Supplementary file

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Facility readiness for diagnosis and management of glomerular diseases in low-resource settings

Glomerular disease accounts for 20-40% of chronic kidney disease, more so in low-resource settings. The understanding of glomerular disease has graduated from a pattern-based to etiopathogenesis based classification.

The contemporaneous understanding of glomerular diseases necessities access to proper diagnostic modalities including serological tests and ability to do and read a kidney biopsy.

Likewise, the treatment of these conditions is evolving from toxic non-specific immunosuppressive to novel targeted therapy. The examples include rituximab/Obinutuzumab in primary membranous nephropathy and belimumab in lupus nephritis.

The challenges in diagnosis and management of glomerular disease are unique in resource-limited nations. Acknowledging and realising the magnitude of the problem is the first step to unravelling the optimal solution.

So, we intend to carry a survey to know the challenges in diagnosing and managing glomerular diseases in limited-resource nations.

*Required

1. I understand and consent to participate in this survey *

Mark only one oval.

- Yes
- No

Please answer a few questions about yourself and your practice

2. How old are you *

Mark only one oval.

- Less than 30 years
- 30-39 years
- 40-49 years
- 50-59 years
- 60 years or older

3. What is the country of your practice? *

Mark only one oval.

- Afghanistan
- Albania
- Algeria
- Andorra
- Angola
- Antigua & Deps
- Argentina
- Armenia
- Australia
- Austria
- Azerbaijan
- Bahamas
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium
- Belize
- Benin
- Bhutan
- Bolivia
- Bosnia Herzegovina
- Botswana
- Brazil
- Brunei
- Bulgaria
- Burkina
- Burundi
- Cambodia
- Cameroon
- Canada
- Cape Verde

- [ ] Central African Rep
- [ ] Chad
- [ ] Chile
- [ ] China
- [ ] Colombia
- [ ] Comoros
- [ ] Congo
- [ ] Congo {Democratic Rep}
- [ ] Costa Rica
- [ ] Croatia
- [ ] Cuba
- [ ] Cyprus
- [ ] Czech Republic
- [ ] Denmark
- [ ] Djibouti
- [ ] Dominica
- [ ] Dominican Republic
- [ ] East Timor
- [ ] Ecuador
- [ ] Egypt
- [ ] El Salvador
- [ ] Equatorial Guinea
- [ ] Eritrea
- [ ] Estonia
- [ ] Ethiopia
- [ ] Fiji
- [ ] Finland
- [ ] France
- [ ] Gabon
- [ ] Gambia
- [ ] Georgia
- [ ] Germany
- [ ] Ghana
- [ ] Greece
- [ ] Grenada

- [ ] Guatemala
- [ ] Guinea
- [ ] Guinea-Bissau
- [ ] Guyana
- [ ] Haiti
- [ ] Honduras
- [ ] Hungary
- [ ] Iceland
- [ ] India
- [ ] Indonesia
- [ ] Iran
- [ ] Iraq
- [ ] Ireland {Republic}
- [ ] Israel
- [ ] Italy
- [ ] Ivory Coast
- [ ] Jamaica
- [ ] Japan
- [ ] Jordan
- [ ] Kazakhstan
- [ ] Kenya
- [ ] Kiribati
- [ ] Korea North
- [ ] Korea South
- [ ] Kosovo
- [ ] Kuwait
- [ ] Kyrgyzstan
- [ ] Laos
- [ ] Latvia
- [ ] Lebanon
- [ ] Lesotho
- [ ] Liberia
- [ ] Libya
- [ ] Liechtenstein
- [ ] Lithuania

