

Right-siting Chronic Kidney Disease Care—A Survey of General Practitioners in Singapore

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Abstract

Introduction: Chronic kidney disease (CKD) is a major public health problem in Singapore. Efforts are being made to right-site CKD care (stage 1 to 3) from specialist outpatient clinics (SOCs) to general practitioners (GPs) to ease congestion. This study aims to identify factors influencing screening and management of CKD among GPs in Singapore. **Materials and Methods:** A survey was conducted among the 1202 GPs between April and September 2010. The survey questionnaire was developed in collaboration with experts in nephrology and general practice, it included questions about screening, awareness and management of CKD. **Population studied:** GPs registered with the National Healthcare Group General Practitioner (NHG GP) partner database. **Results:** Three hundred and two GPs completed the survey. A total of 70% of the respondents were males and with their median years of practice as 18. A total of 86% of them reported screening for CKD while 50% of GPs were confident of managing patients with CKD stage 1; and 38% of GPs are aware of CKD guidelines. Majority of GPs (64%) agreed that right-siting of early CKD patients would ease congestion at SOCs. Some of the obstacles in CKD management listed by the GPs were lack of patient trust, experience and communication with the specialist and the inability of the patient to pay. **Conclusion:** GPs screen patients for CKD, however their awareness of guidelines is limited. Opportunities exist for improving physician recognition of CKD, awareness of CKD guidelines, improving collaborative care and reimbursement for the patient and the provider. This study has identified factors which when addressed could lead to wider acceptance of CKD right-siting by both the patients and the GPs.

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Key words: Awareness, Barriers, Care transfer, Confidence, Primary care physician, Motivational factors

Introduction

Chronic kidney disease (CKD) is a major public health problem worldwide and in Singapore, it has large financial implications. The increasing prevalence of diabetes and hypertension coupled with ageing population are some factors that contribute to the increasing incidence of kidney disease.¹⁻³

Health services worldwide are facing an enormous challenge of delivering care to these patients while simultaneously reducing costs. Healthcare infrastructure in Singapore compromises private general practitioners (GPs), polyclinics, specialist outpatient clinics (SOCs), acute hospitals and national specialty centers to community hospitals, nursing homes and day care centers. Recently there has been an increasing shift in primary care patient

load from private GPs to the public sector primary care (polyclinics) and SOCs resulting in overcrowding at SOCs and polyclinics. This has led to increasing wait time for SOCs appointments.⁴ It is argued that moving care out of hospitals and closer to patients' homes would lead to cost savings and improved quality of care.⁵ Since 2004, the term "right-siting" has been increasingly used to describe the principle that chronic disease patients should be managed in primary care rather than specialist settings.⁶

Private GPs remain the main provider of primary care services in Singapore, they are a relatively untapped pool of resources to be organised to deliver better care for our population, especially people with chronic diseases.⁶ Currently, major efforts have been made to right-site CKD care (stage 1 to stage 3) to GPs to ease congestion

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at SOC. There is an apparent dearth of literature on GPs perception of “right-siting” and especially on managing CKD in Singapore. This study aims to identify factors influencing CKD screening and management among GPs in Singapore. The information from this study would help plan programme(s) to encourage their participation in the right-siting programme.

Materials and Methods

A survey was conducted between April and September 2010 among the 1202 GPs registered in the National Healthcare Group (NHG) General Practitioner (NHG GP) partner programme. The NHG is a cluster of restructured public institutions providing primary, secondary and tertiary care through polyclinics, community/general hospitals and specialist hospitals respectively. The NHG GP Partners programme enables GP Partners to gain access to a multitude of healthcare resources, thereby providing their patients with a higher platform of medical services.

Questionnaire Development

A questionnaire was developed in collaboration with experts in nephrology and general practice to achieve the study objectives (Appendix 1). The objectives of the questionnaire were:

- To explore the factors influencing GPs reluctance/apprehension regards managing patients with chronic kidney disease (CKD).
- To elicit their confidence level in managing stage 1 to 3 CKD patients.
- To understand their opinion about right-siting CKD stage 1 to early stage 3 CKD patients from specialist outpatient clinics in tertiary hospitals to primary care.
- To elicit their awareness of CKD guidelines.
- To understand the obstacles and motivational factors for CKD management in primary care.

