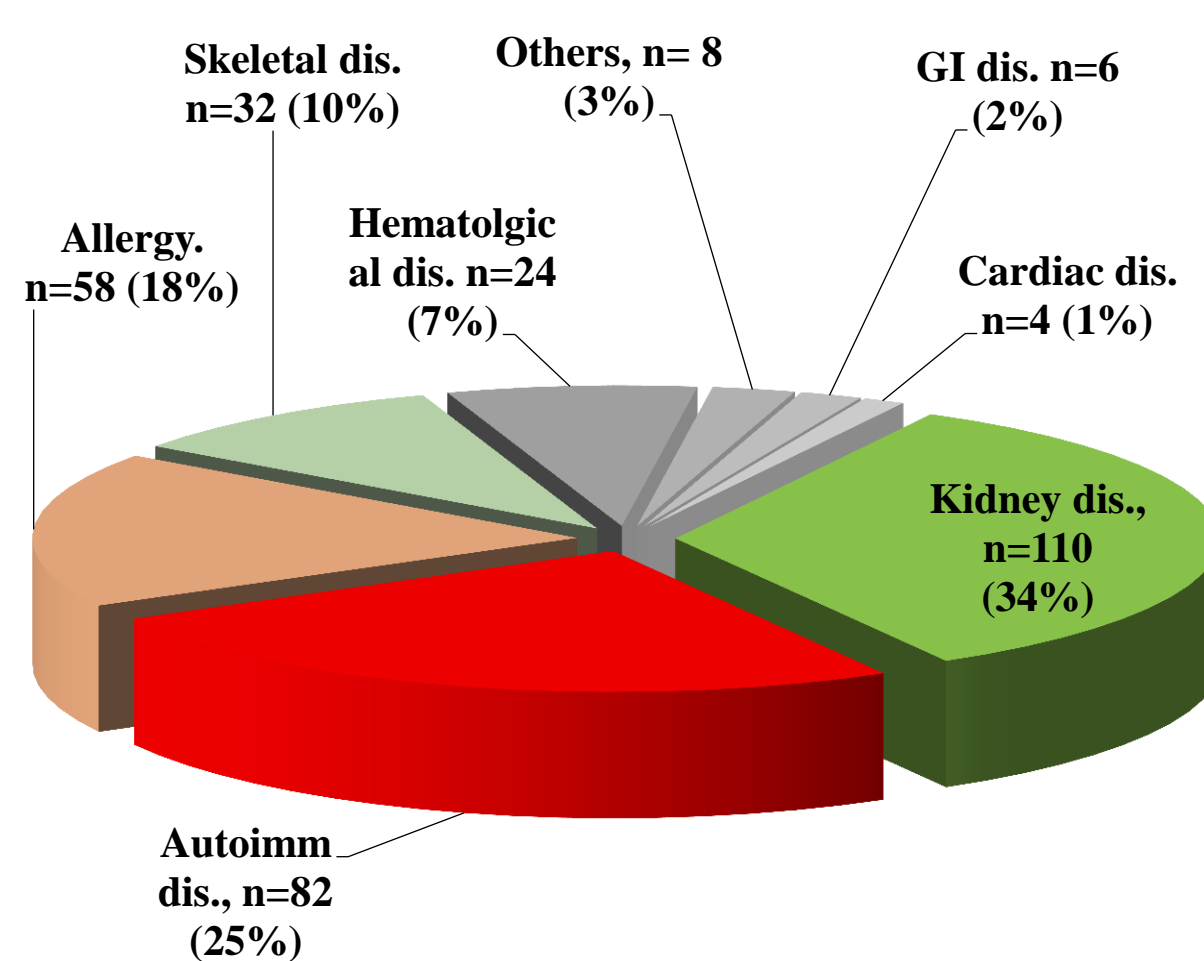
The data collected included patient's demographical, disease categories, complement test results and financial cost.

Descriptive statistics (median, mean, range, frequency and percentages), and Chi square analysis were calculated.

Table 1: Basic demographics data of 326 patients with C3 and C4 tests

Variables	Number (%)
Total Patient	326 (100%)
Age (yrs., mean ± SD)	36±17.6
Age category	
5 months-14 years	47 (14%)
15-65 years	271 (81.6%)
>65 years	18 (5.4%)
Sex	
Male	148 (45.4%)
Female	178 (54.6%)
Male: Female ratio	0.8:1

Fig 1: Distribution of patients according to disease type.

