Knowledge Regarding Management of Diabetic Nephropathy Among Medical Officers (MO) at HUSM and Its Association With MO Profiles

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ABSTRACT

Knowledge Regarding Management of Diabetic Nephropathy Among Medical Officers (MO) at Hospital Universiti Sains Malaysia (HUSM) and Its Association With MO Profiles.

Background: Many studies had assessed the knowledge and practices among the physicians in the management of chronic kidney disease (CKD) but no specific study to assess the knowledge of medical officers regarding the management of diabetic nephropathy. Many patient with diabetic nephropathy are seen by medical officers level, who are less experienced than nephrologists to offer optimal care. It is not known whether knowledge regarding management of diabetic nephropathy among medical officers are adequate in care of diabetic nephropathy patient and whether characteristics of medical officer are associated with having adequate knowledge.

Study Design: Cross-sectional study.

Setting & Participants: Self administered Questionnaire to medical officers at two medical based department HUSM (n=102) with distribution of 51 Internal Medicine and 51 Family Medicine in April 2011. The questionnaire consist of four knowledge domains regarding management of diabetic nephropathy and had established validation.

Predictor or Factor: MO characteristics, including age, sex, specialties, years since graduation, attended seminar, status (either service MO or Master MO) and year of master program.

Outcomes & Measurements: Total performance score (maximum=35). Adequate level of knowledge determined by expert panels as score of ≥67%. Regression analysis of the association between MO profiles and overall MO knowledge of diabetic nephropathy.

Results: Total 102 out of 108 (94%) eligible medical officers returned a completed survey. Overall, 49% of medical officers have adequate level of knowledge. All medical officers have managed diabetic nephropathy cases but even so, only 78% of them have attended seminars/ talks or workshops regarding diabetic nephropathy. Overall, no relationship between level of knowledge and MO specialties (Internal Medicine Vs Family Medicine department). There were also no significant relationship between level of knowledge and status of MO (service MO or master MO). There were significant relationship between level of knowledge and year of master (p=0.016) and year four masters MO had more than 7 fold greater odds of showing a adequate level of knowledge compared with MO who are not yet joining master (95% CI 1.44,36.20, p = 0.016).

Limitations: The questionnaire type of study is limited to test all type of knowledge (such as recall, comprehension, application, analysis, synthesis and evaluation). Domain of patient management such as patient education were not included in this questionnaire. This study not addressed the attitude and practice of MO regarding management of diabetic nephropathy.

Conclusion: We found that medical officers have significant gaps in their knowledge regarding management of diabetic nephropathy that might require further improvement for better future patient care. Master training may offer the best opportunity to improve the awareness and knowledge of diabetic nephropathy guidelines through more focused educational efforts.

Key words: Diabetic Nephropathy, Medical Officer, Internal Medicine, Family Medicine, Questionnaire.

ABSTRAK

Pengetahuan Mengenai Pengurusan Penyakit Buah Pinggang Yang Disebabkan oleh Kencing Manis (*Diabetic Nephropathy)* Di kalangan Pegawai Perubatan di HUSM dan Kaitannya dengan Profil Pegawai Perubatan.

Latar Belakang: Kebanyakan kajian lepas dijalankan untuk menguji tahap pengetahuan dan amalan para pengamal perubatan mengenai pengurusan penyakit buah pinggang kronik *(Chronic Kidney Disease)* tetapi belum ada kajian yang menjurus kepada pengetahuan pegawai perubatan *(medical officer)* dalam perawatan penyakit *diabetic nephropathy* khususnya. Pesakit *diabetic nephropathy* kebanyakannya dilihat oleh peringkat pegawai perubatan sahaja yang mana kurang berpengalaman berbanding pakar buah pinggang yang sepatutnya di dalam pemberian rawatan yang optima. Justeru itu, masih tidak diketahui adakah pengetahuan di kalangan pegawai perubatan ini mencukupi di dalam penjagaan pesakit *diabetic nephropathy* dan samaada ciri-ciri pegawai perubatan bersangkut paut terhadap pengetahuan yang mencukupi di kalangan pegawai perubatan.