Questionnaire items and the theoretical basis for the questionnaire were identified from literature review and corroborated by expert opinion.⁷⁻¹³ The questions were a mixture of pre-coded, single, multiple choice, rank-order and likert-type questions. A draft questionnaire was prepared and circulated among the investigators who brainstormed the current issues in CKD management. This draft questionnaire was then pre-tested, piloted and minor changes in word selection and instructions were made to the questionnaire. The questionnaire consisted of mixture of confidence, knowledge and awareness questions about CKD screening and management. A copy of the survey questionnaire is enclosed in Appendix 1. The questionnaire was mailed

to the GPs together with a survey invitation letter and instruction on filling up the questionnaire. The GPs were requested to fax back the completed questionnaire. Non-responders were followed up with 3 telephonic reminders to facilitate their participation. Data obtained from the completed questionnaires were entered and stored in MS excel spreadsheet.

Statistical Analysis

Data were summarised using descriptive summary measures, including proportions for categorical variables, means ($\pm$ standard deviation) for continuous variables. For categorical variables, we used the Pearson chi-squared test to associate between variables. The multivariate analysis was performed using a logistic regression model with a stepwise backward elimination procedure. All statistical analysis was performed using PASW Statistics (version 18).

Results

The final response rate was 25%. After 3 rounds of reminders, we received 302 completed questionnaires from the GPs. Ninety-two percent of the GPs who responded were Chinese, 70% of them were male, 8% of them had completed Master of Medicine (MMed) or Graduate Diploma, 4% of them had fellowships and 3% of them had other masters degrees (MPH, MSc Public Health). Median years in medical practice were 18 years (IQR, 14 years). A total of 85% of the GPs reported that, 1 in 4 patients seen by them in a year are diabetics. Majority of the GPs (61%) reported seeing less than 10 CKD patients in a year. A total of 11% of them reported seeing less than 20 CKD patients, 6% of them reported seeing less than 30 patients a year and 5% of them reported seeing more than 30 CKD patients per year.

Confidence in CKD Management

Fifty percent of the GPs reported feeling confident in managing patients with CKD stage 1. Thirty-three percent of GPs reported feeling confident in managing CKD stage 2 patients. Thirteen percent of GPs reported feeling confident

Table 1. GPs Confidence in Managing CKD (Stages 1, 2 and 3)

Question: My confidence level in managing patients with chronic kidney disease (CKD)	CKD (%)		
	Stage 1	Stage 2	Stage 3
Not confident at all	4	5	11
Not confident	12	20	37
Neutral	35	42	39
Quite confident	43	29	11
Very Confident	7	4	2

in managing CKD stage 3 patients (Table 1). Majority of GPs (64%) agreed that right siting CKD patients early would ease congestion at SOC. More number of years in general practice was associated with the higher number of CKD patients treated and managed (chi-square test, $P = 0.0001$) (Table 2).

Screening for CKD

Eighty six percent of the GPs ($n = 259$) reported screening for CKD. Eighteen percent of GPs reported screening for the all major risk factors for CKD (Table 3). Twenty-seven percent of GPs reported screening for CKD using urine

Table 2. Years in General Practice and Average Number of Chronic Kidney Disease Patients Treated and Managed

Years in General practice	Average no. of CKD patients treated and managed	
	Males	Females
	Mean $\pm$ SD	Mean $\pm$ SD
≤ 4	2.7 $\pm$ 1.8	3.3 $\pm$ 1.6
5 – 14	8.4 $\pm$ 1.7	8.4 $\pm$ 1.5
15+	14.2 $\pm$ 2.0	14.4 $\pm$ 1.7