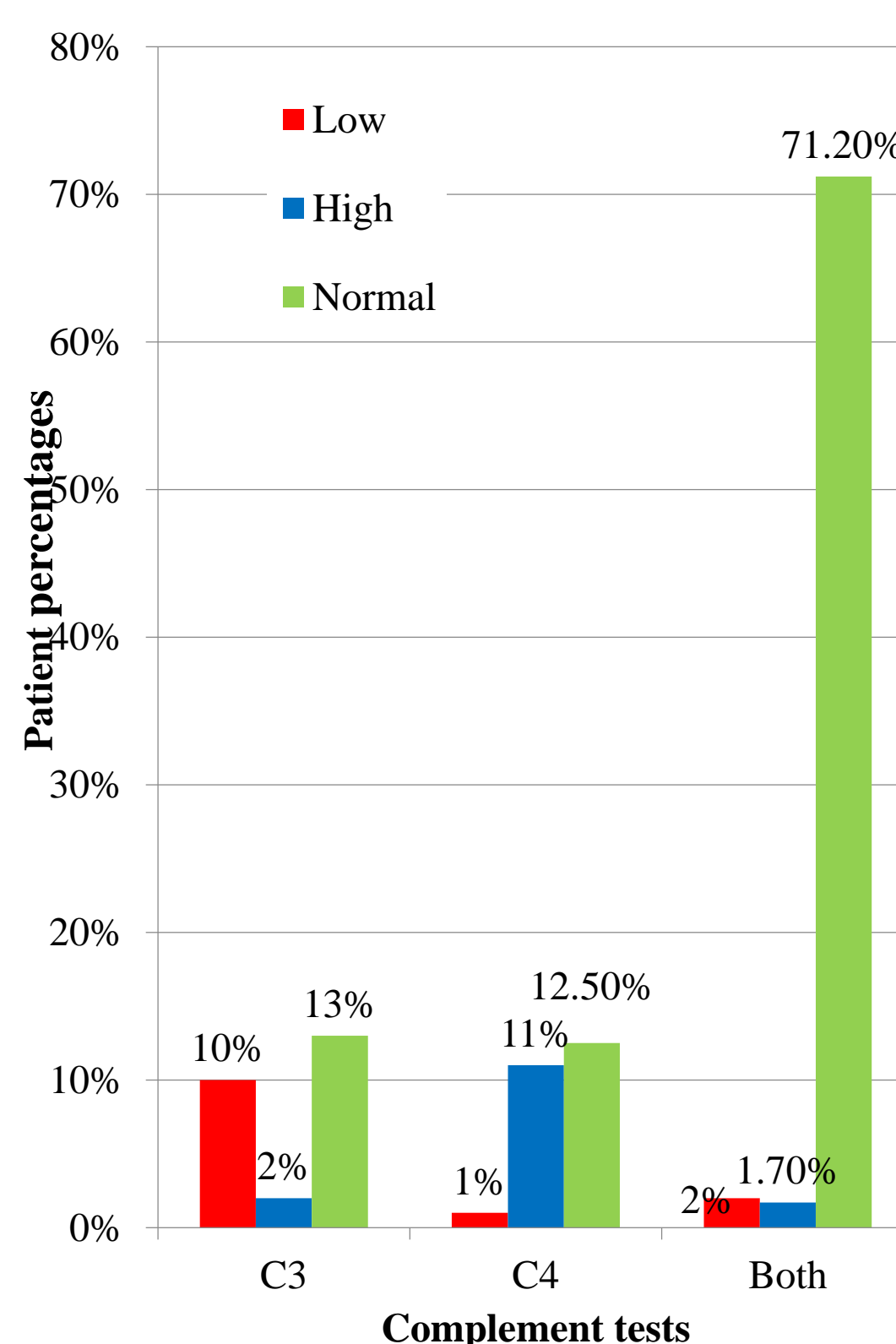


The top 3 diseases constituted 77% of all diseases where C3 and C4 tests were ordered as:

- Kidney diseases: 34%
- Autoimmune diseases: 25%
- Allergic diseases: 18%.

RESULTS

Fig 2: Percentages of C3, C4, and both in patients.



Abnormal C3 and C4: 29%
Low C3/C4: 13%
High C3/C4: 16%

Table 2: Calculation of C3 and C4 cost at HMC.

Cost type	Phase	Mean cost (QR)
Direct Cost	Pre-Analytical phase *	6.16
	Analytical phase**	12.12
Indirect Cost		3.65
Total		21.93

Table 3: Cost of C3, C4, or both in private healthcare providers across Qatar

Private HC Providers	Cost (QR)		
	C3	C4	Both
Hospital 1	150	150	300
Hospital 2	150	150	300
Lab 1	300	300	600
Lab 2	190	190	380
Average	197.5	197.5	395
SD	70.88 723	70.88 723	141.7 745

CONCLUSIONS

This is the first study of its kind to address the clinical utility and cost effectiveness of C3 and C4 test at HMC-Qatar. Although the cost of a single test of C3 or C4 is low, the total annual cost is huge. The treating physician is recommended to exercise judicious clinical wisdom when ordering C3 or C4 tests as diagnostic tools.

REFERENCES

- Thurman and Yapa R. Front Immunol. 2019;10:672.
- Karasu E, et al. Front Immunol. 2019;10:543.

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- It was approved by IRB at HMC, Protocol, No: MRC-01-19-089.