Bentuk Kajian: Kajian hirisan lintang.

Penglibatan: Borang kajian soal selidik diedarkan kepada dua jabatan di HUSM (n=102) dengan pembahagian; perubatan dalaman,51 dan perubatan keluarga,51. Borang kajian soal selidik terbahagi kepada empat bahagian mengenai perawatan pesakit ‘diabetic nephropathy’ dan telah di ‘validate’.

Faktor berkaitan: Ciri-ciri pegawai perubatan termasuklah umur, jantina, jabatan, jumlah tahun sejak graduasi, kehadiran seminar sebelumnya dan status (samaada sebagai pegawai perubatan servis ataupun pegawai perubatan master) dan tahun pengajian di dalam program master.

Penanda aras: Jumlah markah purata keseluruhan (maksimum =35). Tahap pengetahuan ditentukan oleh ‘expert panel’. Analisa pengurangan (regression analysis) digunakan untuk mengetahui perkaitan antara ciri-ciri pegawai perubatan dengan markah keseluruhan.

Keputusan: Seramai 102 daripada 108 (94%) pegawai perubatan telah mengembalikan borang kaji selidik dengan lengkap. Semua pegawai perubatan melaporkan pernah merawat kes *diabetic nephropathy* namun begitu, hanya 78% sahaja yang pernah menghadiri seminar-seminar/ ceramah/ bengkel mengenai *diabetic nephropathy.* Secara keseluruhannya, didapati tiada beza tahap pengetahuan di kalangan pegawai perubatan diantara Jabatan Perubatan Dalaman dan Perubatan Keluarga. Selain itu, status pegawai perubatan (servis atau master) juga tidak berkaitan dengan tahap pengetahuan. Tahun pengajian di dalam master program berkaitan dengan tahap pengetahuan dan pegawai perubatan master tahun empat menunjukkan 7 kali ganda lebih berpengetahuan berbanding pegawai perubatan yang belum lagi menyertai master (95% CI 1.44,36.20 p=0.026).

Limitasi: Kajian jenis kajiselidik adalah terhad dan tidak berupaya menguji semua jenis tahap pengetahuan. ‘Domain’ yang lain seperti pendidikan pesakit tiada di dalam borang kaji selidik ini. Kajian ini juga tidak menekankan ‘attitude’ dan ‘practice’ mengenai perawatan ‘diabetic nephropathy’.

Penutup: Kami mendapati bahawa pegawai perubatan mempunyai jurang di dalam pengetahuan mengenai perawatan *diabetic nephropathy* dan ini memerlukan usaha penambahbaikkan demi penjagaan pesakit yang lebih baik di masa akan datang. Latihan kepakaran *(master training)* mungkin berupaya menyediakan peluang yang terbaik untuk memperbaiki tahap kesedaran dan pengetahuan mengenai *diabetic nephropathy* melalui usaha pengajaran yang lebih fokus.

1.0 INTRODUCTION

1.1 Diabetes and diabetic nephropathy

The prevalence of diabetes mellitus has risen worldwide. Diabetes prevalence is increasing most rapidly in the developed countries undergoing transition from traditional to modern lifestyles. Other factors responsible for the increasing prevalence of diabetes include changes in diagnostic criteria, increased public awareness, decreasing overall mortality, increase in the magnitude and frequency of obesity, and the widespread adoption of a sedentary lifestyle.