Table 4. Screening Tests Used by GPs for CKD

Screening tests used by GPs	Percentage
Serum creatinine, serum creatinine with eGFR, random urine albumin creatinine ratio or urine protein creatinine ratio	10.3%
Serum creatinine, urinalysis/UFEME, urine dipsticks to estimate protein or albumin, random urine albumin or urine protein, random urine albumin creatinine ratio or urine protein creatinine ratio	5.3%
Serum creatinine, urinalysis/UFEME, urine dipsticks to estimate protein or albumin, random urine albumin creatinine ratio or urine protein creatinine ratio	5.3%
Serum creatinine, urinalysis/UFEME, urine dipsticks to estimate protein or albumin, random urine albumin creatinine ratio or urine protein creatinine ratio, 24-hour urine creatinine clearance 24-hour urine protein excretion	3.6%
Serum creatinine, urinalysis/UFEME, random urine albumin creatinine ratio or urine protein creatinine ratio, 24-hour urine creatinine clearance 24-hour urine protein excretion	3.6%
Serum creatinine, random urine albumin creatinine ratio or urine protein creatinine ratio	3.3%
Serum creatinine, urinalysis/UFEME, urine dipsticks to estimate protein or albumin	3%
Serum creatinine, urinalysis/UFEME, 24-hour urine creatinine clearance 24-hour urine protein excretion	3%
Serum creatinine, serum creatinine with eGFR, urinalysis / UFEME, urine dipsticks to estimate protein or albumin, random urine albumin or urine protein, random urine albumin creatinine ratio or urine protein creatinine ratio	2.6%
Serum creatinine, urinalysis/UFEME	2.6%
Serum creatinine, urinalysis/UFEME, urine dipsticks to estimate protein or albumin, random urine albumin or urine protein, random urine albumin creatinine ratio or urine protein creatinine ratio, 24-hour urine creatinine clearance 24-hour urine protein excretion	2.6%
Serum creatinine, urinalysis/UFEME, random urine albumin or urine protein, random urine albumin creatinine ratio or urine protein creatinine ratio	2.6%
Serum creatinine, serum creatinine with eGFR, urinalysis/UFEME, urine dipsticks to estimate protein or albumin, random urine albumin or urine protein, random urine albumin creatinine ratio or urine protein creatinine ratio, 24-hour urine creatinine clearance 24-hour urine protein excretion	2.3%
Serum creatinine, serum creatinine with eGFR, urinalysis/UFEME, random urine albumin creatinine ratio or urine protein creatinine ratio	2%
Serum creatinine, urinalysis/UFEME, urine dipsticks to estimate protein or albumin, random urine albumin or urine protein	2%
Urinalysis/UFEME, random urine albumin creatinine ratio or urine protein creatinine ratio	2%

GPs: General Practitioners; CKD: Chronic kidney disease; eGFR: estimated glomerular filtration rate; UFEME: Urine Full Examination Microscopic Examination

Table 3. Diseases/Conditions Screened for CKD

Diseases/Conditions screened for CKD	Percentage*
Type 1 & 2 diabetes, hypertension, CVD, age >55 years, obesity, family history of ESRD	18.3%
Type 1 & 2 diabetes, hypertension	15.3%
Type 1 & 2 diabetes, hypertension, CVD, family history of ESRD	11.2%
Type 1 & 2 diabetes, hypertension, family history of ESRD	10.4%
Type 1 & 2 diabetes, hypertension, CVD, age >55 years, family history of ESRD	10.1%
Type 1 & 2 diabetes, hypertension, CVD	10.1%
Type 1 & 2 diabetes, hypertension, CVD, age >55 years	6.3%
Type 1 & 2 diabetes, hypertension, age >55 years, family history of ESRD	5.2%
Type 1 & 2 diabetes, hypertension, Age >55 years	2.2%
Type 1 & 2 diabetes	2.2%
Type 1 & 2 diabetes, hypertension, CVD, Age >55 years, obesity	1.9%
Type 1 & 2 diabetes, hypertension, Age >55 years, obesity, family history of ESRD	1.5%
Type 1 & 2 diabetes, hypertension, CVD, obesity	1.5%

*Percentage do not add up to hundred as they are not mutually exclusive. CKD: Chronic kidney disease; ESRD: End-stage renal disease; CVD: Cardiovascular disease

dipsticks to detect protein or albumin alone or in combination with other screening tests (Table 4).

