

**How to Cite:**

Kurup, N. S., Jagadeesha, M., Nair, S. V., & Mishra, P. K. (2022). Understanding factors affecting referral of chronic kidney disease patients: Perception of specialist, general physicians and patients. *International Journal of Health Sciences*, 6(S1), 8283–8297.  
<https://doi.org/10.53730/ijhs.v6nS1.6927>

## **Understanding factors affecting referral of chronic kidney disease patients: Perception of specialist, general physicians and patients**

**Dr. Nandita S Kurup**

Student, MBA Hospital and Healthcare Management, Symbiosis Institute of Health Sciences, Symbiosis International Deemed University, Pune, Maharashtra, India

**Dr. Jagadeesha M**

Assistant Professor, Symbiosis Institute of Health Sciences, Symbiosis International Deemed University Pune, Maharashtra, India

**Dr. Sanjeev V Nair**

Associate Professor, Department of Nephrology, Saveetha Medical College and Hospital SIMATS, Chennai, Tamil Nadu, India  
Corresponding Author Email: [docsvn@gmail.com](mailto:docsvn@gmail.com)

**Dr. Pramod Kumar Mishra**

Associate Professor, Symbiosis Institute of Health Sciences, Symbiosis International Deemed University, Pune, Maharashtra, India

**Abstract---**Purpose-The purpose of this exploration study was to comprehend the elements influencing referral of patients with kidney disease to nephrologists and furthermore the perception of specialists and general physicians who come across kidney patients in their practice regarding referral. Methodology- This research paper adopts the empirical cross sectional study method incorporating both qualitative and quantitative method of research to collect data from specialists, physicians and patients. Primary data collection using questionnaire and personal interview and extensive review of published literatures was done. SPSS Analysis (Chi-Square and frequency) was used to find the association of factors to referral timing and perception was understood. Findings- The study finds to have positive association ( $p$  value  $< 0.05$ ) of demographic factors with the referral timing patients with kidney disease and dialysis initiation with age, gender, income, family support and education levels showing positive correlation with early referral to a specialist and appropriate initiation of hemodialysis. Consistency in perception regarding different consulting types in patients and care providers can be seen.

Differing perception regarding the referral stage and timing of patients, varied guidelines followed by general physicians affect the treatment and referral timing is found. The study signifies the importance of early referral of kidney patients and integrated multidisciplinary approach. Conclusions- A well timed referral to the nephrologist is required for better outcomes. Greater coordination between patients, primary care physicians and specialists will result in better quality of care for CKD patients.

**Keywords---**Referral, Chronic Kidney Disease, Perception, Factors.

## **Introduction**

Chronic Kidney Disease (CKD) has become a global burden today. Diabetes and Hypertension which are identified as the prime causal factors of CKD in many studies is also rapidly increasing globally. Studies have shown that it is important to identify and regulate these causes for better management. CKD is a non-communicable disease where progressive loss of functions of kidney occurs leading to permanent kidney failure overtime. It is classified into five progressively worsening stages with the last stage labelled as End-stage renal illness (ESRD). Every year, more than 1 lakh new people with kidney illness enter Renal Replacement Therapy and the average age-adjusted incidence rate for ESRD is 229 for each million population.(1)

Various factors affect the referral of patients with kidney illness to the nephrologist. These factors and their influence can vary according to race, nation and their medical systems. Late referral results in the first presentation to a nephrologist at ESRD stage and often leads to initiation of emergency dialysis procedures which gives reduced time for education and pre-dialysis preparation, not only affecting the patient's life physically but also psychologically whereas patients who are referred earlier are better managed, even with the presence of other risk factors and co-morbidities.

Early referral decreases the need for urgent dialysis, hence granting optimum time to plan proper conservative treatment until the beginning of Renal Replacement Therapy. Frequent hospitalization, length of hospital stay also decreases, contributing to significant reduction in cost and improvement in patient's clinical outcome and survival. (2, 3) Previous studies have suggested that there are no formal system for referral of patients.(4)

In India, comparatively less information is available on kidney patients, thus this examination was directed to assess the impact of different demographic and socio-economic components on the referral period of patients and to understand the perception of the patients on preference of different types of consulting practices and of healthcare providers regarding preferred guidelines, referral timing and consulting practice that would be most effective for patients.

