

List of Contents

Contents	Page. No
Dedication	I
Acknowledgment	II
Abstract in Arabic	III
Abstract in English	IV
List of contents	V
List of tables	IX
List of figures	XI
Chapter (1): Introduction and literature Review	
1. 1General introduction	1
1.1.1.The History Of Blood Transfusion Medicine	2
1.1.2. Blood Group Antigens And Antibodies	3
1.1.3. Antigens	3
1. 1.4. Antibodies	4
1.2. General Introduction of ABO System	4
1.2. 1. Antigens Of ABO Blood Group System	5
1.2.2. The sub groups of A	6
1.2.3. The H antigen	6
1.2.4. Secretors and non secretors	6
1.2.5..Development of the A, B and H antigens	11
1.2.6. Antibodies Of ABO Blood Group System	11
1.3.General Introduction of Kell System	14
1.3.1. Nomenclature (Notation)	15
1.3.2.Genetics and Inhirtance Of Kell Antigens	18
1.3.3.Antigens Of Kell Blood Group System	19

1.3.3.1. Antigens K (K1) and k (K2)	19
1.3. 3.2.The Numbers of K and k Antigen sites	20
1.3.3.3. Antigens Kp ^a (K3) , Kp ^b (K4) , and Kp ^c (K21)	20
1.3.3.4. Antigen Js ^a (K6) and Js ^b (K7)	21
1.3.3.5. Other Antigens Of The Kell system	21
1.3.3.5.1. Antigen Kw (K8)	21
1.3.3.5.2. Antigen Kl (Class) (K9)	21
1.3.3.5.3. Antigen UI ^a (K10)	21
1.3.3.5.4. Antigen K11 (cote)	22
1.3.3.5. 5.Antigen K12 (Boc)	22
1.3.3.5.6.Antigen K13 (Sgro)	22
1.3.3.5.7.Antigen K14 (San)	22
1.3.3.5.8.Antigen K 15(Kx)	22
1.3.3.5.9.Antigen K16	23
1.3.3.5.10.Antigen K17 (weeks,wk ^a)	23
1.3.3.5.11.Antigen K18	23
1.3.3.5.12.Antigen K19	23
1.3.3.5.13.Antigen Km (K20)	23
1.3.3.5.14.Antigen Bar (K22)	24
1.3.3.5.15.Antigen K23	24
1.3.3.5.16.Antigen Cls (K24)	24
1. 3.3.6. The Ko Phenotype	26
1.3.3.7. Depressed Kell Antigens	26
1.3. 3.7.1.The Mcleod phenotype	26
1.3.3.7.2. Hemolytic Anemia	28
1.3 3.7.3. Other Depressed kell Antigens	28

13.3.8 Biochemistry of Kell system Antigens	31
1.3. 3.9.Other Notes On The Kell Antigens	32
1.3 .3..10 The Development of Kell antigens.	32
1.3.3.11.Kell antigens on cells other than Red cells	33
1.3.4.The Antibodies Of The Kell System	33
1.3.4.1. Clinical significance of Kell antibodies	33
1.4.Objectives of the study	37
1.4. 1 General objectives	37
1.4.2.Specific objectives	37
1.5 Rational	38
Chapter (2): Materials and method	
2.1.Geographical Distribution Of the Manaseer tribe	39
2.2. Study design	39
2.3. Study Area	39
2.4 Study population	39
2.4.1.. Selection criteria	39
2.5. Data collection	39
2.6. Sample size and type	40
2.7. Methods	40
2.7.1. Sample collection method	40
2.7.2 . ABO grouping method: (Slide Method)	41
2.7.2.1. Requirements	41
2.7.2.2. Principle of ABO slide grouping method	41
2.7.2.3. Test procedure	41
2.7.2.4. Interpretation of results	41
2.7.3. Rh (D) typing (Slide method)	42

2.7.3.1.Interpretation	42
2.7.4. Kell grouping method	42
2.7.4.1. Gel Immune Diffusion Technique	42
2.8. Ethical consideration	44
2.9. Data processing and presentation	45
Chapter 3 : The results	46
Chapter 4: Discussion	
4.1.Discussion	60
4.2. conclusions and Recommendation	63
4.2.1.Conclusion	63
4.2.2. Recommendation	64
Chapter 5: References	65

List of tables

Table NO	Table Name	Page NO
1.1	ABO system groups-Antigens-Antibodies	8
1.2	Number of A and B antigen sites on red cells of various A and B groups	9
1.3	Incidence of ABO blood groups in Britain .	13
1.4	Antigens of the Kell blood group system: Nomenclature	17
1.5	The antigens of the Kell system together with their numerical equivalents and antigen frequency. ¹⁷	25
1.6	Miss Shakila Ashraf in 2001 established the percentage of K_1 and K_2 and their gene frequency among Pakistani population	29
1.7	Frequency of k_1 antigen in different populations	30
1.8	The 8 gene complex, 36"Pairings" and 27 phenotypes, theoretically possible in the Kell system using 6 Kell antisera	35
3.1	Frequency of ABO blood group in Almnaseer ethnic group	47
Table NO	Table Name	Page NO

3.2	Frequency of Rh blood group in Almnaseer ethnic group	49
3.3	Table(4.3) Frequency of K1 blood group in Almnaseer ethnic group	51
3.4	Frequency of K2 blood group in Almnaseer ethnic group	53
3.5	Corelation between K ₁ antigen and ABO blood groups in Almnaseer ethnic group	55
3.6	Corelation between K ₂ (k) antigen and ABO blood groups in Almnaseer ethnic group	57

List of figures

Table NO	figure Name	page NO
10	Pathways from HAB Blood group genes to antigens	1.1
48	Frequency of ABO Blood Group in Almnaseer ethnic group	3.1
50	Frequency of Rh Antigen in Almnaseer ethnic group	3.2
52	Frequency of K1 Antigen in Almnaseer ethnic Group	3.3
54	Frequency of K2 Antigen in Almnaseer ethnic Group	3.4
56	Correlation between ABO Blood Group and K1 antigen in Almnaseer ethnic Group	3.5
58	Correlation between ABO Blood Group and K2 antigen in Almnaseer ethnic Group	3.6
59	Correlation between ABO Blood Group and Rh antigen in Almnaseer ethnic Group	3.7