Awareness of CKD Guidelines

Only 38% of the GPs ($n = 114$) were aware of CKD guidelines or adhering to it. Of those who were aware, 49% of them were aware of Ministry of Health (MOH), Singapore guidelines, 7% of them were aware of Kidney Disease Outcomes Quality Initiative (KDOQI) guidelines, 0.9% of them were aware of Kidney Disease: Improving Global Outcomes (KDIGO) guidelines, 1.8% of them were

aware of treatment guidelines from medical books, 0.9% of them were aware of Australian guidelines and 9.6% of them specified various other guidelines for CKD management. Another 28% of the respondents did not specify which guideline they were adhering to.

Obstacles and Motivational Factors in CKD Management

GPs were asked to rank their perceptions on obstacles and motivational factors. The questionnaire also had an open-ended option to capture other factors that were not listed. Table 5 shows the obstacles ranked in order of their mean ranks. The 3 most difficult obstacles ranked by the GPs are lack of access to support services, lack of time for consultation and inability of patient to pay for chronic care management. Some of the other obstacles listed by the GPs were lack of access (to specialist, to patient records, to necessary medications) and lack of confidence. Some of the patient factors (Table 6) that the GP felt were obstacles were patient's unwillingness to pay for the services, patients with multiple comorbidities, doctor hopping and ease of appointment.

Table 5. Obstacles for CKD Management, Ranked by Mean Rank Order

S/N	Obstacles for CKD management	Mean rank $\pm$ SD	Rank of Obstacles
1	Lack of support services. (i.e. dietician, diagnostic, laboratory)	2.3 ± 2.0	7
2	Lack of patient's trust in GP for chronic care management.	3.9 ± 1.9	4
3	Inability of patient to pay for chronic care management.	3.7 ± 1.9	5
4	Lack of access to patient's information (from hospital).	4.7 ± 1.7	1
5	Inability to bill for chronic care management.	4.5 ± 1.8	2
6	Lack of access to evidence-based guidelines.	4.3 ± 2.2	3
7	Lack of time for consultation.	3.6 ± 1.9	6

Rank score ranges from 1 to 7, (1: Easiest obstacle, 7: Most difficult obstacle)

CKD: Chronic kidney disease; GP: General Practitioner

Table 6. Obstacles in Chronic Kidney Disease Management and Verbatim Responses

GP factors	Patient factors
Lack of direct access / co-management with renal physician. (2)*	Patient not willing to pay for long consultation.
Lack of interest.	Worsening of condition (Complexity).
Nature of my practice.	Doctor hopping/ Lack of regular follow-up.
Not confident, Lack of sufficient support & experience (4)*	Lack of patient motivation / trust in GPs/ Lethargy / poor.
Lack of time to keep up-to-date.	Compliance to screening, diet/ defaulting patients. (2)*
Lack of medicine for CKD, e.g. Renavite, etc	Referring to OPD is still best option.
Speaking with hospital specialist who understands the situation in the community.	Difficulty obtaining an appointment.
No internet connection.	Patients fear and dislike seeing a GP.
Too much paperwork.	Lack of patients not channelled to specialised care.
	Lack of family / social support management.
	Lack of time to explain to the patient.

*The number in the parenthesis indicates the number of GPs who expressed similar opinion.

CKD: Chronic kidney disease; OPD: Outpatient department

Table 7. Motivational Factors for CKD Management, Ranked by Mean Rank Order

S/N	Motivational factors for CKD management	Mean rank $\pm$ SD	Rank of Motivational factors
1	Access to patient's information (from hospital).	2.8 ± 1.4	2
2	Access to updates and guidelines.	3.0 ± 1.4	3
3	Less cost to patient for chronic care management.	2.5 ± 1.3	1
4	Less time consumed in consulting chronic disease patients.	3.3 ± 1.3	5
5	More support services (i.e. Dietician, podiatrist, diagnostic laboratory).	3.2 ± 1.3	4