It is hard to evaluate the specific pervasiveness of CKD in India as CKD registry is not maintained.(5) Ajay Singh et.al (1)conducted a cross sectional study on Epidemiology and risk factors of CKD patients and observed 17.2% prevalence in India with roughly 6% having CKD stage 3, 4 or 5. Good quality of care and early intervention is necessary to slow down the progression of the disease.(6) There is no universal definition for referral in context of late or early. Early referral stimulates the identification of causes which could be reversible, can provide optimum duration for management and patient preparedness by education about the treatment. Along with early referral, planned dialysis also have showcased better prognosis. (7) Patients who are reluctant to start with dialysis should be properly educated regarding its benefits. Literature review shows that the duration to determine early and late referral varies from 3 months to more than 12 months. A positive correlation has been observed between time of referral of patient and increased progression of disease and shorter duration of planning for Renal Replacement Therapy (RRT). (8) Late referral is also seen to have association with increased risk of mortality. A minimum month duration of more than three months for preparation of patients to initiate Renal Replacement Therapy by a nephrologist is considered to be ideal.(9)

Although many physicians and specialists have understood the significance of judicious transfer to a nephrologist, still it is seen that countless CKD patients are alluded late in relation to the beginning of dialysis.(2) Previous studies have concluded that approximately 20-35% of the patients with kidney disease are referred late. Many potential factors affecting referral have been identified in the previous studies. Lack of awareness, lack of screening of individuals with high risk factors, socioeconomic factors, age. etc have seen to negatively impact referral.(10) Study by Nestor Oliva-Damaso.et al(11) suggests referral of younger patients earlier to determine the effect on prognosis and treatment outcome. Healthcare providers of primary care have to make the decision to refer the patient to the nephrologists for limited resource optimization and patient benefits.It has been observed that digital technology has also positively impacted the referral pattern. An app, developed on the basis of laid down guidelines by KDIGO for referral has improved referral of kidney patients by 28%. (12)

The objectives of this research study are to:

- 1) Identify factors influencing referral timing of kidney patients to a nephrologist and initiation of dialysis
- 2) Assess variation in the following of referral guidelines by physicians and specialists
- 3) Assess variation in preference of referral stage between physicians and nephrologists
- 4) Understand the perception of specialists, general physicians and patients with regards to appropriateness and choice of consultation services respectively.

## Method

A cross-sectional, prospective study was conducted involving the individuals with Chronic Kidney Disease from various Patient Support Groups of India, general physicians, other specialists and nephrologists. Data was collected over a period of 4 months from July to October 2020 through a questionnaire, which was circulated and direct interviews were also conducted. Consent was obtained from the participants to contribute voluntarily to the study. Patients with reversible, acute kidney injury and missing data were excluded from the study.

Possible factors like age, socio-economic factors, family support, education level, availability of insurance were investigated in the questionnaire for patients and their effect on the referral timing was evaluated. The referral group was divided into categories. The group of patients where referral was made preceding one year before the commencement of dialysis were called Early Referral patients. The patients who were alluded to nephrologist with a length of under 1 year and inception of dialysis were named Late Referral Group.

Simultaneously, perception of patients regarding their preference of consulting type and perception of doctors (primary care physicians and nephrologists) regarding right referral time, early referral, judgement choices based on experience or guidelines were collected. The data was analyzed to find the factors contributing to late referral, which was summed up by using chi-square test done by cross tabulation with help of statistical tool PASW Statistics- SPSS software for Windows 10, version 18.

## Results

### Patient Findings

The majority of patients were middle aged and above, male, employed and had CKD due to either diabetes or hypertension. Of the total 161 patients, 24.8% (40) patients were referred early, 33.5% (54) patients were referred late and 42.6% (67) of the patients were not on dialysis yet. Graph 1

Analysis showed a strong statistical significance ( $p < 0.05$ ) for the relation between demographic factors like age, gender, occupation, income, family support, education, smoking and the referral time gap of patients to nephrologist and initiation of dialysis. While the availability of medical insurance  $p(0.628)$  did not show a significant relation with the time gap of referral to dialysis initiation. Details are outlined in Table 1.

The study was consistent with the findings of the research by Navaneethan et al (13) regarding socio economic factor being linked to referral but was in contrast to findings with regards to insurance.

## Healthcare Provider Findings

### *Preference Regarding Stage during Referral*

In the second part of the study the same 161 patients and a total of 50 physicians and 31 nephrologists were surveyed to comprehend their perceptions regarding referral to a specialist. A contrast in preference of referral stage could be observed between physicians and nephrologist. While majority of general physicians preferred to refer patients in stage 2 to a nephrologist, majority nephrologists found stage 3 appropriate to be referred by physicians.