- [ ] Luxembourg
- [ ] Macedonia
- [ ] Madagascar
- [ ] Malawi
- [ ] Malaysia
- [ ] Maldives
- [ ] Mali
- [ ] Malta
- [ ] Marshall Islands
- [ ] Mauritania
- [ ] Mauritius
- [ ] Mexico
- [ ] Micronesia
- [ ] Moldova
- [ ] Monaco
- [ ] Mongolia
- [ ] Montenegro
- [ ] Morocco
- [ ] Mozambique
- [ ] Myanmar, {Burma}
- [ ] Namibia
- [ ] Nauru
- [ ] Nepal
- [ ] Netherlands
- [ ] New Zealand
- [ ] Nicaragua
- [ ] Niger
- [ ] Nigeria
- [ ] Norway
- [ ] Oman
- [ ] Pakistan
- [ ] Palau
- [ ] Panama
- [ ] Papua New Guinea
- [ ] Paraguay

- [ ] Peru
- [ ] Philippines
- [ ] Poland
- [ ] Portugal
- [ ] Qatar
- [ ] Romania
- [ ] Russian Federation
- [ ] Rwanda
- [ ] St Kitts & Nevis
- [ ] St Lucia
- [ ] Saint Vincent & the Grenadines
- [ ] Samoa
- [ ] San Marino
- [ ] Sao Tome & Principe
- [ ] Saudi Arabia
- [ ] Senegal
- [ ] Serbia
- [ ] Seychelles
- [ ] Sierra Leone
- [ ] Singapore
- [ ] Slovakia
- [ ] Slovenia
- [ ] Solomon Islands
- [ ] Somalia
- [ ] South Africa
- [ ] South Sudan
- [ ] Spain
- [ ] Sri Lanka
- [ ] Sudan
- [ ] Suriname
- [ ] Swaziland
- [ ] Sweden
- [ ] Switzerland
- [ ] Syria
- [ ] Taiwan

- [ ] Tajikistan
- [ ] Tanzania
- [ ] Thailand
- [ ] Togo
- [ ] Tonga
- [ ] Trinidad & Tobago
- [ ] Tunisia
- [ ] Turkey
- [ ] Turkmenistan
- [ ] Tuvalu
- [ ] Uganda
- [ ] Ukraine
- [ ] United Arab Emirates
- [ ] United Kingdom
- [ ] United States
- [ ] Uruguay
- [ ] Uzbekistan
- [ ] Vanuatu
- [ ] Vatican City
- [ ] Venezuela
- [ ] Vietnam
- [ ] Yemen
- [ ] Zambia
- [ ] Zimbabwe

4. For how long have you been involved in the care of patients with glomerular diseases? *

Mark only one oval.

- ◯ <5 Years
- ◯ 5-10 Years
- ◯ 11-20 Years
- ◯ >20 years
- ◯ I am not at all involved in the care of patients with glomerular diseases

Role

5. What best describes your role (choose one)? *

Mark only one oval.

- ◯ Nephrologist
- ◯ General physician
- ◯ Pediatrician
- ◯ Pathologist
- ◯ Nurse
- ◯ Other non-physician provider involved in care of patients with kidney disease
- ◯ Non-medical kidney health stakeholder
- ◯ Other: _____

6. What best describes your practice *

Mark only one oval.

- ◯ Solo practice
- ◯ Group practice
- ◯ Academic/university hospital
- ◯ Private hospital

7. What kind of patients do you manage? *

Mark only one oval.

- ◯ Adults only
- ◯ Children only
- ◯ Both adults and children

8. Did you receive whole or part of your nephrology training outside your home country? *

Mark only one oval.

- ◯ Yes
- ◯ No *Skip to question 11*

Nephrology training

9. If you selected yes in the last question, please select the country where you received your training *

Mark only one oval.