Rank score ranges from 1 to 5, (1: most motivating factor, 5: least motivating factor)

Table 8. Other Motivational Factors—Verbatim Responses

Access to specialist /Co-management with renal physician.
More interaction between the GP and renal physicians.
Adequate remuneration to GP, for time spent in managing CKD.
Technological assistance

- Not using computer—"So via internet is out for me".
 - For sharing information on medical records, diagnostic tests, etc
- Patient education
- Lack of patient education.
 - Lack of faith in the GP for CKD management.
 - Educate the patient to trust the GPs.
 - Compliance.
 - Poor patient compliance.

GP: General Practitioner; CKD: Chronic kidney disease

Table 7 shows the motivational factors for CKD management ranked in order of their mean ranks, 3 key motivational factors were less cost to patient for chronic care management, access to patient information and access to updates and guidelines.

Other motivational factors were co-management of the patient with the specialist, more interactions with the specialist and adequate remuneration for the GP for the time spent in managing CKD (Table 8).

GPs Opinion on Right-Siting CKD Care

Respondents were asked about their agreement or disagreement to the statement “GPs would help to reduce congestion at specialist outpatient clinics if they saw patients

Table 9. Reasons for Disagreeing to “Right-siting CKD Care”—Verbatim Responses

S/N	Reasons for disagreeing or staying neutral to “Right-siting CKD care”
1	Patients are not very comfortable with GP treating and price in CKD / Patients are at times reluctant to heed advice given to them/ Patient will not promptly come for follow-up. (3)*
2	Not too sure if I can handle CKD patients, may need training. (4)*
3	It will increase congestion at GP clinics.
4	GPs themselves are very busy too. (3)*
5	Don't see that many patients.
6	Better to be managed at specialist outpatient clinic.
7	(1) Poor coordination / communication between hospitals and GPs. (2) No access to patient's information.
8	GPs can handle CKD stage 1 only, stage 2 and 3 needs to be treated at SOC. (2)*
9	Unstable patients should be seen by specialists.
10	We would like to help but clinic may be busy already with their present patients.
11	There should be more specialists.
12	Patients continue to enjoy subsidised medication of RHs.
13	Patients must be stable, willing to follow-up at GP clinic and enjoy subsidised medications just as in RHs.
14	GPs are not seeing CKD for various reasons (from patient to system). All factors should align before congestion can be resolved.
15	Reducing anxiety about a disease will reduce congestion. Supply creates demand in healthcare economics. Person-serviced approach will reduce congestion.
16	Patients more confident with specialist care, prefer specialist care for reasons such as cost subsidy. (9)*
17	Clinic congestion due to many factors. (2)*

*The number in parenthesis represents the number of GPs who expressed similar opinion.

CKD: Chronic kidney disease; RHs: Restructured hospitals; GP: General Practitioner

with CKD state 1 to stage 3”. The options were “strongly disagree”, “mildly disagree”, “neutral”, “mildly agree”, “strongly agree”.

Thirty-six percent and 28% of the GPs strongly agreed and mildly agreed to the statement respectively. Table 9 shows their reasons for disagreement or neutral verdict. Some key reasons for their disagreement were, subsidised specialist care at SOCs appeared more appealing to the patients when compared to GP care, lack of training in GPs to manage CKD and the patient's lack of confidence in GPs for managing CKD.

GPs Preferred Mode for Continuing Medical Education (CME)

GPs were asked about their most preferred mode for delivering CME on chronic care. Thirty-percent of the GPs preferred e-learning website posts, 33% of them preferred talks by restructured hospitals, 17% of them preferred ad-hoc specialist talks sponsored by pharmaceutical companies, 12% of them preferred newsletter updates and 2% of them preferred congresses/conventions and workshops.