According to the 3rd National Health and Morbidity Survey of Malaysia 2006, the prevalence of diabetes mellitus in Malaysia has risen to 14.9% from 8.3% in 1996. With the global epidemic of type 2 diabetes mellitus, diabetes has become the leading cause of end stage renal failure (ESRF) in most countries. Diabetic renal disease is a serious problem resulting from microvascular complications in both type 1 and type 2 diabetes mellitus (Ulasi, 2005). Approximately 20 – 30% of all diabetic subjects will develop evidence of diabetic nephropathy, which represents a continuum from microalbuminuria, to overt nephropathy or microalbuminuria, and finally ESRF (Soldatos and Cooper, 2008).

Diabetic nephropathy is a clinical syndrome characterized by the following (Vecihi Batuman. *et al.*, 2011):

- Persistent albuminuria (>300 mg/d or >200 µg/min) that is confirmed on at least two occasions 3-6 months apart
- Progressive decline in the glomerular filtration rate (GFR)

- Elevated arterial blood pressure

Proteinuria was first recognized in diabetes mellitus in the late 18th century. In the 1930s, Kimmelstiel and Wilson described the classic lesions of nodular glomerulosclerosis in diabetes associated with proteinuria and hypertension (Kimmestiel and Wilson, 1936).

Diabetic nephropathy has been classically defined as increased protein excretion in urine. Early stage is characterized by a small increase in urinary albumin excretion (UAE), also called microalbuminuria or incipient diabetic nephropathy (Viberti G.C. *et al.*, 1982, Mogensen C.E. and C.K., 1984). More advanced disease is defined by the presence of macroalbuminuria or proteinuria. The latter is classically named overt diabetic nephropathy.

Microalbuminuria represents the earliest clinical evidence of diabetic nephropathy and is a marker of increased cardiovascular morbidity and mortality. Its early detection allows the implementation of individualised and aggressive intervention programmes to reduce cardiovascular risk factors. The high prevalence of micro or macroalbuminuria observed in Asian type 2 diabetic patients is alarming (58.6%) and indicates an impending pandemic of diabetic cardiovascular and renal diseases in Asia according to MicroAlbuminuria Prevalence (MAP) Study (Wu *et al.*, 2005). It was a cross-sectional study, involved hypertensive type 2 diabetic adult patients in 103 centres in 10 Asian countries including Malaysia. A total of 6,801 patients were enrolled and 5,549 patients constituted the per-protocol population and the result showed, the prevalence of macroalbuminuria was 39.8% and the prevalence of microalbuminuria was 18.8%. This study also found that only 11.6% of the patients had systolic and diastolic blood pressure below the 130/80 mm Hg target.

A study was also done in Sarawak (Wong, 2005) shows the prevalence of proteinuria in diabetic in a Primary Health Care Setting in Sarawak was 48% (proteinuria or microalbuminuria). In this study, from 970 cases where urine test results were tested, 315 (32%) were positive for proteinuria using urine dipstick (overt proteinuria). Remaining of the cases that tested negative for proteinuria were further tested microalbuminuria and 155 cases (32%) had a positive test for microalbuminuria.

In Malaysia, more and more new dialysis patients were reported to have diabetes mellitus accounting for more than half of all new dialysis patients since 2002. According to 17th Report of the Malaysian Dialysis and Transplant Registry 2009, 58% of the new dialysis patient in year 2009 were due to diabetes mellitus compared to other causes like hypertension (13%), glomerulonephritis (3%), obstructive uropathy (2%), systemic lupus erythematous (1%) and unknown cause (27%) (Lim Yam Ngo *et al.*, 2009).

1.2 Management strategies for diabetic nephropathy

The best treatment is a multiple risk factor interventional approach. The goal to be pursued is retarding the development or progression of diabetic nephropathy and to decrease the subject's cardiovascular risk and mortality.

Approaches for management can be considered from the perspectives of both primary and secondary prevention (Paul M. Zabetakis. and Nissenson., 2000).

❖ **Primary prevention:**

- ✓ Glycemic control in type 1 diabetes: reduces the onset of microalbuminuria and slows the progression of nephropathy.
- ✓ Glycemic control in type 2 diabetes: reduces the onset of microalbuminuria.
- ✓ Control of blood pressures: reduces progression of nephropathy.