- Afghanistan
- Albania
- Algeria
- Andorra
- Angola
- Antigua & Deps
- Argentina
- Armenia
- Australia
- Austria
- Azerbaijan
- Bahamas
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium
- Belize
- Benin
- Bhutan
- Bolivia
- Bosnia Herzegovina
- Botswana
- Brazil
- Brunei
- Bulgaria
- Burkina
- Burundi
- Cambodia
- Cameroon
- Canada

- [ ] Cape Verde
- [ ] Central African Rep
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- [ ] Chile
- [ ] China
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- [ ] Nauru
- [ ] Nepal
- [ ] Netherlands
- [ ] New Zealand
- [ ] Nicaragua
- [ ] Niger
- [ ] Nigeria
- [ ] Norway
- [ ] Oman
- [ ] Pakistan
- [ ] Palau
- [ ] Panama
- [ ] Papua New Guinea

- [ ] Paraguay
- [ ] Peru
- [ ] Philippines
- [ ] Poland
- [ ] Portugal
- [ ] Qatar
- [ ] Romania
- [ ] Russian Federation
- [ ] Rwanda
- [ ] St Kitts & Nevis
- [ ] St Lucia
- [ ] Saint Vincent & the Grenadines
- [ ] Samoa
- [ ] San Marino
- [ ] Sao Tome & Principe
- [ ] Saudi Arabia
- [ ] Senegal
- [ ] Serbia
- [ ] Seychelles
- [ ] Sierra Leone
- [ ] Singapore
- [ ] Slovakia
- [ ] Slovenia
- [ ] Solomon Islands
- [ ] Somalia
- [ ] South Africa
- [ ] South Sudan
- [ ] Spain
- [ ] Sri Lanka
- [ ] Sudan
- [ ] Suriname
- [ ] Swaziland
- [ ] Sweden
- [ ] Switzerland
- [ ] Syria

- Taiwan
- Tajikistan
- Tanzania
- Thailand
- Togo
- Tonga
- Trinidad & Tobago
- Tunisia
- Turkey
- Turkmenistan
- Tuvalu
- Uganda
- Ukraine
- United Arab Emirates
- United Kingdom
- United States
- Uruguay
- Uzbekistan
- Vanuatu
- Vatican City
- Venezuela
- Vietnam
- Yemen
- Zambia
- Zimbabwe

10. Why did you choose to train overseas (choose as many as relevant)

Tick all that apply.

- [ ] No opportunity to train in home country
- [ ] Wanted to develop new clinical skills
- [ ] Wanted to develop new research skills
- [ ] As part of an existing program

Other: [ ] _____

Kidney Biopsy

11. Did you receive formal training to perform a kidney biopsy?

Mark only one oval.

- ◯ Yes
- ◯ No

12. Who performs kidney biopsy at your center

Mark only one oval.

- ◯ Nephrologist (me and/or my colleagues) *Skip to question 15*
- ◯ Others (e.g. a radiologist) *Skip to question 15*
- ◯ We do not perform kidney biopsy

13. What proportion of patients where a kidney biopsy is indicated for diagnosis and management of kidney disease are able to get a biopsy *

Mark only one oval.

- ◯ Less than 10%
- ◯ 10-25%
- ◯ 26-50%
- ◯ >50%

Skip to question 15

No biopsy

14. Why do you not do a biopsy

Mark only one oval.

- ◯ Lack of training
- ◯ Cost of biopsy (needle/gun/processing)
- ◯ No nephropathologist
- ◯ Difficulty in obtaining consent
- ◯ Other: _____

Skip to question 21

Biopsy processing

15. How many kidney biopsies were done at your center in a usual (non-COVID) month

Mark only one oval.

- ◯ 0-5
- ◯ 5-10
- ◯ More than 10

16. Where is the nephropathologist who reads your biopsy located?

Mark only one oval.

- ◯ In my hospital
- ◯ In my city
- ◯ Another city in my country
- ◯ Overseas
- ◯ Other: _____

17. Are the biopsies processed for

Tick all that apply.

- [ ] Light microscopy
- [ ] Immunofluorescence
- [ ] Electron microscopy

18. What proportion of kidney biopsies are evaluated by immunofulorescence/immunohistochemistry

Mark only one oval.

- ◯ <10%
- ◯ 11-50%
- ◯ 50-75%
- ◯ >75%

19. What proportion of kidney biopsies are evaluated by Electron Microscopy

Mark only one oval.

