

Identifying Challenges and Potential Solutions for Sustainable Kidney Nutrition Care Delivery in Selected Asian Countries



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Background: Recent surveys highlight gross workforce shortage of dietitians in global kidney health and significant gaps in renal nutrition care, with disparities greater in low/low-middle income countries.

Objective: This paper narrates ground experiences gained through the Palm Tocotrienols in Chronic Hemodialysis (PaTCH) project on kidney nutrition care scenarios and some Asian low-to-middle-income countries namely Bangladesh, India, and Malaysia.

Method: Core PaTCH investigators from 3 universities (USA and Malaysia) were supported by their postgraduate students (n = 17) with capacity skills in kidney nutrition care methodology and processes. This core team, in turn, built capacity for partnering hospitals as countries differed in their ability to deliver dietitian-related activities for dialysis patients.

Results: We performed a structural component analyses of PaTCH affiliated and nonaffiliated (Myanmar and Indonesia) countries to identify challenges to kidney nutrition care. Deficits in patient-centered care, empowerment processes and moderating factors to nutrition care optimization characterized country comparisons. Underscoring these factors were some countries lacked trained dietitians whilst for others generalist dietitians or nonclinical nutritionists were providing patient care. Resolution of some challenges in low-to-middle-income countries through coalition networking to facilitate interprofessional collaboration and task sharing is described.

Conclusions: We perceive interprofessional collaboration is the way forward to fill gaps in essential dietitian services and regional-based institutional coalitions will facilitate culture-sensitive capacity in building skills. For the long-term an advanced renal nutrition course such as the Global Renal Internet Course for Dietitians is vital to facilitate sustainable kidney nutrition care.

Keywords: Dietitians; kidney nutrition care; Asia; low-to-middle-income countries; interprofessional collaboration; coalition networking

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Introduction

GLOBAL SURVEYS CONDUCTED by the International Society of Nephrology¹ and the International Society of Renal Nutrition and Metabolism (ISRNM)² reveal disparities in dietitian delivered kidney nutrition

care with low-to-middle-income countries (LMICs) greatly affected. The Global Kidney Nutrition Care Atlas specifically highlighted critical shortfalls in nutrition assessment, timely identification of malnutrition and poor communication with doctors on nutrition matters,

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especially exacerbated in the LMICs.² These viewpoints mostly reflected nephrologist stakeholders.

Our paper narrates ground experiences gained through the Palm Tocotrienols in Chronic Hemodialysis (PaTCH) project in selected LMICs and the ability to deliver critical tasks essential to the nutrition care process.³ Further details on PaTCH can be found here: <https://clinicaltrials.gov/ct2/show/NCT02358967>. The PaTCH study's screening for patient recruitment was based on nutrition assessment protocol standardized for chronic kidney disease (CKD).³

Building Capacity for Knowledge and Skills in Advanced Renal Nutrition Practice

Partnering universities agreed to prioritize building capacity skills in kidney nutrition care to benefit patients. Student exchanges between universities' Labs facilitated this training which through experience sharing enabled transformations, cross-cultural enrichment and communication. The participation of 17 postgraduate students across Labs allowed for a sizable workforce.

Capacity in Research and Clinical Skills for Core Team

Malaysia has no advanced renal nutrition practice, and Wayne State University (WSU) did not have renal nutrition expertise for graduate research. So we prioritized capacity building in kinanthropometry, muscle status assessment, protein energy wasting (PEW) diagnosis, laboratory protocols, nutrition screening, and quality of life assessment. We implemented handgrip strength dynamometry and malnutrition inflammation score (MIS) assessment into patient screening, along with protocols for kinanthropometry⁴ and ultrasound imaging of muscle status⁵ following training of Malaysian researchers in Italy.

Trained Became Trainers

Our students became highly trained in kidney nutrition care methodology and processes over 12 months of capacity building. This core team supported didactic seminars and workshops for the Renal Nutrition Seminars organized by the National Kidney Foundation-Malaysia⁶ and events in India⁷ and Bangladesh.^{8,9}

Extending PaTCH to South Asia

The PaTCH collaboration extended strategic partnerships with the Kidney Foundation Hospital and Research Institute (KFHRI) in Bangladesh, and the Fortis Hospital and Sanjay Gandhi Postgraduate Institute of Medical Sciences in India. **Figure 1** depicts PaTCH core team development and capacity building initiatives with external collaborators.