With regards to the type of care and degree of specialist involvement what was interesting was that while the primary care physicians' and nephrologists' views were almost aligned with regards to the degree of involvement of the specialist, patients seemed to prefer a larger degree of involvement for the primary care physician. This was reflected by the responses to the preferences for CKD being managed by the physician only. While 100% of nephrologists disagreed with this compared to 76% of primary care physicians, only 50.3% patients totally disagreed with this idea. Similarly with regards to the preference for nephrologist only care, while nephrologists and physicians' views seemed to align ( 67.7% vs 70% agree), patients agreeing with the idea were only 57.1% This would seem to suggest a patient preference for having their specialist care anchored to some extent with the primary care physicians. Details in Table 2

Majority of the nephrologists followed KDIGO Guidelines, compared to a significant variation seen in the responses of general physicians. Majority of the physicians followed Diabetic and hypertension guidelines followed by NICE and KDIGO. (Graph 2)

#### Patient review 1-

"I feel that physicians are the first point of contact for us. But when I was diagnosed with kidney disease, I preferred to continue my treatment solely under nephrologist because he is the specialist in that."

#### Patient review 2-

"After consulting the nephrologist, I was confident that I can be in control of my disease if I follow his advice. Although having diabetes- I have felt that if there would have been a direct communication between my Diabetologist and nephrologist, a lot of things would have been much easier."

Out of the total patients, 35% disagreed, 37% were neutral, 27% agreed to the physician with nephrology access consulting type. While 48% disagreed, 26% neutral, 26% %agreed about the appropriateness of this consulting type for patients with kidney disease, 58% of nephrologists disagreed. 25% were neutral and only 9.6% agreed.

## Physicians Review

### *Physician review*

“I believe an integrated approach is necessary for management of patients with kidney disease. We also look forward to refer patients at an early stage, but the patients show up late and hence are diagnosed late and hence referred late. Provisions to do health checkup at regular intervals atleast in patients with risk factor is recommended.”

For Physicians with nephrology review, 26.7% did not prefer this type, 34% were neutral and 39% of the patients preferred this consulting type, While 22% disagreed to this consulting type as appropriate, 24% were neutral, and 54% agreed to this type. 25% of the nephrologists did not find this consulting type to be appropriate for the patients while 38% were neutral and 35% agreed.

For nephrologist only, 14.2% of the patients did not prefer this consulting type in contrast to 28.5% being neutral and 57.14% agreeing, While 16% of the physicians did not find this consulting type to be appropriate, 14% were neutral and 70% were in support. 9% of the nephrologist disagreed to this consulting type to be appropriate, while 22.5% were neutral and 67.7% agreed. Details are depicted graphically in graph 3

Overall Physician only was the least preferred and least appropriate consulting type while nephrologist only was the most preferred type and was consistent with physicians and the nephrologists' perception of appropriateness. This result was in contrast to the research of Charlotte Wilson et.al (6) where the most preferred and most appropriate option was found to GP plus, that is general practitioners with nephrologist access.

## Discussion

This study demonstrates that wide range of factors related to patients and the perception of physicians influence the referral timing. Late referral is related not just with the advancement to End Stage Renal Disease, but also increases the risk of mortality and morbidity.(14,15,16) There is no universal definition for referral in context of late or early and it varies in literature. (17) Numerous observational studies have inferred that late referral of patients with kidney disease are related with limitation of therapeutics options and unfortunate clinical results. (16,18,19) Early nephrology referral is relevant for patients for better renal prognosis and survival.(19,20).

In this study the influence of various factors on referral period from the primary nephrologist visit to the dialysis commencement was investigated. The study was consistent with the result of many studies which concluded the association of demographic factors with referral of the patients and initiation of dialysis.

Socioeconomic factors also showed strong association with referral which is consistent with the study of Obialo et al (21). Patients with diabetes or hypertension as the underlying reason of the disease also had significant statistical association with referral consistent with the study of Okaka EI et al and Jones C. et al (22,23) Many studies have concluded that patients with these risk factors are referred late than glomerulonephritis. The early referral of glomerulonephritis can be tacit as treatment for glomerulonephritis is exclusively done in nephrology department. (2)

Kidney Disease Outcomes Quality Initiative Guidelines (KDIGO) was developed by National Kidney Foundation in the year 2002, which was revised in the year 2012. KDIGO defined signs for CKD patients referral based on moderate quality evidence. (24) It is advised to refer patients to nephrologists when patient enter stage 3b of kidney disease, that is when eGFR decreases below 30ml/min/1.73m<sup>2</sup> or when albuminuria (ACR) of more than 300mg/g or presence of Red Blood Cells is found consistently in urine.

This study has shown that majority of nephrologists follow KDIGO guidelines, but there is significant variation in the guidelines followed by the primary care givers of kidney patients. Majority of the primary physicians follow Diabetic and Hypertensive Guidelines instead of KDIGO guidelines, which can lead to difference in treatment modalities and outcome. This is consistent with the prior studies showing that there could be lack of awareness and understanding amongst the practitioners regarding the KDIGO guidelines, referral timing, despite of laid down recommendations.(26,26,27,28) Improving the general practitioners knowledge of CKD guidelines may improve nephrology referrals timeliness and can enhance the collaborative relation between physician and nephrologists.(29) A study by Nastor Oliva (11) evaluated the age aspect for referral and suggested early referral of young patients in contrast to the guidelines which advised waiting until the GFR reduces below 30ml/minute.

This inconsistency can be attributed to the practice patterns of the physicians and also the lack of the universal definition for referral. The referral timing could vary depending on the physician's preferences, practice settings, unclear delineation of roles and responsibilities, association with nephrologists. (29) Comfort level of patients with their physicians could also influence referral.

In our study, the findings show that the most appropriate consulting option for CKD as per medical practitioners for patients with kidney disease is nephrologists only, which the majority of patients agree with but also indicate a preference for care to be conducted along with their primary care physician. Studies have suggested that patients in Early Referral get optimum time to get properly educated about the disease and can receive optimal preparation time for the chosen dialysis modality or kidney transplantation. (30) The need for urgent dialysis is reduced, use of temporary dialysis catheters is decreased, time deferral to plan proper conservative treatment until the beginning of Renal Replacement

Therapy contributing to the improvement in patient's clinical outcome and survival.

## **Recommendations**

Patients with diabetes and blood pressure are at greater risk of development of kidney disease and hence should get tested at regular intervals to avoid the consequences of late diagnosis. Based on our study findings on preference to refer, it is suggested to refer patient at stage 3 to nephrologists enabling sufficient time for education, proper treatment and management of patients and to reduce burden and optimum utilization of resources on appropriate patients, thus delivering optimum and quality care.

The guidelines should be strictly enforced to have a uniform and an integrated treatment approach for a better outcome. Practice can be improved significantly with an integrated approach. Medical history is a relevant aspect of diagnosis, and record sharing would enable the nephrologists and the associated specialists and physicians to administer integrated care to the patient.

## **Conclusion**

To improve the clinical outcome in a patient with chronic kidney disease, well-timed referral to a nephrologist whilst administering appropriate care is relevant. In spite of availability of strategies regarding appropriate timing of referral, they are either not adequately followed or there is deferral in perception amongst the healthcare providers. Efficiency of care can be increased by integrated care settings which includes timely referral of patients to nephrologists, adequate time for planning of renal replacement therapy approach and patient education for self-management of health and observing the demographic factors while diagnosis and referral.

## **References**

1. Singh AK, Farag YM, Mittal BV, Subramanian KK, Reddy SR, Acharya VN, Almeida AF, Channakeshavamurthy A, Ballal HS, Gaccione P, Issacs R. Epidemiology and risk factors of chronic kidney disease in India—results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. *BMC nephrology*. 2013 Dec;14(1):1-0.
2. Lee J, Lee JP, An JN, Kim SG, Kim YL, Yang CW, Kang SW, Kim NH, Kim YS, Oh YK, Lim CS. Factors affecting the referral time to nephrologists in patients with chronic kidney disease: A prospective cohort study in Korea. *Medicine*. 2016 May;95(19).
3. Smart NA, Dieberg G, Ladhani M, Titus T. Early referral to specialist nephrology services for preventing the progression to end-stage kidney disease. *Cochrane Database of Systematic Reviews*. 2014(6).

4. Rajapurkar MM, John GT, Kirpalani AL, Abraham G, Agarwal SK, Almeida AF, Gang S, Gupta A, Modi G, Pahari D, Pisharody R. What do we know about chronic kidney disease in India: first report of the Indian CKD registry. *BMC nephrology*. 2012 Dec;13(1):1-8.
5. Agarwal SK, Srivastava RK. Chronic kidney disease in India: challenges and solutions. *Nephron clinical practice*. 2009;111(3):c197-203.
6. Wilson C, Campbell SM, Luker KA, Caress AL. Referral and management options for patients with chronic kidney disease: perspectives of patients, generalists and specialists. *Health Expectations*. 2015 Jun;18(3):325-34.
7. Park JI, Kim M, Kim H, An JN, Lee J, Yang SH, Cho JH, Kim YL, Park KS, Oh YK, Lim CS. Not early referral but planned dialysis improves quality of life and depression in newly diagnosed end stage renal disease patients: a prospective cohort study in Korea. *PLoS One*. 2015 Feb 23;10(2):e0117582.
8. Parameswaran S, Babu Geda S, Rathu M, Singh Kohli H, Lal Gupta K, Sakhuja V, Jha V. Referral pattern of patients with end-stage renal disease at a public sector hospital and its impact on outcome. *National Medical Journal of India*. 2011 Jan 1;24(4):208.
9. Okazaki M, Inaguma D, Imaizumi T, Kada A, Yaomura T, Tsuboi N, Maruyama S. Unfavorable effects of history of volume overload and late referral to a nephrologist on mortality in patients initiating dialysis: a multicenter prospective cohort study in Japan. *BMC nephrology*. 2018 Dec;19(1):1-0.
10. Baer G, Lameire N, Van Biesen W. Late referral of patients with end-stage renal disease: an in-depth review and suggestions for further actions. *NDT plus*. 2010 Feb 1;3(1):17-27.
11. Oliva-Damaso N, Oliva-Damaso E, Rodriguez-Perez JC, Payan J. Improved nephrology referral of chronic kidney disease patients: potential role of smartphone apps. *Clinical kidney journal*. 2019 Dec;12(6):767-70.
12. Liu P, Quinn RR, Karim ME, Bello A, Tam-Tham H, Weaver R, Ronksley PE, Quan H, Strippoli GF, Manns B, Hemmelgarn BR. Nephrology consultation and mortality in people with stage 4 chronic kidney disease: a population-based study. *Cmaj*. 2019 Mar 11;191(10):E274-82.
13. Navaneethan SD, Aloudat S, Singh S. A systematic review of patient and health system characteristics associated with late referral in chronic kidney disease. *Bmc Nephrology*. 2008 Dec;9(1):1-8.
14. Lee J, Lee JP, Park JI, Hwang JH, Jang HM, Choi JY, Kim YL, Yang CW, Kang SW, Kim NH, Kim YS. Early nephrology referral reduces the economic costs among patients who start renal replacement therapy: a prospective cohort study in Korea. *PLoS One*. 2014 Jun 13;9(6):e99460.
15. Gøransson LG, Berggren H. Consequences of late referral of patients with end-stage renal disease. *Journal of internal medicine*. 2001 Aug 19;250(2):154-9.
16. Kazmi WH, Obrador GT, Khan SS, Pereira BJ, Kausz AT. Late nephrology referral and mortality among patients with end-stage renal disease: a propensity score analysis. *Nephrology Dialysis Transplantation*. 2004 Jul 1;19(7):1808-14.

17. Marron B, Ostrowski J, Török M, Timofte D, Orosz A, Kosicki A, Calka A, Moro D, Kosa D, Redl J, Qureshi AR. Type of referral, dialysis start and choice of renal replacement therapy modality in an international integrated care setting. *PloS one*. 2016 May 26;11(5):e0155987.
18. Levin A. Consequences of late referral on patient outcomes. *Nephrology dialysis transplantation*. 2000 Sep 2;15(suppl\_3):8-13.
19. Ratcliffe PJ, Phillips RE, Oliver DO. Late referral for maintenance dialysis. *Br Med J (Clin Res Ed)*. 1984 Feb 11;288(6415):441-3.
20. Nakamura S, Nakata H, Yoshihara F, Kamide K, Horio T, Nakahama H, Kawano Y. Effect of early nephrology referral on the initiation of hemodialysis and survival in patients with chronic kidney disease and cardiovascular diseases. *Circulation Journal*. 2007;71(4):511-6.
21. Obialo CI, Ofili EO, Quarshie A, Martin PC. Ultralate referral and presentation for renal replacement therapy: socioeconomic implications. *American journal of kidney diseases*. 2005 Nov 1;46(5):881-6.
22. Okaka EI, Adejumo OA, Akinbodewa AA. Late referral and associated factors among chronic kidney disease outpatients in Southern Nigeria. *Annals of African medicine*. 2020 Jan;19(1):47.
23. Jones C, Roderick P, Harris S, Rogerson M. Decline in kidney function before and after nephrology referral and the effect on survival in moderate to advanced chronic kidney disease. *Nephrology Dialysis Transplantation*. 2006 Aug 1;21(8):2133-43.
24. Singh K, Waikar SS, Samal L. Evaluating the feasibility of the KDIGO CKD referral recommendations. *BMC nephrology*. 2017 Dec;18(1):1-6.
25. Choukem SP, Nchifor PK, Halle MP, Nebongo DN, Mboue-Djieka Y, Kaze FF, Monekosso GL. Knowledge of physicians on chronic kidney disease and their attitudes towards referral, in two cities of Cameroon: a cross-sectional study. *BMC research notes*. 2016 Dec;9(1):1-6.
26. Agrawal V, Ghosh AK, Barnes MA, McCullough PA. Perception of indications for nephrology referral among internal medicine residents: a national online survey. *Clinical Journal of the American Society of Nephrology*. 2009 Feb 1;4(2):323-8.
27. De Wilde MA, Speeckaert M, Van Biesen W. Can increased vigilance for chronic kidney disease in hospitalised patients decrease late referral and improve dialysis-free survival?. *BMC nephrology*. 2018 Dec;19(1):1-6.
28. Almaghraby MF. Early referral to nephrologist is required for improving outcome of chronic kidney disease patients. *Tanta Medical Journal*. 2014 Jan 1;42(1):14.
29. Greer RC, Liu Y, Cavanaugh K, Diamantidis CJ, Estrella MM, Sperati CJ, Soman S, Abdel-Kader K, Agrawal V, Plantinga LC, Schell JO. Primary care physicians' perceived barriers to nephrology referral and co-management of patients with CKD: a qualitative study. *Journal of general internal medicine*. 2019 Jul;34(7):1228-35.
30. Kim DH, Kim M, Kim H, Kim YL, Kang SW, Yang CW, Kim NH, Kim YS, Lee JP. Early referral to a nephrologist improved patient survival: prospective

cohort study for end-stage renal disease in Korea. PLoS One. 2013 Jan 25;8(1):e55323.

## Tables

Table 1

Shows the frequency percent distribution of time gaps between referral to dialysis initiation through demographic factors and its association by using the chi-square tests

|                      |               | Time Gap Between Nephrology Referral And Initiation Of Dialysis |                                                  |                                                 |          |
|----------------------|---------------|-----------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------|----------|
| Parameters           |               | Dialysis not started                                            | Early referral (<1 year before dialysis started) | Late referral (>1 year before dialysis started) | TOTAL    |
| Age                  |               |                                                                 |                                                  |                                                 | p(0.031) |
|                      | 18-30         | 45.5%                                                           | 36.4%                                            | 18.2%                                           | 100.0%   |
|                      | 30-50         | 48.1%                                                           | 19.8%                                            | 32.1%                                           | 100.0%   |
|                      | >50           | 27.7%                                                           | 25.5%                                            | 46.8%                                           | 100.0%   |
| Gender               |               |                                                                 |                                                  |                                                 | p(0.012) |
|                      | Male          | 39.2%                                                           | 32.4%                                            | 28.4%                                           | 100.0%   |
|                      | Female        | 45.8%                                                           | 11.9%                                            | 42.4%                                           | 100.0%   |
| Occupation           |               |                                                                 |                                                  |                                                 | p(0.010) |
|                      | Office        | 43.9%                                                           | 24.4%                                            | 31.7%                                           | 100.0%   |
|                      | Teacher       | 20.0%                                                           | 32.0%                                            | 48.0%                                           | 100.0%   |
|                      | Self Employed | 36.8%                                                           | 13.2%                                            | 50.0%                                           | 100.0%   |
|                      | Others        | 52.6%                                                           | 29.8%                                            | 17.5%                                           | 100.0%   |
| Income               |               |                                                                 |                                                  |                                                 | p(0.035) |
| In Rupees (annually) | No income     | 53.7%                                                           | 24.4%                                            | 22.0%                                           | 100.0%   |
|                      | <2.5lakhs     | 22.2%                                                           | 37.8%                                            | 40.0%                                           | 100.0%   |
|                      | 2.5-5lakhs    | 46.8%                                                           | 21.4%                                            | 32.1%                                           | 100.0%   |

|                   |                            |       |       |       |          |
|-------------------|----------------------------|-------|-------|-------|----------|
|                   | >5lakhs                    | 46.6% | 24.8% | 33.5% | 100.0%   |
| Family support    |                            |       |       |       | p(0.005) |
|                   | No support- 50% support    | 42.9% | 42.9% | 14.3% | 100.0%   |
|                   | >50%-full support          | 41.3% | 19.8% | 38.9% | 100.0%   |
| Education         |                            |       |       |       | p(0.031) |
|                   | School Level Education     | 27.5% | 22.5% | 50.0% | 100.0%   |
|                   | Graduation/Post Graduation | 46.3% | 25.6% | 28.1% | 100.0%   |
| Medical Insurance |                            |       |       |       | p(0.628) |
|                   | Yes                        | 41.9% | 21.6% | 36.5% | 100.0%   |
|                   | No                         | 41.4% | 27.6% | 31.0% | 100.0%   |
| Smoking Habit     |                            |       |       |       | p(0.003) |
|                   | Yes                        | 49.2% | 22.1% | 28.7% | 100.0%   |
|                   | No                         | 17.9% | 33.3% | 48.7% | 100.0%   |
| Cause Of CKD      |                            |       |       |       | p(0.035) |
|                   | Diabetes                   | 33.9% | 17.7% | 48.4% | 100.0%   |
|                   | Hypertension               | 46.3% | 27.8% | 25.9% | 100.0%   |
|                   | Others                     | 46.7% | 31.1% | 22.2% | 100.0%   |
| TOTAL             |                            |       |       |       |          |
|                   |                            | 41.6% | 24.8% | 33.5% | 100.0%   |

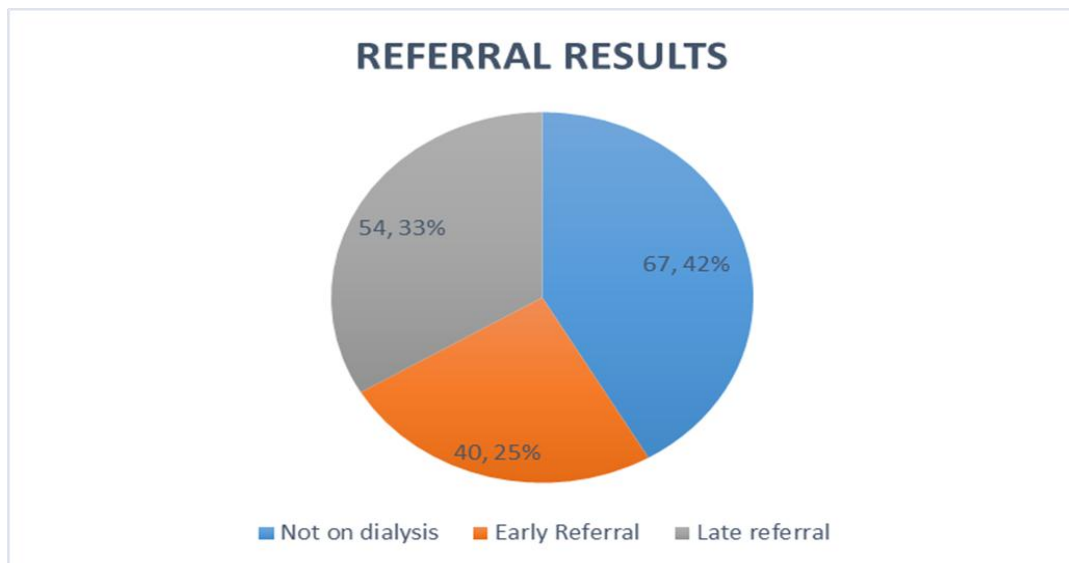
Table 2

Shows the frequency distribution of the preferences for patients, primary care physicians and nephrologists towards time and type of referral to a specialist

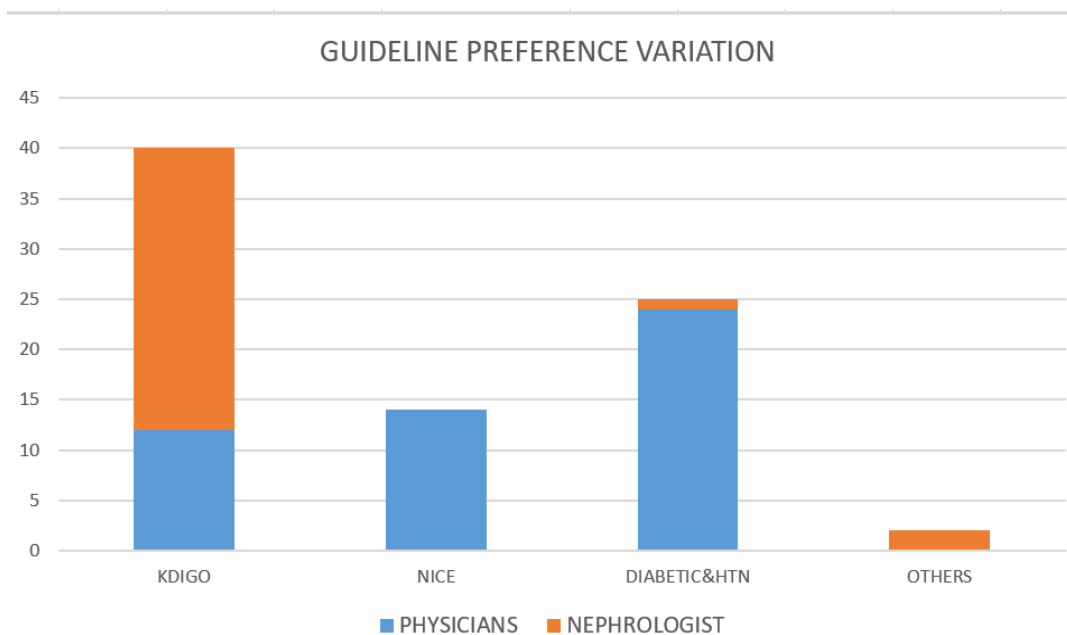
|                  |                                  | Strongly Disagree | Disagree | Total Disagree (%) | Neutral | Neutral (%) | Agree | Strongly Agree | Total Agree (%) |
|------------------|----------------------------------|-------------------|----------|--------------------|---------|-------------|-------|----------------|-----------------|
| Patient (n=161)  | PREFERENCE FOR CONSULTING TYPE   |                   |          |                    |         |             |       |                |                 |
|                  | Physician Only                   | 46                | 35       | 50.3               | 54      | 33.5        | 19    | 7              | 16.1            |
|                  | Physician with nephrology access | 18                | 39       | 35.4               | 60      | 37.2        | 32    | 12             | 27.3            |
|                  | Physician with nephrology review | 20                | 23       | 26.7               | 55      | 34.1        | 47    | 16             | 39.1            |
|                  | Nephrologist only                | 16                | 7        | 14.2               | 46      | 28.5        | 39    | 53             | 57.1            |
| Physician (n=50) | APPROPRIATE CONSULTING TYPE      |                   |          |                    |         |             |       |                |                 |
|                  | Physician Only                   | 29                | 9        | 76                 | 7       | 14          | 2     | 3              | 10              |
|                  | Physician with nephrology access | 8                 | 16       | 48                 | 13      | 26          | 12    | 1              | 26              |
|                  | Physician with nephrology review | 4                 | 7        | 22                 | 12      | 24          | 20    | 7              | 54              |
|                  | Nephrologist only                | 3                 | 5        | 16                 | 7       | 14          | 13    | 22             | 70              |
| Nephrologist     | Physician Only                   | 25                | 6        | 100                | 0       | 0           | 0     | 0              | 0               |

|        |                                  |   |    |      |    |      |   |    |      |
|--------|----------------------------------|---|----|------|----|------|---|----|------|
| (n=31) | Physician with nephrology access | 5 | 13 | 58   | 8  | 25.8 | 2 | 3  | 16.1 |
|        | Physician with nephrology review | 5 | 3  | 25.8 | 12 | 38.7 | 9 | 2  | 35.4 |
|        | Nephrologist only                | 1 | 2  | 9.6  | 7  | 22.5 | 9 | 12 | 67.7 |

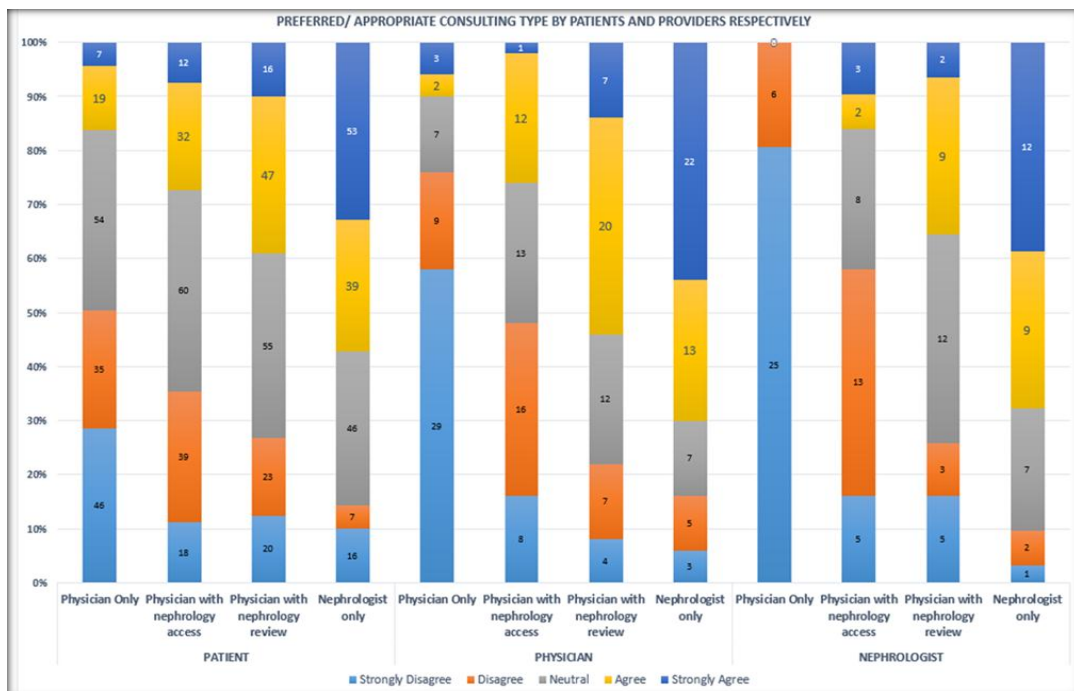
## GRAPHS



Graph 1: Shows the percentage distribution of the patients with kidney disease between referral and time gap between initiation of dialysis and not on dialysis.



Graph 2: Shows the comparison of guidelines followed by general physicians and nephrologists.



Graph 3: Shows the distribution of perception of patients, general physicians and nephrologists with regards to preference and appropriateness of consulting type.