- ◯ <10%
- ◯ 11-50%
- ◯ 50-75%
- ◯ >75%

20. What is the turnaround time for kidney biopsy reporting

Mark only one oval.

- ◯ Less than 3 days
- ◯ 3-7 days
- ◯ 8-14 days
- ◯ 15-30 days
- ◯ > 30 days

Workup and treatment

21. Please indicate the degree of difficulty with which you are able to obtain the following tests (0: no difficulty; 5: greatest difficulty, cannot order) *

Mark only one oval per row.

	0	1	2	3	4	5
Antinuclear antibody (ANA)	◯	◯	◯	◯	◯	◯
Antinuclear cytoplasmic antibody (ANCA)	◯	◯	◯	◯	◯	◯
Anti-phospholipase A2 receptor (anti-PLA2R) antibody	◯	◯	◯	◯	◯	◯
Anti-glomerular basement (GBM) antibody	◯	◯	◯	◯	◯	◯
Complement levels	◯	◯	◯	◯	◯	◯
Serum protein electrophoresis	◯	◯	◯	◯	◯	◯

22. Please indicate the ease with which the following treatment options are available for treatment of glomerulonephritis (0: never available, 5: always available) *

Mark only one oval per row.

	0	1	2	3	4	5
ACE inhibitors						
Angiotensin receptor blockers						
Diuretics						
Corticosteroids						
Azathioprine						
Cyclophosphamide						
Calcineurin inhibitors						
Mycophenolate						
Rituximab						

23. Please indicate the common barriers to diagnosis and treatment of glomerular diseases (0: not a barrier 5: a frequently encountered barrier) *

Mark only one oval per row.

	0	1	2	3	4	5
Delayed presentation						
Diagnostic workup not possible						
Treatment is expensive						
Treatment is not available						
Religious or cultural beliefs						

24. What proportion of patients have to pay out of pocket for diagnosis and treatment of glomerular diseases

Mark only one oval.

- <10%
- 11-25%
- 26-50%
- 51-75%
- >75%

25. What is the proportion of ADULT patients who are treated empirically with the following drugs in the absence of proper work up *

Mark only one oval per row.

	None	<25%	25-49%	50-74%	75% or more	We always work up our patients
Low-dose corticosteroids (equivalent of less tham 1 mg/kg of prednisolone)						
High dose corticosteroids (equivalent of >1 mg/kg of prednisolone or intravenous pulses)						
Oral Azathioprine						
Oral cyclophosphamide						
Intravenous cyclophosphamide						
Calcineurin inhibitors (cyclosporine or tacrolimus)						
Mycopheonolate						

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Supplementary Table 1: List of countries with number of responders

Africa	
Botswana	4
Burkina	1
Cameroon	10
Congo	1
Ethiopia	6
Ghana	3
Ivory coast	2
Kenya	10
Mozambique	1
Nigeria	52
Rwanda	5
Senegal	1
Sierra Leone	1
South Africa	7
Sudan	4
Tanzania	18
Tunisia	1
Uganda	2
Zambia	4
Asia	
Afghanistan	1
Bangladesh	4
India	100
Indonesia	2
Myanmar	12
Nepal	12
Pakistan	4
Philippines	22
Vietnam	1
NIS Countries	
Albania	1
Belarus	1
Kyrgyzstan	1
Macedonia	1
Russian Federation	3