❖ **Secondary prevention:**

- ✓ Strict glycemic control in type 1 diabetes: slows the rate of rise of proteinuria and the onset of overt nephropathy with microalbuminuria.
- ✓ Anti-hypertensive treatment: slows the rate of progression of albuminuria in type 1 and type 2 diabetes.
- ✓ ACE inhibition: delays progression of kidney dysfunction as determined by creatinine levels.

1.3 Specific management of diabetic nephropathy

a) Blood pressure control

Treatment of hypertension leads to an important risk reduction in cardiovascular and microvascular events. According to UK Perspective Diabetes Study Group in 1998, a reduction from 154 to 144 mm Hg on systolic blood pressure reduced the risk for the development of microalbuminuria by 29%. The Seventh Report of the Joint National Committee (JNC 7) on Prevention, detection, evolution, and Treatment of High Blood Pressure, JNC 7 reported that BP targets for patients with DM are lower (130/80 mm Hg) than those for patients without DM (Chobanian AV *et al.*, 2003).

Adequate blood pressure control in diabetes mellitus patients decreases onset of both microalbuminuria and macroalbuminuria as well as improvement of retinopathy with systolic blood pressure target < 130mmHg (Chobanian AV *et al.*, 2003).

In the Hypertension Optimal Treatment (HOT) study a reduction of diastolic BP from 85 to 81 mm Hg resulted in 50% reduction in the risk of cardiovascular events in diabetic but not in non-diabetic patients (Hansson L *et al.*, 1998).

According to Modified Diet in renal Disease (MDRD) trial, patients with proteinuria >1 g/day and renal insufficiency had a slower decline in renal function when BP was <125/75 mm Hg (Peterson JC *et al.*, 1995).

In order to reach the BP goal of 130/80 mmHg in diabetic patients in general or 125/75 mmHg in patients with protienuria >1.0 g/24 h and increased serum creatinine, three to four antihypertensive agents are usually necessary (Bakris, 2001).

ACE inhibitors are recommended as first-line therapy for patients with type 1 and type 2 diabetes. Angiotensin-II receptor blockers are now recommended as first-line therapy for patients with type-2 diabetes by the American Diabetes Association. Both classes of drugs reduce the risk of the development or progression of overt nephropathy. Other agents that can be used to lower blood pressure include Beta blockers, calcium channel blockers, and diuretics.

The non-dihydropyridine calcium channel blockers have been shown to lower protein excretion in patients with diabetes (Bakris, 1990). Their antiproteinuric effect may be

due to reduction in intraglomerular pressure, reduction in glomerular hypertrophy, and improved glomerular size (diltiazem). The dihydropyridine calcium channel blockers have a variable effect on protein excretion ranging from increased protein excretion to no effect to a fall in protein excretion in various studies.

b) Glycemic control

Glycemic control improves not only hyper filtration but also microalbuminuria, macroalbuminuria and progression to diabetic nephropathy (Araki S *et al.*, 2005, Ismail-Beigi F *et al.*, 2010). The American Diabetes Association recommends that treatment aim at achieving glycemic target HbAlc of <7%.

According to the Action to Control Cardiovascular Risk in Diabetes Study (ACCORD study), it was a randomized study, 10,000 patients were involved and 35% had a previous cardiovascular event, were assigned to receive either intensive therapy (targeting a glycated haemoglobin level below 6.0%) or standard therapy (targeting a level from 7.0 to 7.9%) and the result showed higher mortality in the intensive-therapy group led to a discontinuation of intensive therapy after a mean of 3.5 years of follow-up.

Possibility of significant hypoglycaemia and increased mortality in those with cardiovascular co-morbidity with intensive blood glucose lowering with insulin and oral agents, careful monitoring of haemoglobin Al C is necessary and perhaps should be maintained closer to 7% in this patient group (Ismail-Beigi F *et al.*, 2010).