Multivariate Analysis

We explored the association between GPs confidence in managing CKD (stage 1 to 3), and factors such as age, gender, years in general practice, credentials, adherence to guidelines, screening for CKD and their opinion on “right-siting CKD care”. Factors found significant on univariate analysis were included in a multivariate model. Confidence in treating CKD stage 1 was higher for GPs who had 5 to 14 years of practice (OR: 5.6, 95% CI, 2.1 to 14.9) and over 15 years of practice (OR: 3.4, 95% CI, 1.2 to 10.0) when compared to GPs with less than 4 years in practice. However, years of practice did not affect GPs confidence in managing CKD stage 2 and 3. Similarly GPs who were aware of or adhering to CKD guidelines were more confident in managing CKD stage 1 (OR: 2.7, 95% CI, 1.1 to 6.4), no effect on CKD stage 2 and 3. GPs who agreed that right-siting would reduce congestion were more confident of treating CKD stage 1 (OR: 3.2, 95% CI, 1.4 to 7.6), no effect on CKD stage 2 and 3.

Discussion

The GPs in Singapore are less confident in managing CKD. Only half of the general practitioners were confident of managing CKD stage 1, 1 in 3 GPs were confident of managing CKD stage 2 and only 1 in 8 GPs were confident of managing CKD stage 3. Studies^{11,12,14} elsewhere also showed a knowledge gap in CKD management among the general practitioners. However, low practitioner confidence

and knowledge gaps have been reversed by educational interventions.¹⁵

Majority of the GPs reported screening for CKD; only 38% of the GPs were aware or adhering to CKD guidelines and this was higher than elsewhere.¹⁶ The GPs who reported screening for CKD but were unaware of CKD guidelines could be using diabetes, hypertension guidelines to screen for CKD. Lack of awareness of CKD clinical practice guidelines was identified as an important barrier to care. GPs who are unaware of the guidelines are less likely to recognise progression of CKD and recommend nephrologist care.¹⁷

Majority of the GPs agreed that right-siting early CKD (stages 1 to 3) would ease congestion, some of the key obstacles that were identified were lack of access to patient information, inability of patient to use Medisave for CKD consultation at GP clinics, lack of access to evidence-based guidelines, lack of patient trust in GPs for CKD management (poor patient buy-in), inability to bill the patient for the services provided, lack of time, lack of collaboration with a specialist for co/management and lack of adequate training. Some of the motivational factors other than the above mentioned factors were less cost to patient for chronic care management, more support services and less time consumed in consulting chronic disease patients.

Implications

Improve GPs Confidence in CKD Management: Currently there are no regular channels of communication between GPs and the nephrologist. This call for improved networking between the 2 providers to encourage co-management of CKD, more CME to increase GPs confidence and to address knowledge deficits, collaborative development of clinical practice guidelines.^{17,18}

Secure Patient's Buy-in: Patients have an impression that SOC's care is superior to GP care, when both serve different but equally important functions in the healthcare delivery spectrum. These taboos have to be cleared by engaging the media and the providers to help improve the image of the GPs, so that patients would be willing to be right-sited.^{10,19}

Address Systemic / Structural Issues: Singapore's healthcare has become increasingly specialised and has improved care delivery within the respective specialty domains. However, the healthcare in its entirety is fragmented, and ultimately, no one has the ownership of the patient. In contrast, patients in UK are followed up with the same GP (or GP practice); this promotes continuity of care and is in line with the concept of a primary physician. It is time to explore this model, while preserving patient choice.²⁰

The extension of the Primary Care Partnership Scheme (PCPS) to patients with chronic diseases is a welcome move. However, within the primary care providers, polyclinic

treatment (chronic patients) is currently cheaper than treatment at GP clinics, given the subsidised drug prices and consultation fees. Thus, patients prefer to stay in the treatment cycle between polyclinics and SOC's, further hindering right-siting efforts. Liberalisation of subsidy policies would address certain critical issues to right-siting such as differential drug and tests pricing (GPs vs hospitals) and differential cost subsidy.^{8,9}

Another barrier to CKD right-siting is the access to patient records; coordination of care requires seamless sharing and transfer of information among the team of providers. Some GPs are not IT-ready, hence are unable to access patient records from SOC's and Restructured Hospitals (RHs) and vice versa. The National Electronic Healthcare Record when made available would facilitate integration and advancing communication between institutions, caregivers and patients. Slow standardisation of health IT systems across hospitals and clinics despite continuous efforts in this area also remains a challenge.¹⁸