KFHRI's 6 nephrologists and 35 medical officers provide inpatient and outpatient care for all stages of kidney disease. It is a major dialysis provider in Bangladesh with 8 doctors facilitating >360,000 sessions over the last 16 years. At KFHRI, 2 research fellows and 2 nutritionists were assigned to PaTCH tasks during the site familiarization visit.

In India, we first linked with the Sanjay Gandhi Institute, a 1200-bed hospital with 16 dietitians and 7 nephrologists. Fortis Hospital at New Delhi, is a 140-bed facility with 6 dietitians, where inpatient cases regarding kidney care received follow-up every 10 days. Our team visited this site twice for capacity building.

Ground Reality of Nutrition Care at Visited Sites

Although the primary objective of our strategic partnerships was to conduct the PaTCH study, we discovered different levels of expertise with our partners, in their capacity to deliver nutrition-related project activities.

Bangladesh lacks formally trained dietitians, which meant the Dhaka dialysis provider relied on 2 nutritionists with background in community health but without clinical knowledge to handle kidney patients. Nutritional status of hemodialysis (HD) patients was poorly documented which meant PEW prevalence was never assessed.¹⁰ Two nutritionists from the Dhaka dialysis center visited the Malaysia Lab for a 2-week training attachment. This, however, did not yield capacity outputs for anthropometry and dietary methodology. We then progressed to task shifting whereby doctors performed the physical assessment to collect skinfold measurements and handgrip strength from patients, whilst the nutritionist and interning nutrition majors concentrated on dietary assessment skills. Task shifting was achieved through onsite capacity building by the Malaysia team over 3 training periods.

India by contrast has access to dietitians, since many Universities offer dietetics programs. Our assessment with the Sanjay Gandhi Institute revealed training needs in nutrition assessment and screening and methodology skills applicable to kidney nutrition care to meet PaTCH requirements. A workshop on nutritional screening and assessment with food questionnaire development was arranged with teams from WSU and Malaysia for a dietitian audience.⁷ However, we could not progress beyond this didactic education because liability rules for a government institution prevented a formal contract.

The New Delhi dialysis provider being a private hospital progressed to a formal relationship. The 6 general dietitians, however, lacked expertise in renal nutrition. With only serum albumin and body mass index (BMI) available to assess nutritional status, PEW assessment was not feasible. Additional reports for serum sodium, potassium and creatinine were only available at patient cost. Patient dietary records were regularly collected but apart from macronutrients' information, formal analysis excluded sodium, potassium and phosphorus. Our upskilling activities, therefore, focused on nutritional assessment including dietary records, anthropometry, functional status and applying MIS to identify malnutrition.

Challenges to Kidney Nutrition Care in Selected Countries of Asia

Generally, dialysis protocols were not uniform as per 3 × 4 hr sessions in Malaysia or 2 × 4 hr sessions in



Figure 1. Core team development for external capacity building initiatives with collaborators and coalition networks. FH, Fortis Hospital; MIS, Malnutrition-Inflammation Score; MSN, Malaysia Society of Nephrology; NGO, nongovernmental organization; NKF, National Kidney Foundation; NRR, National Renal Registry; PaTCH, Palm Tocotrienols in Chronic Hemodialysis; PEW, protein-energy wasting; Pis, Principal Investigators; QoL, quality of life; SGPGIMS, Sanjay Gandhi Postgraduate Institute of Medical Sciences; TU, Taylor’s University; UKM, Universiti Kebangsaan Malaysia; UPM, Universiti Putra Malaysia; WSU, Wayne State University.