We should also keep in mind that therapeutic goals should be individualized. Target blood sugar levels can be achieved using oral hypoglycaemic agents, insulin, or a

combination of both. A variety of oral agents are available for type 2 diabetes patients prior to the need for insulin therapy. Some require dose adjustment and should be used with caution in diabetic nephropathy patients with renal dysfunction, particularly with GFR <60 ml/min (stage 3 or greater chronic kidney disease, CKD) due to high risk of hypoglycaemia (Ahmed Z *et al.*, 2009).

c) Preventing Microalbuminuria

High blood pressure is an independent risk factor for nephropathy and may precede and accelerate the development of microalbuminuria. An additional reason for considering ACE inhibitors as first-line therapy in hypertensive patients with diabetes is therefore the dual potential benefit of reducing blood pressure and preventing microalbuminuria and related morbidity. Results from the Action in Diabetes and Vascular disease: PreterAx and DiamicroN modified release Controlled Evaluation (ADVANCE) trial showed that metabolic control also has a key role in preventing microalbuminuria (Patel, 2008). In 11,140 patients with type 2 diabetes, reduced glycated haemoglobin (HbA_{1c}) level to below 6.5% reduced the incidence of microalbuminuria by 9% and the risk of renal function worsening by 21% compared with standard glucose control. Although strict metabolic control did not translate into a reduced cardiovascular risk, HbA_{1c} targets below 7% may be appropriate for preventing microvascular complications.

d) Preventing Overt Nephropathy

i) Type 1 Diabetes:

The European Microalbuminuria Captopil Study showed that ACE inhibition was associated with a decreased incidence of overt nephropathy (defined as the development of persistent macroalbuminuria) and with preserved renal function compared with placebo in normotensive patients with type 1 diabetes, microalbuminuria and normal kidney function (Viberti *et al.*, 1994).

ii) Type 2 Diabetes:

The Heart Outcome Prevention Evaluation (HOPE) study investigated whether the addition of the ACE inhibitor Ramipril to the current medical regimen of high risk patients with diabetes mellitus can lower the risk of cardiovascular events. In the MIcroalbuminuria, Cardiovascular, and Renal Outcomes (MICRO) HOPE sub study, the effect of Ramipril on the risk of overt nephropathy was investigated. The interpretation showed that Ramipril has beneficial for cardiovascular events and overt nephropathy in people with diabetes. The cardiovascular benefit was greater than that attributable to the decrease in blood pressure. This treatment represents a vasculoprotective and renoprotective effect for people with diabetes (H C Gerstein *et al.*, 2000). IRbesartan in patients with type 2 diabetes and MicroAlbuminuria (IRMA) study, is a randomized clinical trial involving 590 hypertensive patients with type 2 diabetes and microalbuminuria (Parving, 2001). The study found that a median of 2 years of treatment with 300 mg per day of the ARB Irbesartan was associated with a threefold reduction in the incidence of macro-albuminuria compared with placebo. The Aliskiren in the evaluation of proteinuria in Diabetes (AVOID) trial (Parving *et al.*, 2008) was a randomized, double-blind, placebo-controlled, multinational study that aimed to

evaluate the antiproteinuric effect of aliskiren (300 mg per day) in 599 hypertensive patients with type 2 diabetes and nephropathy who were on therapy with losartan at a fixed dose of 100 mg per day. The researchers found that treatment with aliskiren for 24 weeks was associated with a 20% reduction in albuminuria (compared with no change with placebo). These findings led the authors to conclude that aliskiren might have renoprotective effects that are independent of its blood-pressure-lowering effects in patients with hypertension, type 2 diabetes, and nephropathy.

e) Preventing End Stage Renal Disease

i) Type 1 Diabetes:

In 1993, the Collaborative Study (Lewis *et al.*, 1993) found that in 409 patients with type 1 diabetes, albuminuria >500 mg per day and serum creatinine <221 µmol/l (<2.5 mg/dl), 3 years of captopril treatment was associated with a 50% reduction in the incidence of a combined end point of doubling of serum creatinine, progression to end-stage renal disease (ESRD) or death, compared with placebo.

ii) Type 2 Diabetes:

The Irbesartan in Diabetic Nephropathy Trial (IDNT) (Lewis *et al.*, 2001) showed that ARB therapy (versus placebo) decreased the incidence of a composite end point of doubling of serum creatinine concentration, ESRD, or death by 19% in large cohorts of patients with type 2 diabetes and overt nephropathy.

f) Preventing Cardiovascular Events

Although ACE inhibitors and ARBs seem to be similarly renoprotective in patients with diabetes, studies also suggest that these agents may have different effects on cardiovascular outcomes. ABCD (Appropriate Blood Pressure Control in Diabetes) trial has compared the effects of two treatments (the ACE inhibitor enalapril versus calcium-channel blocker nisoldipine) and two target blood pressures (diastolic <75 mmHg versus diastolic 80-90 mmHg) in patients with type 2 diabetes and normoalbuminuria, microalbuminuria or macroalbuminuria. The results of ABCD trial (Patel, 2008) showed five fatal or nonfatal acute myocardial infarctions occurred in the 235 patients (2.1%) on enalapril compared with 25 such events in the 235 patients (10.6%) on calcium-channel blocker, nisoldipine. It also showed that ACE-inhibitor therapy was associated with a greater decrease in left ventricular mass than was treatment with nisoldipine.

In the Losartan Intervention For Endpoint reduction in hypertension (LIFE) study (Lindholm *et al.*, 2002) fatal or nonfatal cardiovascular events occurred in 103 of 586 patients (17.6%) with type 2 diabetes allocated to losartan compared with 139 of 609 patients (22.8%) allocated to the β-blocker atenolol. However, these findings were confounded by the higher prevalence of cardiovascular risk factors (such as smoking, systolic hypertension, and atrial fibrillation) and more-severe diabetes at baseline among the individuals assigned to atenolol.

1.4 Prognosis of diabetic nephropathy

Diabetic nephropathy accounts for significant morbidity and mortality. Microalbuminuria independently predicts cardiovascular morbidity, and microalbuminuria and macroalbuminuria increase mortality from any cause in diabetes mellitus. Microalbuminuria strongly predicts the development of diabetic nephropathy: patients with type 1 and type 2 diabetes with microalbuminuria have a 21-fold and nine fold increased risk, respectively, of developing diabetic nephropathy compared with those without microalbuminuria. Microalbuminuria is also associated with increased risk of coronary and peripheral vascular disease and death from cardiovascular disease in the general nondiabetic population.

Diabetic nephropathy is found to be significantly associated with diabetic retinopathy and coronary artery disease (Chandy *et al.*, 2008). Moreover, 40-50% of patients with type 2 diabetes and microalbuminuria eventually die of cardiovascular disease (Eurich *et al.*, 2004) and this proportion is three times higher than the proportion of deaths attributed to cardiac causes among patients who have diabetes but no evidence of renal disease.

Preventing microalbuminuria is therefore instrumental in preventing the eventual progression to overt renal disease and may help to limit the excess cardiovascular risk associated with diabetes. Intensified metabolic and blood-pressure control, particularly with RAAS-inhibitor therapy, might also lead to the regression of microalbuminuria (Parving, 2001).

1.5 Knowledge and management of diabetic nephropathy

Knowledge of the risk factors for the development of chronic kidney disease especially due to diabetic nephropathy is crucial for prevention of the disease process (Duaine D. Murphree and Thelen., 2010). In addition, with rising in the prevalence of chronic kidney disease, the role of the family physician in improving patient care and disease outcomes has become increasingly evident and with that regard, additional training and education about chronic kidney disease and its complications is warranted to better equip family physicians to directly impact disease progression (Duaine D. Murphree and Thelen., 2010). It has been shown that primary care physicians' familiarity with chronic kidney disease is suboptimal (Rubeen K. Israni *et al.*, 2009). According to (Rubeen K. Israni *et al.*, 2009) also, the outcome of chronic kidney disease (CKD) including progression to end stage renal disease (ESRD) is influenced by patient's treatment and is known to be suboptimal. From their study regarding physician characteristics and knowledge of CKD management, only 35% of the physicians have adequate knowledge. They had concluded in their study that, knowledge plays an important role in attitude and practice of physicians and therefore, there is need to improve CKD knowledge in primary care physician, especially regarding recognition of CKD at an early stage.

Previous questionnaire study done by (Shaista Tamizuddin and Ahmed., 2010), in their survey involved 114 doctors regarding knowledge, attitude and practices regarding chronic kidney disease and estimated GFR in a tertiary care hospital in Pakistan have found that majority of the study subjects (78%) were aware that eGFR is better than raised serum creatinine alone in assessing severity of kidney disease but 48% of the subjects were not aware when to refer based on eGFR, 84% of the respondents knew implications of late

referral (morbidity and mortality) but despite that, 55% would still not refer to nephrologists even if it was indicated. In that study, the authors have concluded that there is a need for continuing education and awareness among physicians regarding CKD management and benefits of timely referral to a nephrologist that may have a significant impact on CKD management and outcome of these patients.

1.6 Diabetic nephropathy at HUSM

Hospital Universiti Sains Malaysia is located at Kubang Kerian, Kelantan. This hospital being a tertiary centre for nephrology cases from whole Kelantan including cases from Besut, Terengganu. Despite that, this hospital only has two nephrologists currently. At HUSM, majority of the diabetic nephropathy cases were manage as outpatient basis either at the nephrology clinic or outpatient clinic, Klinik Rawatan Keluarga (KRK). There are two types of medical officers at HUSM, service medical officers and master medical officers. In managing diabetic nephropathy, patients at outpatients' basis were seen by Family Medicine MO whereas inpatient referrals usually were seen by medical officers from Internal medicine. Because of the large number of patients with diabetic nephropathy and CKD and a relatively smaller number of nephrologists, most patients are likely to receive their renal disease care from the medical officers. It is not known whether knowledge regarding management of diabetic nephropathy among medical officers might have an important role in the suboptimal care of diabetic nephropathy patient and whether profiles of medical officer are associated with level of their knowledge. This study was conducted to assess the level of knowledge of medical officers (MO) at Internal Medicine department and Family Medicine department

Hospital Universiti Sains Malaysia regarding the knowledge related to diabetic nephropathy and its association with MO profiles.

1.7 Knowledge that necessary (for MO) for proper management

According to (Duaine D. Murphree and Thelen., 2010) there are at least five main domains that required by the family physicians to provide quality care for their patients with chronic kidney disease and the domains are; screening, prevention, intervention to slow the progression, complication and patient education.

In order to assess the knowledge regarding management of diabetic nephropathy in medical officers, we had developed 35-item questionnaire based on KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for Diabetes and Chronic Kidney Disease, 2007. The questionnaire has developed according to four domains which were consist of screening & early diagnosis, prevention (primary and secondary), intervention to slow the disease progression and complications. The questions were one best answer and multiple true/ false type. We have done the questionnaire validation test in view of no available validated questionnaire on diabetic nephropathy were found.

We hope that the data collected in this study would provide the information about the gaps in knowledge among medical officers at HUSM related to diabetic nephropathy management and therefore, we will able to improve it for future patient's better management.

2.1 RESEARCH QUESTIONS

1. Is the level of knowledge regarding management of diabetic nephropathy among Medical Officer (MO) at both Internal Medicine and Family Medicine department HUSM adequate?

2. Is there relationship between knowledge and MO speciality (Internal medicine Vs Family medicine) & status of MO (Service MO Vs Master MO)?

3. Is there an association between MO profiles (age, gender, years since graduation, status: MO service/MO master, year in master program and specialties) with level of knowledge?

2.2 NULL HYPOTHESIS

1) The level of knowledge regarding management diabetic nephropathy among Medical Officer (MO) at HUSM is inadequate.

2) There are no relationship between knowledge and MO specialties (Internal medicine Vs Family medicine) & status of MO (Service MO Vs Master MO).

3) There are no associations between MO profiles (age, gender, years since graduation, status: MO service/MO master, year in master program, specialties) with level of knowledge.

2.3 OBJECTIVES

Primary Objectives:

1. To develop and validate a questionnaire for medical officers on knowledge regarding management of diabetic nephropathy.

2. To assess the medical officer's knowledge using the above validated questionnaire.

Secondary Objectives:

1) To determine the mean performance score of MO on knowledge regarding management of diabetic nephropathy.

2) To determine level of knowledge regarding management of diabetic nephropathy among medical officers at HUSM.

3) To determine relationship between knowledge and MO specialties (Internal medicine Vs Family medicine) & status of MO (Service MO Vs Master MO).

4) To determine association between MO profiles with adequacy of knowledge.

3.0 METHODOLOGY

3.1 Study design: A cross sectional study

3.2 Study area: Hospital Universiti Sains Malaysia, Kubang Kerian Kelantan.

3.3 Study population:

All medical officers from medical based department (internal medicine and family medicine department) at HUSM, n=102 (51 internal medicine, 51 family medicine).

3.4 Estimation of the sample size

a) According to one study (Rubeen K. Israni *et al.*, 2009) reported that 35% of their participants (primary care physicians) have adequate knowledge on CKD management based on correctly answering at least 24 of 27 knowledge items. Therefore, by using single proportion formula,

(P=0.35)

(1-P) = 0.65

Precision: 0.1 (10%)

Level of significant 5% (0.05)

So, n= 87

Add 20% non-response rate, so n=104

b) According to one study, (Varun Agrawal *et al.*, 2008) about knowledge of clinical practice guidelines for CKD among internal medicine residents have reported that, small improvement in mean performance score of knowledge regarding chronic kidney disease was observed with increasing post graduate year and the mean score of post graduate year 1 was 68.8%. Therefore by using two proportion formula,

Po: Previous data on the score among the post graduate year one internal medicine residents. (Po=68.8%)

Pi: Probability of the score among the post-graduate year 4 is estimated about 95%, Pi = 0.95

Ratio of control to case patients (m) = 1

power,(p) = 0.8

precision(α) = 0.05

So, by using the PS software for power and sample size calculation version 3.0.34,

n = 66

Add 20% non-response rate, so n=79

Final sample size:

Taking the highest between 2 sample calculation, so the sample size for this study is 104.

3.5 Sampling method:

No sampling method were applied (All eligible subjects were included in the study)

3.6 Subjects selection:

a) Inclusion criteria:

- Medical officers at both medical and family medicine departments of HUSM.

b) Exclusion criteria:

- Medical officers who are currently doing specific nephrology posting/training/rotation
- Medical officers from departments other than medical and family medicine
- Respondents other than medical officers (specialist/ medical student)
- Questionnaire items which were not completely answered
- Demographic data which were not completely filled
- Questionnaire that were not returned immediately after the test

3.7 Duration of the study:

The study was conducted from January until May 2011. Data collection was completed in April 2011.

3.8 Definitions

a) Medical officers was defined as doctors who had completed their housemanship training.

b) Service medical officer was defined as MO who are working at Hospital USM but not in the Master training program.

c) Master medical officer was defined as MO who are in Master training program either Master in Internal medicine or Master in Family Medicine.

d) 'Adequate knowledge' was defined as overall score of 67% and above (was determined by expert panels).