Incentivise GPs: The service contracts and other financial arrangements between GPs and their tertiary partners at SOC's that reward GPs for the attainment of defined patient outcomes could also be explored. Other performance-based measures and payments should be explored to incentivise doctors to improve the overall delivery of care and management of patient outcomes.¹⁸

Seamless Care Integration: The Agency for Integrated Care (AIC) has been set up by the Ministry of Health (MOH) in 2009 to oversee, coordinate and facilitate all efforts in care integration by facilitating integration projects involving partners across the primary, acute, intermediate- and long-term care (ILTC) and home care sectors. Seamless care integration could be achieved only by effective and efficient communication and collaboration of all providers.

Limitations: The surveyed GPs were derived from the NHG GP partner database, a voluntary database, which may not be nationally representative. The views of GPs enrolled in the partner programme may be more positive in comparison to those who are not enrolled in the programme. Limitations notwithstanding, this study has identified crucial factors which when addressed could lead to wider acceptance of CKD right-siting by both the patients and the GPs.

Right-siting Unanswered Questions: Though efforts are being made to right-site chronic care to the GPs, we do not know if the health outcomes are as good in the primary care setting as in the hospitals. Crucial information like the cost of transferring care and the cost benefit of right-siting CKD care are unavailable. The sustainability of diverting low cost cases, on which hospitals make a profit, while leaving them with complex cases, is questionable. While the principle of right-siting is sound, questions on cost, quality and patient

acceptance are largely unanswered.

Conclusion

GPs in Singapore screen patients for CKD, however their awareness of CKD guidelines is limited and they are less confident in managing CKD stage 2 and 3. The study also highlights some of the important barriers to right-siting CKD care in Singapore. Opportunities exist for improvement, which includes increasing GPs' recognition of CKD, awareness of the evidence-based CKD guidelines, improving collaborative care with nephrology and reimbursement for the patient and the provider.

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Appendix 1. A General Practitioner and Family Physicians Survey in 2010.

Section A [Please circle the appropriate choice(s)]		
A1	On the average ... of my patients have diabetes	1. 0% -24% 2. 25% – 49% 3. 50% – 74% 4. 75% + 5. Others, specify: 6. Don't know
A2	On the average I treat and manage CKD patients in a year	Answer: number of patients (Approximate)
A3	My confidence level in managing patients with CKD stages 1 is	1. Not confident at all 2. Not confident 3. Neutral 4. Quite confident 5. Very confident
A4	My confidence level in managing patients with CKD stages 2 is	1. Not confident at all 2. Not confident 3. Neutral 4. Quite confident 5. Very confident
A5	My confidence level in managing patients with CKD stages 3 is	1. Not confident at all 2. Not confident 3. Neutral 4. Quite confident 5. Very confident
A6	I normally screen for chronic kidney disease	1. Yes 2. No Skip to A9
A7	The diseases for which I would screen for CKD include (please circle all that applies)	1. Type 1 & 2 Diabetes 2. Hypertension 3. CVD 4. Age > 55 years 5. Obesity 6. Family history of ESRD