Supplemental Table 2: Frequency of using immunosuppressive therapy

	Total	**Africa**	**Asia**	**Others**
Proportion of patients-out of pocket for diagnosis and treatment of glomerular diseases	***(N=295)***	***(N=130)***	***(N=159)***	***N=6***
<10%	37 (12.5%)	20 (15.3%)	13 (8.4%)	04 (66.6%)
11-25%	9 (3.0%)	01 (0.7%)	07 (4.4%)	01 (16.7%)
26-50%	30(10.2%)	09 (6.9%)	20 (12.3%)	01 (16.7%)
51-75%	44 (14.9%)	18 (13.8%)	26 (12.6%)	None
>75%	175 (59.3%)	82 (63.7%)	93 (60.0%)	None
Use of empiric immunosuppressive treatment Low dose steroids (< 1 mg/kg)	*(N=292)*	*(N=131)*	*(N=155)*	*(N=6)*
Nil	79 (27.0%)	27 (20.6%)	49 (31.6%)	03 (50%)
< 25%	85 (29.1.8%)	22 (16.7%)	60 (38.7%)	02 (33.3%)
25-49%	43 (14.7%)	25 (19.0%)	17 (11.0%)	01 (16.7%)
50-74%	39 (13.3%)	22 (16.7%)	17 (11.0%)	None
>75%	47 (16.1%)	35 (26.7%)	12 (7.7%)	None
High dose steroids (>1 mg/kg)	*(N=292)*	*(N=131)*	*(N=155)*	*(N=6)*
Nil	106 (36.3%)	29 (22.1%)	74 (47.7%)	03 (50%)
< 25%	82 (28.0%)	36 (27.4%)	44 (28.4%)	02 (33.3%)
25-49%	43 (14.7%)	24 (18.3%)	18 (11.6%)	01 (16.7%)
50-74%	27 (9.2%)	13 (9.9%)	14(9.0%)	None
>75%	34 (11.6%)	29 (22.1%)	05 (3.2%)	None
Azathioprine	*(N=292)*	*(N=131)*	*(N=155)*	*(N=6)*
Nil	152 (52.0%)	53 (40.4%)	95 (61.3%)	14 (66.4%)
< 25%	85 (29.1%)	45 (34.3%)	39 (25.2%)	01 (16.7%)
25-49%	35 (12.0%)	24 (18.3%)	11 (7.1%)	None
50-74%	14 (4.8%)	06 (4.5%)	07 (4.5%)	01 (16.7%)
>75%	7 (2.4%)	03 (2.2%)	03 (1.9%)	None
Cyclophosphamide	*(N=292)*	*(N=131)*	*(N=155)*	*(N=6)*
Nil	165 (56.5%)	66 (50.3%)	95 (61.3%)	04 (66.7%)
< 25%	83 (28.4%)	44 (33.5%)	38 (24.5%)	01 (16.7%)
25-49%	28 (9.6%)	15 (11.4%)	13 (8.4%)	None
50-74%	10 (3.4%)	03 (2.2%)	06 (3.9%)	01 (16.7%)
>75%	6 (2.5%)	03 (2.2%)	03 (1.9%)	None

Calcineurin inhibitors	*(N=292)*	*(N=131)*	*(N=155)*	*(N=6)*
Nil	156 (53.4%)	60 (45.8%)	92 (59.4%)	04 (66.6%)
< 25%	87 (29.7%)	45 (34.3%)	41 (26.5%)	01 (16.7%)
25-49%	32 (10.9%)	17 (12.9%)	15 (9.7%)	None
50-74%	13 (4.4%)	05 (3.8%)	07 (4.5%)	01 (16.7%)
>75%	04 (1.4%)	04 (3.0%)	00 (0.0%)	0
Mycophenolate mofetil	*(N=292)*	*(N=131)*	*(N=155)*	*(N=6)*
Nil	144 (49.3%)	50 (38.1%)	91 (58.7%)	03 (50%)
< 25%	84 (28.7%)	46 (35.1%)	36 (23.2%)	02 (33.3%)
25-49%	31 (10.6%)	16 (12.2%)	15 (9.7%)	None
50-74%	19 (6.5%)	09 (6.8%)	9(5.8%)	01 (16.7%)
>75%	14 (4.8%)	10 (7.6%)	04 2.6%)	None

IV-intravenous, CNI-calcineurin inhibitors, MMF-mycophenolate mofetil