Table 1. Components for Optimal Kidney Nutrition Care and Status Across Visited Asian Countries*

Elements	Components	Malaysia	Bangladesh	India	Myanmar†	Indonesia‡
Patient-centered care	Chronic Care Model	Not available	Not available	Not available	Not available	Not available
	Attributes, Interventions & Outcomes according to <i>Nutrition Care Process</i>	Possible	Limited	Limited but possible	Nonexistent	Possible
Patient empowerment Moderating factors	Awareness	Limited	NA	Limited	NA	Limited
	Self-care	NA	NA	NA	NA	NA
	Health Literacy [§]	Moderately limited	Severely limited	Severely limited	Severely limited	Moderately limited
	Access to dietitian for Renal Services	Generalist dietitians but not Renal specialists	NA	Adjunct to nephrology practice in major hospitals	NA	Generalist dietitians without advanced renal nutrition training
	University curriculum for Dietetics [undergraduate program]	Yes since 1984	NA	Favors food technology as employment generator	Yes since 1940s	NA
External courses for advanced renal nutrition courses	NA	NA	NA	NA	NA	NA
Food composition data	Yes	Yes	Yes	Yes	NA	Yes

NA, not available.

*Information in Table 1 is based on aggregated subjective inputs from stakeholders using the staticized group techniques approach requiring one round of information gathering from qualified respondents with moderate interactions between the facilitators and respondents.^{33,34} Questioning involved at least one site visit with each country with follow-up emails for subsequent verification.

†Myanmar and Indonesia visits were undertaken in 2016 and 2022 by TK and ZAMD, respectively, in a non-PaTCH capacity. Their inclusion is as comparators for structural deficit comparisons.

‡There are various levels of nutrition and dietetics education in Indonesia. The Ministry of Health provides nutrition vocational education for diploma 3 (41 study programs) and diploma 4 (11 study programs). Meanwhile, the universities provide undergraduate didactic nutrition education with a total of 92 study programs, while for dietitian professional education (supervise practice) there are only 9 study programs throughout Indonesia.

§As per healthy literacy scale of Sorensen et al. (2015).³⁵ Limited health literacy is defined as insufficient (severe) and problematic (moderate) literacy.

Bangladesh or both options in India based on affordability. Our site familiarization in Bangladesh and India as well as our experience in Malaysia indicated challenges to kidney nutrition care unique to each country. One of us [TK] had visited Rangoon, Myanmar in 2016 at the invitation of the Myanmar Nephro-Urological Society for a Renal Nutrition Seminar. (Myanmar's status for optimal nutrition care delivery is included as a comparator to our PaTCH collaborating sites). Additionally as Indonesia is South East Asia's largest economy, information on kidney nutrition care is also included for comparison as one of us (ZAMD) collaborates with an Indonesian Nutrition Society representative.

Structural deficits at varying levels of kidney nutrition expertise and manpower were evident across these countries [Table 1].

Bangladesh

Through interactions at workshops held at Dhaka and site visits we observed hesitance from doctors to engage with nutritionists. Some doctors expressed concern about nutritionists' limited knowledge on kidney disease. An additional perception was the increased cost burden to patient care in *certain private practices* if employing nutritionists. This was underscored by nongovernment philanthropy targeting *increased dialysis capacity* rather than nutrition education support for patients. More recent *research focus* was on transplantation, but there is a paucity of organ donors. It was felt by medical personnel that continuing medical education inclusive of nutrition content would improve knowledge on kidney nutrition care.

Critically, there was also patient reluctance to consult nutritionists for fear of restrictive diets. Simple measures

like BMI assessment in nutrition screening were not being performed in 70% of Bangladesh dialysis centers.¹¹ With nutritional screening conducted at the visited Bangladesh center we found high incidence of PEW and suboptimal intakes for calories and protein.¹⁰ There were scarce provisions of oral nutrition supplements to mitigate nutritional deficits as expected as per Kidney Disease Outcomes Quality Initiative recommendations.¹² Even the provision of vitamin supplements was a challenge to reach targeted patients as these were passed on to children at home.

India

At the Delhi center, patient care involved the nephrologist, dietitians, dialysis nurses and other staff but lacked coordination in patient monitoring related to nutrition assessment. Issues were maintaining adequate documentation, feedback and prioritizing patient follow-up tasks and responsibilities. Interprofessional collaboration (IPC) for communication and coordination was viewed as a novel practice in a tertiary hospital setting. Despite providing adequate training and subsequent site visits to understand and resolve these issues, systemic change to practice is required to bring about patient-centered care.

Malaysia

Dietetics education in Malaysia has evolved from the 1990s with 8 universities offering undergraduate programs in dietetics. The public health system is the largest employer of generalist dietitians. However, these individuals lack training in management of chronic diseases such as diabetes or CKD. In the existing system, CKD patient care is referral-based with limited follow-up in public and private hospitals. A state of nutrition care survey¹³ assessing access to dietitians in outpatient dialysis settings, revealed 50% were without dietitian services, 18% had full access, whilst others relied on locum (10%), shared (7%), or referral to hospital-based (11%) dietitians. Regular nutritional screening by a dietitian was lacking, and assessment was based on serum albumin and BMI as reported annually by the National Renal Registry.¹⁴ Even then earmarking patients with malnutrition and addressing nutritional repletion was not formalized for optimal dialysis delivery.

Myanmar

Neither dietitians nor nutritionists were functioning in the health care system,¹⁵ and from interactions with the Myanmar Nephro-Urological Society, nutrition is not integral to kidney care management. Further, the lack of a food composition database impedes reference to nutrient composition of local foods, although the process to accumulate this data has started.¹⁵

Indonesia

The structural framework for training of nutritionists and dietitians is stronger in Indonesia. A state of nutrition care survey conducted in March 2022 with 903 responses revealed a multitier nutritionist workforce (*unpublished*

survey results).¹⁶ Nutrition vocational education through preuniversity diplomas 3 and 4 are mainly offered through 54 institutions under the Ministry of Health and 9 universities. Despite 152 universities providing undergraduate nutrition programs, only 9 accredited institutions facilitate nutritionists becoming dietitians via a 1-year internship program. About 37.6% of surveyed professionals performed dedicated kidney nutrition tasks and were primarily experienced general dietitians in hospital settings. In some facilities, nutrition counseling was provided by medical doctors with and without clinical nutrition training, pharmacists and nurses. A formal assessment of nutritional status by dietitians is performed for CKD patients regularly in most health facilities (79.6%). Nevertheless, formalized training in renal nutrition is lacking.

Approaches to Resolution

The limited CKD patient access to dietitians in Malaysia meant doctors and nurses became providers of some nutrition education.¹³ Providing standardized education for dialysis patients benchmarked to expert guidelines was initiated in the late 1990s.¹⁷ PaTCH nutritional screening for recruited patients facilitated development of a dietary database. This enabled datamining for identifying habitual dietary patterns related to nutritional risk¹⁸ and risk for hyperphosphatemia,¹⁹ developing diet quality metrics²⁰ and a food frequency questionnaire (FFQ) applicable to the Malaysian HD patient.²¹ Datamining further facilitated developing a phosphate mobile app to manage hyperphosphatemia.²² We were also able to establish a protocol with population-specific reference norms for quadriceps assessment by ultrasound imaging as an indicator of muscle wasting.²³ But beyond this, we examined patient issues related to nutritional risk such as quality of life,²⁴ nutrition literacy²⁵ and Ramadhan fasting.²⁶

In the long term, Malaysia requires incentivizing dietitians as stakeholders in kidney care through higher wages, locum services and advanced renal nutrition education. The existing workforce system may change as the government now seeks to have dietitians' with specialization in various clinical fields including renal nutrition. One proposed scheme is the "subject matter expert" whereby dietitians are eligible if meeting specific criteria (dedicated service in a specialized field for >5 years or holding a related advanced degree). Financial remuneration, promotion and recognition of expertise will incentivize dietitians in this scheme. However, similar initiatives for dietitians in private settings are not available.

We found that building fundamental skills in dietary methodology was critical to move PaTCH at the Bangladesh dialysis provider site. This entailed teaching how to reference the food composition tables and food labels of processed foods such as biscuits, and recipe construction for cooked meals to enable nutritional analyses of patient meals. The collection of food records from patients

was another step to build core skills. We facilitated nutrition students from Noakhali University to intern at the dialysis center, supported by remote lectures from WSU and capacity training by the Malaysia team for specific skills. The third upskilling was on anthropometry and handgrip strength determinations by the medical doctors. The now trained health-care team at the Bangladesh dialysis center completed nutritional assessment as per the ISRNM guidelines revealing the state of malnutrition at this one site.¹⁰ Pilot data assessing the impact of providing structured nutritional education (both verbally and via a simplified booklet) to the HD patients, shows patient benefits toward informed dietary choices.²⁷ Patient dietary records have yielded datamining for an HD-specific FFQ for Bangladeshi HD patients,²⁸ modeled on the Malaysian FFQ.²¹ Work is now ongoing to expand the approach of nutritional assessment to other dialysis centers in Bangladesh using the validated FFQ.

We have newly initiated with Nephrocare in Kolkata, India to develop an FFQ specific to HD patients for this region, as it is geographically close to Bangladesh and shares a native language. Nephrocare is supported by 5 dietitians dedicated to kidney care. Both inpatients or outpatients (200 patients/week) are provided regular follow-up with dietary recalls within 3 months depending on their medical situation. Dietitians apply MIS, SGA, and ISRNM's PEW criteria to screen for malnutrition supported by data for serum albumin, calcium, phosphorus, vitamin D, iPTH, potassium, and sodium. Patients use a calculator app to check dietary potassium load to avert hyperkalemia.

The Way Forward

Our situational analyses reinforces findings from the Global Surveys^{1,2} that dietitians are grossly missing in global kidney care especially in LMICs. However, going further, dietitians to deliver essential services such as nutrition screening assessment and counseling patients are also lacking as highlighted by the Global Kidney Nutrition Care Atlas.² These 2 fundamental tasks are integral to identifying and treating malnutrition.

The Bangladesh site was the most receptive to change, and although only one center experience is narrated here, it has become a useful case study for other LMIC centers. However, the attitude of their nephrologists was mixed, with only some being supportive. The same trends were also apparent in the Indian centers. Within the three centers in India there were dramatic differences in terms of dietitian involvement in patient care. Collectively in South Asia, the deference paid to medical doctors by patients is offset by resistance to receiving 'counseling' from dietitians.

IPC is essential to the multidisciplinary team required to identify and treat nutrition-related metabolic issues, as well as malnutrition. But a silo-themed health-care delivery prevailed in all countries discussed here, in concor-

dance with lack of communication on nutrition matters between dietitians and doctors as revealed by the Global Kidney Nutrition Care Atlas.² IPC is also vital where with absent dietitians, other health professionals can be trained to provide basic patient counseling and nutrition screening.²⁹ This we showed in Bangladesh where doctors performed the physical assessment. For India and Malaysia where generalist dietitians are available but dedicated renal dietitians are lacking, different areas of IPC may be feasible. For example, developing a mobile app to facilitate hyperphosphatemia management in dialysis patients occurred through collaboration between the National Kidney Foundation-Malaysia, Malaysian Society of Nephrology, and two academic institutions.²² Thus upskilling in advanced nutrition care could be facilitated through networking, strategic partnerships, and coalitions.³⁰ Such collaborations foster patient-centred care across different countries, where ethnicity, religion and culture are multiple factors to consider when disseminating the Renal Diet.

Dietitians are essential to CKD management in the primary care setting. Therefore, a less myopic view is to recognize that Medical Nutrition Therapy is central to the prevention and management of CKD and end-stage kidney disease. With dietary advice being complex, successful management requires planning, periodic assessment of nutritional status, as well as monitoring of dietary compliance issues related to metabolic outcomes.³ Dietitians not involved in renal practice daily, need training on the specific challenges in CKD/end-stage kidney disease.³¹ Formal training in nutrition and adequate preparation for providers is limited by the generalist dietitian or physicians.³¹ The emergence of the Global Renal Internet Course for Dietitians supported by the National Kidney Foundation, USA, therefore, is greatly welcomed to facilitate this advanced training.³² Global Renal Internet Course for Dietitians especially benefits LMIC dietitians by providing affordable online access.

Conclusion

Suboptimal kidney nutrition care to varying degrees is evident from described case scenarios of selected LMICs. Barriers are traced to regio-cultural differences in understanding the scope of kidney nutrition care and lack of dietitians essential for the required health-care delivery. For the short term, regional institutional coalitions should facilitate culture-sensitive skills sharing along with IPC to fill gaps in essential services. But a generational long-term dietitian upskilling through advanced renal nutrition knowledge is critical to facilitating sustainable kidney nutrition care.

Practical Application

This narrative should serve as a guide to instituting IPC in LMICs to fill gaps in essential dietitian services provided

to patients with CKD. Regional-based institutional coalitions that facilitate culture-sensitive capacity in building renal nutrition care skills will also facilitate this process.

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