A8	I use the following tests to screen patients for CKD (please circle all that applies)	1. Serum creatinine 2. Serum creatinine with eGFR 3. Urinalysis/ UFEME 4. Urine dipsticks to estimate protein or albumin 5. Random urine albumin or urine protein 6. Random urine albumin creatinine ratio or urine protein creatinine ratio 7. 24-hour urine creatinine clearance 24-hour urine protein excretion
A9	I am adhering to or are aware of CKD guidelines.	1. Yes 2. No 3. Don't know/ Not sure
A10	The guidelines which I am currently adhering to or are aware of for CKD management are	
A11	I mostly refer my patients with diabetes for retinopathy screening to	1. Govt restructured hospitals, specify..... 2. Private Hospitals specify..... 3. Polyclinics specify..... 4. Others, specify.....
A12	I mostly refer my patients with diabetes for foot screening to	1. Govt restructured hospitals, specify..... 2. Private Hospitals specify..... 3. Polyclinics specify..... 4. Others, specify.....
A13	I would like to offer 'retinopathy screening' for patients with diabetes at my clinic	1. Yes 2. No 3. Don't want to respond
A14	I would like to offer 'foot screening' services for patients with diabetes at my clinic	1. Yes 2. No 3. Don't want to respond
A15	I would like to offer 'mobile dietician' services at my clinic	1. Yes 2. No 3. Don't want to respond
A16	I would be interested to offer the following services to my patients, if XXX can provide the support needed. (please circle all that applies)	1. Physiotherapy 2. Smoking cessation 3. Counselling & patient education 4. Weight management 5. Stress management 6. Others, specify.....
A17	I would refer patients who require physiotherapy services to the polyclinic	1. Yes, specify..... 2. No 3. Don't want to respond

A18	I would refer patients who require smoking cessation services to the polyclinic	1. Yes, specify..... 2. No 3. Don't want to respond	
A19	I would refer patients who require counseling and patient education services to the polyclinic	1. Yes, specify..... 2. No 3. Don't want to respond	
A20	I would refer patients who require weight management to the polyclinic	1. Yes, specify..... 2. No 3. Don't want to respond	
A21	I would refer patients who require stress management to the polyclinic	1. Yes, specify..... 2. No 3. Don't want to respond	
A22	I would mostly refer my patients toin the event they need specialized care for chronic conditions	1. Private hospital, specify..... 2. Restructured hospital, specify.....	
Section B [Please rank or circle the appropriate choice(s)]			
B1	I would rank the issues or obstacles in order of 1-8 (1=easiest to 8=most difficult) in the management of patients with CKD:	1. Lack of support services (i.e.: dietician, diagnostic, laboratory) 2. Lack of patient's trust in GP for chronic care management 3. Inability of patient to pay for chronic care management 4. Lack of access to patient's information (from hospital) 5. Inability to bill for chronic care management 6. Lack of access to evidence-based guidelines 7. Lack of time for consultation 8. Others, specify	rank from 1-8
B2	I would rank the motivational factors in order of 1-6 (1=most motivated to 6=least motivated) to participate in the management of patients with CKD:	1. Access to patient's information (from hospital) 2. Access to updates & guidelines 3. Less cost to patient for chronic care management 4. Less time consumed in consulting chronic disease patients 5. More support services (i.e.: Dietician, podiatrist, diagnostic, laboratory) 6. Others, specify.....	rank from 1-6

B3	Please state if you agree or disagree to the following statement “GPs would help to reduce congestion at specialist outpatient clinics if they saw patients with CKD stage 1 – early stage 3”	1. Strongly Disagree 2. Mildly disagree 3. Neutral 4. Mildly agree 5. Strongly Agree
B3.1	Could you briefly describe your reasons for the above choice?	Answer:
B4	My most preferred mode for delivery of Continuous Medical Education (CME) on chronic care would be: (Please tick one box only)	1. E-learning website posts 2. Talks by Restructured Hospitals/Polyclinics 3. Ad hoc specialists talks organized by pharmaceutical companies 4. Newsletter updates 5. Others, specify
B5	Would you like your clinic assistants to undergo training to support chronic care management for CKD:	1. Yes 2. No 3. Not sure/Don't want to respond
Section C [Please circle the appropriate choice(s)]		
C1	Gender	1. Male 2. Female
C2	Ethnicity	1. Chinese 2. Malay 3. Indian 4. Others
C3	Age	1. ≤ 30 yrs old 2. 30 – 39 yrs old 3. 40 – 49 yrs old 4. 50 – 59 yrs old 5. ≥ 60 yrs old
C4	Credentials	1. MBBS 2. Master of Medicine 3. Graduate Diploma specify..... 4. Masters in specify..... 5. Other specify.....
C5	I have been in general practice for	Answer: years
C6	My practice postal code is	Answer: