Poster Presentation：Hemodialysis
Poster No.：B0229
Abstract Submission No.：APCN20250011

Gender Differences In Fatigue Among Patients Receiving Hemodialysis In Vietnam

Nga Thi Thuy Nguyen[1]; Yeu-Hui Chuang[2]
[1] Faculty of Nursing and Midwifery, Hanoi Medical University, Hanoi city, Vietnam
[2] School of Nursing, College of Nursing, Taipei Medical University, Taipei city, Taiwan

Abstract
Introduction:
Fatigue significantly impacts health-related quality of life and might present differently between men and women. However, gender differences in fatigue among patients undergoing hemodialysis have not been thoroughly investigated worldwide, especially in Vietnam. This study aimed to investigate fatigue levels and gender differences among Vietnamese patients receiving hemodialysis.

Methods:
This cross-sectional study included 328 patients receiving hemodialysis. The Functional Assessment of Chronic Illness Therapy–Fatigue (FACIT–F) scale was used to measure severity of fatigue associated with hemodialysis. Based on the FACIT-F cutoff point of 34, FACIT-F scores < 34 indicate significant fatigue, while scores ≥ 34 indicate no fatigue. Data were analyzed using a chi-square test, and logistic regression analysis.

Results:
Among 328 participants, 145 (44.2%) were male, and 183 (55.8%) were female. Fatigue was reported by 43% of patients receiving hemodialysis. Among females, the prevalence of fatigue was 49.2% compared to 35.2% for males ($p<0.05$). Multiple logistic regression revealed that patients are female (aOR: 1.70; 95% CI: 1.05–2.77), age over 60 years (aOR: 1.78; 95% CI: 1.03-3.02) presence of two or more comorbidities (aOR: 2.86; 95% CI: 1.32–6.22), higher education level (college/university or above; aOR: 2.10; 95% CI: 1.08–4.08), and religious belief (aOR: 2.52; 95% CI: 1.21–5.28) were associated with increased odds of experiencing fatigue. Conversely, engaging in regular exercise (aOR: 0.56; 95% CI: 0.34–0.90) was a factor associated with significantly lower odds of fatigue.

Conclusion:
Fatigue was common among hemodialysis patients in Vietnam. The rate of fatigue has increased significantly in females compared with males. Female patients, as well as those who were older, had multiple comorbidities, higher levels of education, had religious beliefs, and did not exercise regularly, were more likely to experience fatigue. These results emphasize the importance of tailoring fatigue management strategies to individual needs, with particular attention to gender differences among hemodialysis patients.

Keywords：fatigue, gender, hemodialysis, kidney failure

Table 1. Logistic regression on the relationship between fatigue and participants' characteristics (N=328)

Variable	No fatigue (n=187)	Fatigue (n=141)	Logistic regression			
	n(%)	n(%)	OR	95% CI	aOR	95%CI
Gender						
Male	94 (50.3)	51 (36.2)	1			
Female	93 (49.7)	90 (63.8)	1.78	1.14-2.79*	1.70	1.05-2.77*
Age (years)						
≤60	133 (71.1)	85 (60.3)	1		1	
>60	54 (28.9)	56 (39.7)	1.62	1.02-2.58*	1.77	1.03-3.02*
Duration (months)	Median=96 (3 - 348)		1.00	0.96-1.04	1.02	0.98-1.05
Marital status						
Unmarried	35 (18.7)	33 (23.4)	1		1	
Married	152 (81.3)	108 (76.6)	0.75	0.44-1.29	0.98	0.43-2.23
Nap						
Non-napper	53 (28.3)	48 (34.0)	1		1	
Short nappers	37 (19.8)	24 (17.0)	0.72	0.38-1.37	0.67	0.33-1.33
Long nappers	97 (51.9)	69 (48.9)	0.79	0.48-1.29	0.69	0.40-1.20
Comorbidity						
No	35 (18.7)	11 (7.8)	1		1	
1	65 (34.8)	42 (29.8)	2.06	0.94-4.49	1.97	0.86-4.50
≥2	87 (46.5)	88 (62.4)	3.22	1.54-6.74**	2.86	1.32-6.22**
Education						
Less than high school	75 (40.1)	55 (39.0)	1		1	
High school	75 (40.1)	50 (35.5)	0.91	0.55-1.50	1.22	0.70-2.13
College/University or above	37 (19.8)	36 (25.5)	1.33	0.75-2.36	2.10	1.08-4.08*
Religious beliefs						
No	170 (90.9)	117 (83.0)	1		1	
Yes	17 (9.1)	24 (17.0)	2.05	1.06-3.99*	2.52	1.21-5.28*
Children						
No	33 (17.6)	31 (22.0)	1		1	
Yes	154 (82.4)	110 (78.0)	0.76	0.44-1.32	0.72	0.31-1.69
Exercise						
No	68 (36.4)	72 (51.1)	1		1	0.34-0.90*
Yes	119 (63.6)	69 (48.9)	0.55	0.35-0.84**	0.56	

*$p<0.05$, **$p<0.01$

Poster Presentation：Hemodialysis
Poster No.：B0230
Abstract Submission No.：APCN20250067

Far-Infrared Irradiation Induces the Expression of Angiogenesis-Associated Genes

Makoto Saito[1]; Sanshiro Hanada[1]; Hirokazu Kimura[1]; Kazuya Ohama[1]
[1] Department of Clinical Engineering, Gunma PAZ University, Gunma, Japan

Abstract
Introduction:
Far-infrared (FIR) therapy is frequently applied in the treatment of leg ulcers caused by various conditions, including progressive atherosclerotic occlusion, diabetes mellitus, and acute arterial occlusion. Although FIR irradiation has been suggested to promote angiogenesis and thereby contribute to the improvement of these conditions, the molecular mechanisms underlying its therapeutic effects remain poorly understood. To gain a better understanding of the molecular mechanisms involved in FIR irradiation, we investigated the expression of angiogenesis-associated genes in human umbilical vein endothelial cells (HUVECs) exposed to FIR.
Methods:
HUVECs were exposed to far-infrared (FIR) irradiation for 30 minutes. Gene expression was evaluated at multiple time points following irradiation (0, 1, 3, 6, and 24 hours), as well as at 0 and 24 hours under non-irradiated conditions. Quantitative analysis of gene expression was conducted using real-time reverse transcription polymerase chain reaction (RT-PCR). The target genes, selected for their roles in angiogenesis, included heme oxygenase 1 (HMOX1), fms-like tyrosine kinase 1 (FLT1), TEK receptor tyrosine kinase (TEK), and delta-like ligand 4 (DLL4). Glyceraldehyde-3-phosphate dehydrogenase (GAPDH) was used as an internal control. Relative mRNA expression levels were calculated using the ΔΔCt method, with GAPDH as the reference gene and the 0-hour non-irradiated condition serving as the baseline control. Furthermore, a comprehensive gene expression analysis related to angiogenesis was performed using DNA microarray technology.
Results:
FLT1 expression was significantly upregulated at 1 and 3 hours following FIR exposure. In contrast, TEK expression exhibited a marked reduction immediately after irradiation, which persisted at significantly lower levels 3 hours post-exposure. DLL4 expression was markedly elevated immediately following irradiation, significantly downregulated at 3 hours, and subsequently upregulated again at 24 hours. These findings suggest that FIR irradiation elicits a dynamic and temporally regulated angiogenic response. Notably, the data imply that FIR may initially promote angiogenesis, followed by a regulatory mechanism that limits excessive vascular proliferation within 24 hours. Microarray analysis revealed enhanced expression of several pro-angiogenic genes, including epidermal growth factor (EGF), prostaglandin-endoperoxide synthase 2 (PTGS2), and nitric oxide synthase (NOS), with NOS showing the most pronounced upregulation. In contrast, the expression levels of anti-angiogenic genes such as cadherin 1 (CDH1), cyclin-dependent kinase inhibitor 2A (CDKN2A), interleukin-2 (IL2), and plasminogen (PLG) were downregulated. Furthermore, heme oxygenase 1 (HMOX1), known for its anti-inflammatory properties, was upregulated, whereas selectin E (SELE), which is associated with pro-inflammatory responses, was downregulated.
Conclusion:
FIR irradiation exerts dual molecular effects by concurrently promoting angiogenesis and attenuating inflammatory responses at the gene expression levels.

Keywords：angiogenesis-associated genes, Far-infrared therapy

Poster Presentation：Hemodialysis
Poster No.：B0231
Abstract Submission No.：APCN20250193

Hematological Alterations in Hemodialysis Patients with Chronic Kidney Disease Involving Mast Cell Activation and Red Blood Cell Morphology Changes

Henkie Isahwan Ahmad Mulyadi Lai[1]; Rickie Isahdie Ahmad Mulyadi Lai[2]

[1] School of Biosciences, Faculty of Health & Medical Sciences, Taylor's University, Selangor, Malaysia

[2] Department of Medical Sciences, Faculty of Health Sciences, University College of MAIWP International, Kuala Lumpur, Malaysia

Abstract

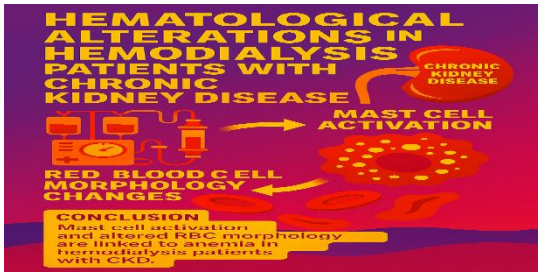
Background: Hemodialysis is a life-sustaining intervention for patients with End-Stage Renal Disease (ESRD), yet it contributes to systemic complications beyond fluid and solute clearance. Hematological disturbances, particularly anemia and inflammation, are common in this population. Recent attention has turned to the dual roles of mast cell activation and red blood cell (RBC) damage as potential contributors to chronic inflammation and reduced erythrocyte lifespan in hemodialysis-treated CKD patients. This study investigates both mast cell activation and dialysis-induced RBC morphological abnormalities to better understand their combined impact on anemia and systemic inflammation.

Methods: A cross-sectional study was conducted on 90 adult ESRD patients undergoing regular hemodialysis at KPJ-Selangor Specialist Hospital. Blood samples were collected post-dialysis in EDTA tubes. Leishman-stained peripheral blood smears were prepared and examined via light microscopy for both mast cell identification and RBC morphology. Each sample was analyzed in triplicate to ensure reproducibility.

Results: Mast cell activation was observed in 43 patients (47.8%), with eosinophilia detected in 28 cases (31.1%) and basophilia in 3 cases (3.3%), suggesting ongoing inflammatory processes. Concurrently, significant RBC abnormalities were noted. Echinocytes and acanthocytes were identified in 49% of patients, with elliptocytes, spherocytes, and teardrop cells (dacrocytes) also present. RBC deformities were more pronounced in males and patients with longer dialysis durations, correlating with lower post-dialysis hemoglobin levels. These findings suggest that both mast cell activation and RBC membrane damage contribute to a pro-inflammatory and anemic state in hemodialysis patients.

Conclusion: Hemodialysis in CKD patients induces significant hematological changes, including mast cell-driven inflammation and RBC membrane stress, both of which contribute to the progression of anemia. These findings underscore the importance of integrating hematologic monitoring and inflammation-targeted strategies in managing dialysis-related complications in ESRD.

Keywords：Chronic Kidney Disease, FGF-23, Anemia, Inflammation, TNF-α, Gene Expression, Erythropoiesis



Poster Presentation：Hemodialysis
Poster No.：B0234
Abstract Submission No.：APCN20250350

Elution and Transmembrane Diffusion of Polyvinylpyrrolidone in a Modified Dialysis Circuit Model

MASAHIRO MIYATA[1]; Yui Shibata[2]; Juri Nakamura[1]; Yui Tanaka[1]; Sachi Hatakeda[1]; Ryoji Sada[2]; Masahiro Sato[1]

[1] Department of Clinical Engineering, Faculty of Fukuoka Medical Technology, Teikyo University, Omuta City, Fukuoka, Japan

[2] Department of Medical Devices, Osaka Metropolitan University Hospital, Osaka City, Osaka, Japan

Abstract

Introduction

Polyvinylpyrrolidone (PVP), a hydrophilic agent used in polysulfone (PSU) dialyzers, elutes into the blood-side circuit during extracorporeal circulation. Previous studies have not adequately replicated clinical dialysis conditions because they used conventional in vitro models without dialysate perfusion. Therefore, the post-elution behavior of PVP and the potential risk of systemic exposure remain unclear. In our previous study using a modified model with dialysate perfusion, PVP was undetectable in the blood-side solution, suggesting its diffusion into the dialysate. The present study aimed to experimentally evaluate the behavior of eluted PVP under clinically relevant dialysis conditions.

Materials and Methods

PVP elution was first assessed using a conventional model, in which 1.0 L of dialysate was recirculated exclusively through the blood-side of a PSU dialyzer (FX-CorDiax 180J) at a flow rate of 200 mL/min for 4 hours, after which PVP concentrations in the solution were measured. Subsequently, using the same circuit and recirculating solution from the conventional model, a modified model was constructed in which dialysate was perfused through the dialysate side at 500 mL/min for an additional 4 hours, simulating clinical dialysis conditions. PVP concentrations were again measured using the Müller colorimetric method (absorbance measured at 470 nm).

Results

In the conventional model, PVP was detected in 4 out of 6 circuits, with concentrations ranging from 0.06 to 1.00 mg (median: 0.27 mg). After dialysate perfusion in the modified model, PVP concentrations in all blood-side samples fell below the detection limit.

Discussion

Although previous reports have suggested that the FX-CorDiax series of dialyzers exhibits minimal PVP elution, our results indicate that elution still occurs. More importantly, the results demonstrate that the eluted PVP can diffuse across the dialysis membrane when dialysate is perfused, suggesting its potential removal during clinical dialysis. This finding underscores a fundamental limitation of conventional models lacking dialysate perfusion: they do not account for PVP diffusion into the dialysate and may therefore overestimate the patient's exposure.

Conclusion

This study clearly demonstrates that low-molecular-weight PVP, once eluted from PSU dialyzers, can diffuse across the dialysis membrane when dialysate is perfused. To the best of our knowledge, few studies have investigated the post-elution behavior of PVP under such conditions. These findings enhance our understanding of the fate of eluted PVP and reinforce the clinical safety of PSU dialyzers when used under realistic dialysis conditions.

Keywords：Hemodialysis, Polyvinylpyrrolidone, Polysulfone, Elution, Diffusion

Poster Presentation：Hemodialysis
Poster No.：B0235
Abstract Submission No.：APCN20250351

Hemodialysis patients variations in hand strength before and after dialysis treatment and mortality.

Battsogt Munkh-Od[1]
[1] Department of Internal Medicine-Endocrine, First Central Hospital, Mongolia

Abstract
Introduction:
The escalating prevalence of dialysis cases in Mongolia has spurred a pressing need to scrutinize the underlying factors triggering this trend. Among the potential drivers, diabetes has emerged as a pivotal concern, warranting meticulous investigation.
Objective:
This study aims to examine the variations in handgrip strength before and after dialysis treatment and explore its association with nutritional status and general physical well-being among patients undergoing maintenance hemodialysis for end-stage renal disease (ESRD) with diabetes.
1. To study the relationship between changes in dry body weight and hand grip strength in people undergoing dialysis treatment
2. To investigate the relationship between hand grip strength and mortality for 2 years of parameters in dialysis
Methods:
Conducted as a single-center study, we conducted an extensive review of data collected over a six-month period from patients undergoing dialysis treatment at Kidney center, The First Central Hospital of Mongolia. The dataset encompassed a diverse demographic, clinical, and diagnostic spectrum.
Results:
Among the 183 participants, 56.3% (n=103) were male, with a mean age of 50.4 ± 17.6 years and an average HD duration of 4.8 ± 4.3 years. The mean body weight change was 1.94 kg (ranging from 0-4.2 kg), a significant indicator of overall body condition. A decrease in mean handgrip strength after dialysis treatment was observed in both sexes and was statistically significant.
Those with substantial changes in body weight showed less variation in HGS before and after dialysis. For male participants with a body weight decrease of up to 5 kg, HGS increased from 22 kg to 28 kg, while those with a body weight decrease exceeding 5 kg experienced a decline in HGS from 48 to 28 kg. Additionally, a positive correlation was found between HGS and mid arm circumference (Spearman's correlation coefficient, $r = 0.126$, $p = 0.001$), suggesting HGS as a potential indicator of nutritional status.
Conclusion:
Monitoring handgrip strength before and after dialysis emerges as a valuable tool to assess patients' general health and nutritional status.
1. There is a weak inverse relationship between dry body weight and hand grip strength in people undergoing dialysis treatment.
2. Hand grip strength was not associated with mortality in hemodialysis patients. However, low muscle mass was associated with a 6.3% increased risk of mortality for 2 years in dialysis.

Keywords：End-stage disease, Renal failure, Hemodialysis

Poster Presentation：Hemodialysis

Poster No.：B0236

Abstract Submission No.：APCN20250579

Ti_3C_2-Derived Adsorbent for Bilirubin Clearance in Hemoperfusion

chang kaixi[1]; Su Baihai[1]

[1] Department of Nephrology, West China Hospital, Sichuan University, Chengdu 610041, China.

Abstract

Introduction: Hyperbilirubinemia is a common complication in critical conditions such as hepatorenal syndrome (HRS) and end-stage kidney disease (ESKD) with hepatic dysfunction. It intensifies oxidative stress and multi-organ damage, correlating with higher mortality. However, current extracorporeal blood purification techniques (e.g., plasma exchange, Molecular Adsorbent Recirculating System (MARS)) face limitations including operational complexity, high costs, poor bilirubin-specific adsorption performance, and insufficient hemocompatibility.

To address these challenges, we developed TiO_2/Ti_3C_2-PES microspheres as a potential bilirubin adsorbent. Zero-dimensional TiO_2 was grown on the surface of Ti_3C_2 via the hydrothermal oxidation method. The resulting TiO_2/Ti_3C_2 nanocomposite was then used to modify a common blood purification substrate material, polyethersulfone (PES), through a simple co-blending process. Finally, the functionalized microspheres were efficiently mass-produced using an electrostatic spray-assisted liquid-liquid phase separation technique. The physicochemical properties, hemocompatibility, and adsorption performance of the TiO_2/Ti_3C_2-PES microspheres were comprehensively evaluated to assess their potential for clinical application as a bilirubin adsorbent.

Methods: Ti_3C_2 was prepared via the hydrofluoric acid etching method reported in our previous work. Subsequently, we synthesized and characterized TiO_2/Ti_3C_2 nanocomposites with varying oxidation degrees through the one-step in-situ hydrothermal process, with their successful formation confirmed by scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray diffraction (XRD), and X-ray photoelectron spectroscopy (XPS). Following this, TiO_2/Ti_3C_2-PES microspheres were fabricated using electrospray-assisted liquid-liquid phase separation. These microspheres were comprehensively characterized by SEM, Brunauer–Emmett–Teller (BET) and mechanical testing, with systematic evaluation of their bilirubin adsorption and hemocompatibility.

Results: Both the TiO_2/Ti_3C_2 nanocomposites and the TiO_2/Ti_3C_2-PES microspheres were successfully synthesized according to the aforementioned methods. The TiO_2/Ti_3C_2-PES microspheres exhibited a unique sponge-like internal structure (Fig. 1) and possessed an average pore diameter of 15.93 nm, slightly larger than that of pure PES microspheres (13.96 nm), accompanied by a 23% increase in mesopore volume. Furthermore, the TiO_2/Ti_3C_2-PES microspheres demonstrated a minimal deformation of only 1.42% under the maximum transmembrane pressure tolerable by hemoperfusion devices. The optimized structure enhanced the TiO_2/Ti_3C_2-PES microspheres' selective adsorption towards bilirubin (Fig. 3). Additionally, blood routine examination results revealed no significant differences between whole blood incubated with both the microsphere and the negative control group (Fig. 2).

Conclusion: In this study, targeting the nano-sized protein-bound toxin bilirubin, we successfully developed TiO_2/Ti_3C_2-PES microspheres combining high-efficiency bilirubin adsorption capacity with excellent hemocompatibility, demonstrating considerable promise for further development in blood purification applications such as artificial liver systems.

Keywords：Bilirubin; Hemoperfusion; Blood purification

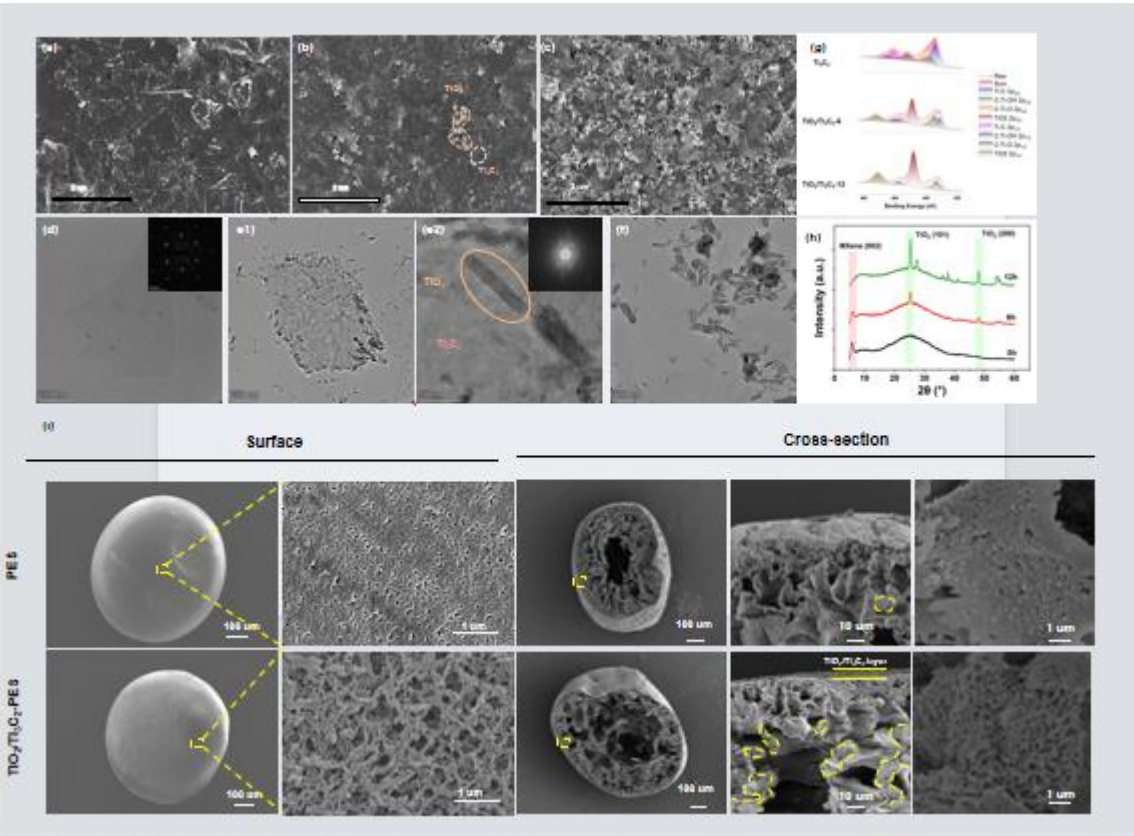


Figure 1. Preparation and Characterization
SEM analysis of (a) Ti_3C_2, (b) TiO_2/Ti_3C_2-6, and (c) TiO_2/Ti_3C_2-12. (d, e1, f) Low-resolution TEM image, e2) High-resolution TEM (HRTEM). (g) XPS spectrum and (h) XRD pattern of NPs. (i) Typical surface and cross-sectional SEM images of PES and TiO_2/Ti_3C_2-PES microspheres.

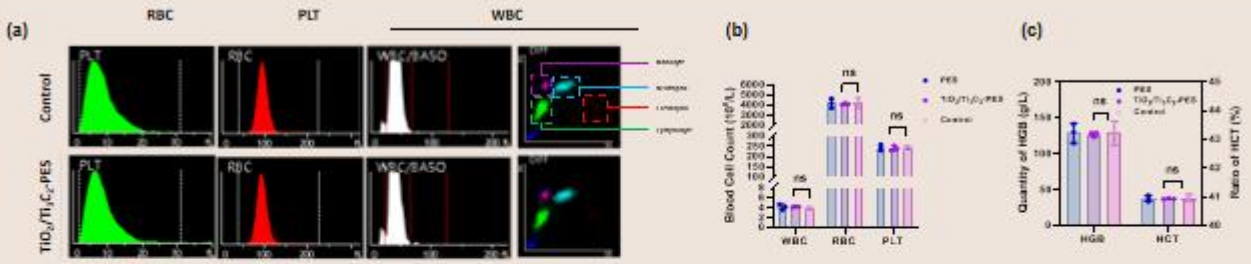


Figure 2. Hemocompatibility tests (a) Blood cell volume distribution and WBC differential, (b) WBC, RBC and PLT counts, (c) HGB and HCT levels.

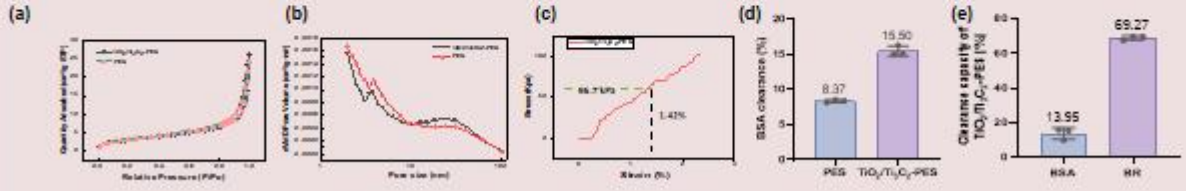


Figure 3. (a) N_2 adsorption/desorption isotherms and (b) pore size distributions of PES and TiO_2/Ti_3C_2-PES microspheres. (c) The compressive stress of TiO_2/Ti_3C_2-PES microspheres. (d) the BSA clearance of PES and TiO_2/Ti_3C_2-PES microspheres. (e) the clearance capacity of v-PES microspheres in BSA/BR solution.

Poster Presentation：Hemodialysis
Poster No.：B0237
Abstract Submission No.：APCN20250894

Serum Uric Acid Level as an Estimated Parameter That Predicts All-Cause Mortality in Patients with Hemodialysis

LI-YUN CHANG[1,2,3]; Sheng-Wen Niu[1,2,3]

[1] Department of Internal Medicine, Division of Nephrology, Kaohsiung Medical University Gangshan Hospital

[2] Department of Internal Medicine, Division of Nephrology, Kaohsiung Medical University Hospital, Kaohsiung Medical University

[3] Department of Medicine, College of Medicine, Kaohsiung Medical University

Abstract

Background: Hyperuricemia is both an inflammatory and nutritional factor. Hyperuricemia is a marker of endothelial injury, which may help to promote atherosclerosis. Hyperuricemia or gouty attack in dialysis patients may also be a reflection of the underlying inflammatory state with subsequent increased risk for mortality. Gout was associated with an increased risk of mortality, especially in female patients without diabetes and hypertension. Uric acid is also correlated with malnutrition-inflammation-atherosclerosis (MIA) syndrome. Contrary to the general population, low but not high serum UA is associated with higher all-cause mortality in chronic dialysis patients, especially in those with PEW. Serum uric acid (UA) in end-stage kidney disease (ESKD) patients serves as a critical indicator for nutrition and inflammation, showing a U-shaped association with all-cause mortality.

Methods: To investigate the impact of hyperuricemia on mortality of hemodialytic subjects, we included 2615 hemodialytic participants based on the presence of UA levels, divided by UA level quintiles and sextiles in both subgroups of Charlson's index < 4(n=1107) and ≥ 4(n=1508). We performed linear regression analysis to investigate the relationship between UA levels and other factors, and Cox regression to confirm the effect of UA level on mortality in both subgroups of Charlson's index < 4 and ≥ 4 in hemodialytic subjects.

Results: In linear regression, UA was associated with male, lower age at dialysis, shorter entry-year, lower prevalence of DM, higher pre-dialytic body weight, lower Kt/V (Gotch), higher nPCR, higher albumin level, higher log of cholesterol level, higher phosphate level and higher log of PTH level. In Cox regression, high UA was associated with worse mortality with Charlson index < 4, but lower mortality with Charlson index ≥ 4: Subgroup of UA=6-7 mg/dl is significantly related to 39% increase in risk of all-cause mortality (HR: 1.39, 95% CI: 1.06–1.82) compared with of UA > 9 mg/dl with Charlson index ≥ 4; and subgroup of UA > 9 mg/dl is significantly related to about double increase in risk of all-cause mortality (HR: 1.99, 95% CI: 1.18–3.36) compared with of UA > 9 mg/dl with Charlson index < 4.

Conclusion: High UA level was associated with worse mortality with Charlson index < 4, may reflect an inflammatory factor; low UA level was associated with worse mortality with Charlson index ≥ 4, may reflect a nutritional factor.

Keywords：Uric acid, all-cause mortality, hemodialysis, Charlson index

Poster Presentation：Hemodialysis
Poster No.：B0238
Abstract Submission No.：APCN20250898

The Role of SFRP2 in Vascular Remodeling of AVF Maturation and Patency

YUEH-LUNG, TSAI[1]; De-En, Lu[1]; Chung-Yi Cheng[1,2,3]; Chung-Te Liu[1,2,3]

[1] Division of Nephrology, Department of Internal Medicine, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan

[2] Department of Internal Medicine, School of Medicine, College of Medicine, Taipei Medical University, Taipei

[3] Taipei Medical University Research Center of Urology and Kidney, Taipei

Abstract

The glycoprotein SFRP2 is known to activate β-catenin signaling and myofibroblast transition in myocardial fibrosis. Previous studies have indicated that myofibroblast proliferation is present in the vascular thickening of mouse arteriovenous fistula (AVF). Thus, it's hypothesized that SFRP2 may have a role in the vascular remodeling involving AVF maturation or patency

Keywords：AVF, ESRD, hemodialysis access

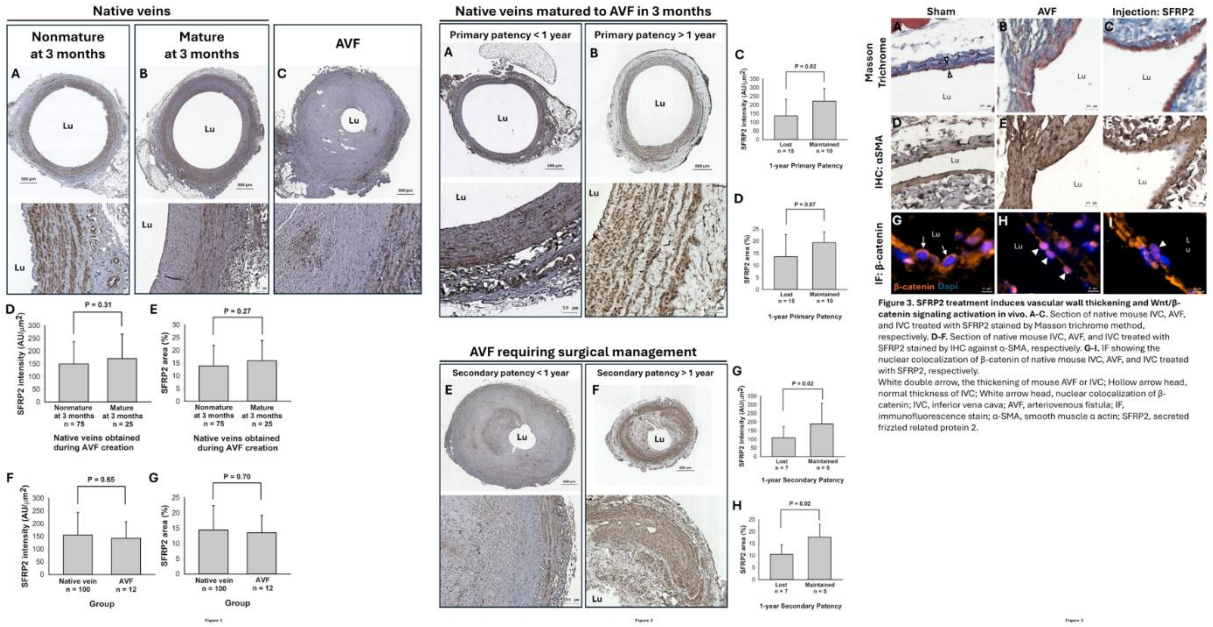


Figure 3. SFRP2 treatment induces vascular wall thickening and Wnt/β-catenin signaling activation in vivo. A-C. Section of native mouse IVC, AVF, and IVC treated with SFRP2 stained by Masson trichrome method, respectively. **D-F.** Section of native mouse IVC, AVF, and IVC treated with SFRP2 stained by IHC against α-SMA, respectively. **G-I.** IF showing the nuclear colocalization of β-catenin of native mouse IVC, AVF, and IVC treated with SFRP2, respectively.
White double arrow, the thickening of mouse AVF or IVC; Hollow arrow head, normal thickness of IVC; White arrow head, nuclear colocalization of β-catenin; IVC, inferior vena cava; AVF, arteriovenous fistula; IF, immunofluorescence stain; α-SMA, smooth muscle α actin; SFRP2, secreted frizzled related protein 2.

Poster Presentation：Hemodialysis
Poster No.：B0239
Abstract Submission No.：APCN20251114

Abdominal Wall Avg For Dialysis Access Between The Left Iliac Artery and To Right Iliac Vein Graft Creation

Munkhjavkhlan Dorjsuren[1]
[1] Division of Dialysis access surgery, Department of Surgery, Mungunguur hospital, Ulaanbaatar city, Mongolia

Abstract
Vascular access complications are a common and serious challenge for patients undergoing long-term hemodialysis. Central Venous Occlusive Disease (CVOD), often resulting from prolonged catheter use, significantly limits peripheral venous access and impedes the creation of upper extremity arteriovenous fistulas or grafts. As a result, alternative approaches, including the use of lower extremity veins, are increasingly considered. This report presents a complex case involving multiple vascular access failures, culminating in a novel surgical approach that represents a first in Mongolia.
Case Presentation
A 65-year-old female with a history of chronic kidney disease and multiple abdominal and vascular surgeries required innovative vascular access after all conventional options were exhausted. Her medical history included a hysterectomy with adnexectomy complicated by ureteral injury, bilateral nephrectomies, and multiple arteriovenous fistulas and tunneled catheter placements, all of which eventually failed due to thrombosis or venous occlusion.
From 2008 to 2025, the patient underwent a series of vascular access surgeries, including left and right upper extremity AVFs and AVGs, as well as repeated catheter placements in femoral and jugular veins. In early 2025, imaging and exploratory laparoscopy confirmed that peritoneal dialysis was not feasible due to extensive intra-abdominal adhesions. With no remaining access sites in the limbs or peritoneum, a unique surgical solution was pursued.
A prosthetic graft was successfully created between the left iliac artery and the right external iliac vein, tunneled through the anterior abdominal wall. This procedure, the first of its kind performed in Mongolia, provided a functional hemodialysis access route and avoided the need for further catheter dependence.
Discussion and Conclusion
This case highlights the critical importance of individualized vascular access planning for patients with long-term dialysis needs. The iliac artery–vein graft presents a viable alternative for patients with complete exhaustion of conventional access sites. As the global dialysis population ages and vascular complications become more prevalent, innovative surgical techniques will be essential to maintain treatment viability and quality of life.
This pioneering procedure sets a precedent for similar cases in Mongolia and other resource-limited settings, demonstrating that even in complex scenarios, safe and effective hemodialysis access can still be achieved.

Keywords：Abdominal wall AVG

Poster Presentation：Hemodialysis
Poster No.：B0240
Abstract Submission No.：APCN20251123

Medication Matters: Navigating Drug Related Problems (DRPs) Gaps In A Dual Healthcare System

CHING Shan Lii[1]; Ernieda Hatah[1]; Farida Islahudin[1]; Nurul Ain Mohd Tahir[1]; Sunita Bavanandan[2]

[1] Centre for Quality Management of Medicines, Faculty of Pharmacy, University Kebangsaan Malaysia, Kuala Lumpur, Malaysia

[2] Department of Nephrology, Hospital Kuala Lumpur Ministry of Health Malaysia, Kuala Lumpur, Malaysia

Abstract

Introduction: HD patients commonly experience DRPs due to complex regimens and care transitions. Largely preventable, DRPs undermine safety and effectiveness, and drive unnecessary healthcare use. Malaysia's dual healthcare systems that operate independently, influence HD units' characteristics. The private sector is primarily non-hospital-based, while the government-funded public sector is exclusively hospital-based, with access to pharmacist-led HD Medication Therapy Adherence Clinic (RPh-HDMTAC). DRP prevalence and characteristics of the Malaysian HD population are limited. The lack of comparative studies limits meaningful inferences for our unique healthcare system. This study aimed to identify and compare DRP prevalence and characteristics within and across settings.

Methods: This prospective study involved a tertiary public hospital with Malaysia's largest RPh-HDMTAC and seven National Kidney Foundation (NKF) sites, the country's largest non-governmental organization. Public patient records (Jan 2021–Aug 2023) were reviewed since RPh-HDMTAC was a standard service, while NKF patients were randomly selected, consented, and enrolled into RPh-HDMTAC. Chronic HD patients aged 18–80 who consented were included, while those with language barriers were excluded. Socio-demographics, clinical characteristics, DRP prevalence and characteristics were collected. DRP identification was standardized before data collection and classified using Pharmaceutical Care Network Europe classification (v9.0) by a renal pharmacist, then verified by a three-member pharmacist panel. Descriptive statistics were reported, and group differences were analyzed with SPSS (v29) using Mann-Whitney U and Chi-square tests.

Results: A total of 76 public and 149 private patients were recruited. DRPs were identified in 42 (55.3%, μ=0.8 DRP/patient) public and 145 (97.3%, μ=4.6 DRP/patient) private patients. Commonly involved medications were antihypertensives (n=151, 20%), phosphate binders (n=119, 15.7%), and anemia preparations (n=113, 14.9%). The groups differed in dialysis vintage ($p=0.02$) and medication numbers ($p<0.001$), with a two-fold difference in prevalence. Chi-square tests showed significant differences in Problem domain (χ^2 (3, N=756) = 30.086, $p<0.001$) and Cause domain (χ^2 (1, N=1145) = 34.861, $p<0.001$). Post-hoc analysis revealed the public group had more P1: Treatment Effectiveness cases ($z=+5.159$, $p<0.001$, $z=+5.904$), driven by clinical factors (C1–C3) like drug, form, or dose selection ($z=+5.904$). The private group had more P3: 'Others' cases ($z=+5.296$, $p<0.001$), which were linked to processes, patient-related or patient transfer-related factors (C5–C9, 'No cause') ($z=+5.904$).

Conclusion: The study revealed that factors beyond patient-related issues such as healthcare-system structures, influence healthcare delivery model that impacts care quality and continuity. This highlights the need for a unified approach through public-private partnerships and policy reforms to establish an integrated healthcare framework, ensuring sustainability of DRP management and improved medication management.

Keywords：hemodialysis, medication management, drug-related problem, healthcare system

A table of summary and comparison of DRP prevalence and characteristics across both healthcare settings:

	Hospital-based group (n = 76)*	Non-hospital-based group (n = 149)#
Number of patients identified with DRPs, n (%)	42 (55.3)	145 (97.3)
Total DRPs identified & intervened, n (μ DRP/patient)	67 (0.8)	689 (4.6)

PROBLEM DOMAIN†	Hospital-based group (n = 76)*	Non-hospital-based group (n = 149)#	N = 756†	Post-hoc Analysis (Per Sub-domain) X^2 (df, n), p value	Post-hoc Analysis (Per Domain) X^2 (df, N), p value
P1: Treatment effectiveness, n (%), z-value	45 (67.2), + 5.159	242 (35.1), - 5.159	287 (38.0)	X^2 (1, n = 287) = 26.618, p < 0.001^AA	
P1.2: Effect of drug treatment not optimal, n (%)	36 (80.0)	219 (31.8)			
P1.3: Untreated symptoms or indication, n (%)	9 (20.0)	23 (3.3)			
P2: Treatment safety, n (%), z-value	6 (9.0), + 0.704	46 (6.9), - 0.704	52 (6.9)	X^2 (1, n = 52) = 0.495, p = 0.482	X^2 (3, N = 756) = 30.086, p < 0.001, Cramer's V = 0.199
P2.1: Adverse drug event (possibly) occurring, n (%)	6 (9.0)	46 (6.9)			
P3: Other, n (%), z-value	16 (23.9), - 5.296	397 (57.6), + 5.296	413 (54.6)	X^2 (1, n = 413) = 28.044, p < 0.001^AA	
P3.2: Unnecessary drug-treatment, n (%)	13 (81.3)	51 (7.4)			
P3.3: Unclear problem/complaint, n (%)	3 (18.8)Φ	346 (50.2)ǂ			
DRP with no problem category, n (%), z-value	0 (0.0), - 0.625	4 (0.6)ǂ, + 0.625	4 (0.5)	X^2 (1, n= 4) = 0.391, p = 0.532	

CAUSE DOMAIN‡	Hospital-based group (n = 76)*	Non-hospital-based group (n = 1069)#	N = 1145‡	Post-hoc Analysis (Per Domain) X^2 (df, N), p value
(I) CLINICAL CAUSES‡, n (%), z-value	**25 (32.9), + 5.904**	**110 (10.3), - 5.904**	**135 (11.8)**	X^2 (1, N = 1145) = 34.861, p < 0.001, Phi coef. = 0.174
C1: Drug selection, n (%)	12 (15.8)	47 (4.3)		
C2: Drug form, n (%)	1 (1.3)	3 (0.3)		
C3: Dose selection, n (%)	12 (15.8)	60 (5.5)		
C4: Treatment duration, n (%)	0 (0.00	0 (0.0)		
(II) NON - CLINICAL CAUSES‡, n (%), z-value	**51 (67.1), - 5.904**	**959 (89.7), + 5.904**	**1010 (88.2)**	
C5: Dispensing, n (%)	1 (1.3)	3 (0.3)		
C6: Drug use process, n (%)	4 (5.3)	2 (0.2)		
C7: Patient-related, n (%)	35 (46.1)	240 (22.0)		
C8: Patient transfer-related, n (%)	3 (3.9)	646 (59.2)		
C9: Other, n (%)	6 (7.9)	58 (5.3)		
DRP with no cause category, n (%)	2 (2.6)	10 (0.9)		

*Public hospital-based HD ambulatory center with pharmacist as part of the multidisciplinary team involved in providing pharmaceutical care to patients. Total number (n) of patients reviewed, presented as individual groups
#Private non-hospital-based HD ambulatory center without pharmacist as part of the multidisciplinary team involved in providing pharmaceutical care to patients. Total number (n) of patients reviewed, presented as individual groups
†Each identified DRP may have no problem or a single problem category. Total number (n) of problems categorized for identified DRPs
ΦEg DRPs: discrepancy in prescribed medication, discrepancy in prescribed dose & detected hypokalemia
ǂEg. DRPs: none/lack of medication reconciliation post transition of care resulted in; i) medication record discrepancy, ii) polypharmacy, iii) prescribed dose discrepancy & iv) prescribed frequency discrepancy
ǂEg: incorrect medication administration however, subsequent monitoring of either vital signs or laboratory remained normal
^^ p-value <.008, Bonferroni-adjusted is considered significant
‡Each identified DRP may have no cause, a single only or multiple causes. Total number (n) of causes categorized for the identified DRPs. Cause domain is divided into 2 categories: i) Clinical causes: factors that are directly related to treatment effectiveness (C1 – C4) and ii) Non-clinical causes: factors involved with work processes, logistics, patient related factor such as (C5-C9, 'No cause')

Poster Presentation：Hemodialysis
Poster No.：B0241
Abstract Submission No.：APCN20251141

Expression Profiling of Personalized Therapy Modelling to Prevent Maturation Failure of Arteriovenous (AV) Fistula in End-stage Kidney Disease Patients

Anindya Amanda Damayanti[1]
[1] Division of Internal Medicine, Clinical Program, Islamic Indonesia University, Yogyakarta, Indonesia

Abstract
Introduction: Maturation of the preaccess vein plays a critical role in ensuring proper vascular access for the dialysis. It refers to the expands and thickens of vein such as arteriovenous fistula (AVF) to become suitable as a durable vascular access. Assessing and preserving the integrity are essential, as it may lead to complication such as vein stenosis or thrombosis. Choosing the right target therapy is crucial to improve maturation outcome. This study aimed to identify the molecular expression that may contribute to the preaccess vein maturation in chronic kidney disease patients.
Method: The gene chip data GSE220796 was obtained from the GEO expression database. Transcriptomic data from veins and hemodialysis AVF samples were compared to identify differentially expressed genes (DEGs) during maturation. The key hub gene were screened by machine learning for KEGG enrichment. At the same time, the protein-protein interaction (PPI) networks of these DEGs were established by STRING.
Results: After data analysis, out of 28.860 items, COL5A2, NR3C2, TOP2A were highlighted for their significant dysregulation in maturation failure cases. Postoperative AVF undergoes several changes in the expression of extracellular matrix (ECM) with proteoglycan primarily present in the intima and fibrillar collagens predominantly found in the media. The gene expression analysis showed that the DEGs clusters related to AVF maturation failure including the upregulation of collagen type VIII in smooth muscle cell and the downregulation of ECM regulators. It potentially serving as biomarkers and therapeutic target in the remodeling between individuals. This identification of blood-vessel module biomarkers can be implemented for modeling anti-maturation failure drugs.
Conclusion: This study suggests that COL5A2, NR3C2, TOP2A as important research target to understand the maturation occurring early after anastomosis. The antiangiogenic properties of collagen VIII, perivascular interventions targeting this collagen during AVF creation could be a promising strategy.

Keywords：AVF, Preaccess, Kidney, Hemodialysis

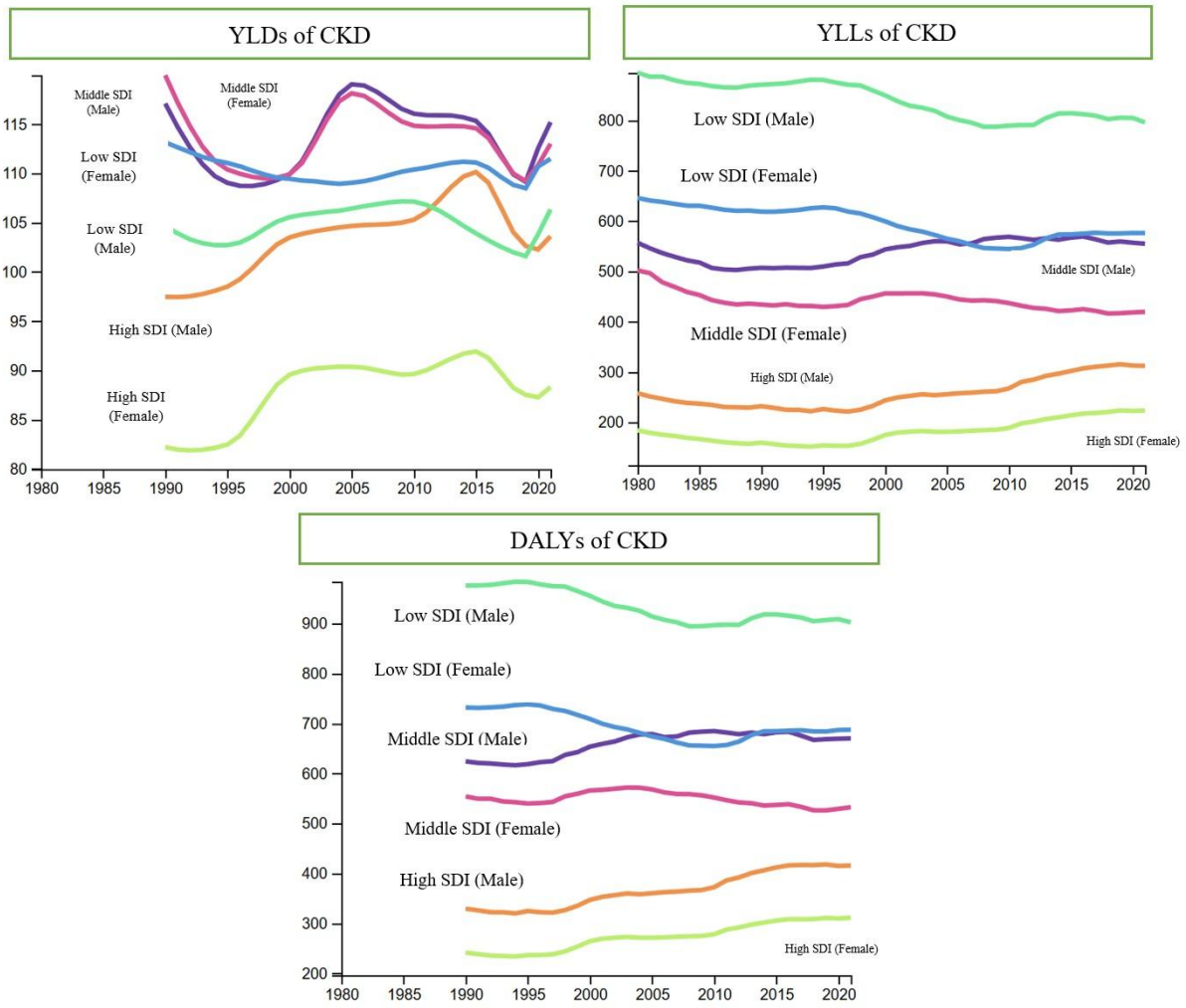
Poster Presentation：Hemodialysis
Poster No.：B0242
Abstract Submission No.：APCN20251198

The Impact of Hemodialysis in Chronic Kidney Disease on the Global Health Burden: A Comparative Study Between Low-, Middle-, and High-SDI Countries

Violetta Meitrie[1]
[1] Department of Basic Medicine, Universitas Islam Indonesia, Yogyakarta, Indonesia

Abstract
Objectives: Chronic kidney disease (CKD) is a common and increasing health problem worldwide, including in Indonesia. Environmental factors, particularly drinking water quality, also play a role in this disease. In Indonesia's predominantly agricultural areas, the increasing incidence of CKD over the past five years has led to the hypothesis of a link between exposure to contaminated water and kidney damage. This was then compared with countries with low, medium, and high sociodemographic indices.
Method: Data were extracted from the Global Burden of Disease (GBD) database from 2017 to 2021. Trends were analyzed over time and stratified by sex. Inclusion criteria included age-standardized prevalence, CKD diagnosis, and residence in a country with a high, middle, or low sociodemographic index (SDI). SDI is defined as information on a country's financial situation, education, fertility rate, and hemodialysis availability. Included in this study were YLDs (years lived with disability), YLLs (years of life lost), and DALYs (disability-adjusted life years) due to CKD from 2017 to 2021.
Result: The data showed that the YLDs were higher in middle-SDI countries than in low-SDI countries and high-SDI countries (223.64-228.22 thousand vs. 212.19-217.81 thousand vs. 191.87-196.32 thousand), which explains why the middle- and high-SDI countries have better access to hemodialysis. Females dominated the YLDs of low-SDI countries, middle-SDI countries, and high-SDI countries (0.99% vs. 1.23% vs. 1.01%) more than males (0.84% vs. 0.98% vs. 0.72%). The YLLs rate shows the possibility of unavailability of hemodialysis, which was higher in low-SDI countries than in middle-SDI countries and high-SDI countries (1.1371-1.385 million vs. 973.82-984.58 thousand vs. 528.25-534.92 thousand). The DALYs were also higher in low-SDI countries than in middle-SDI countries and high-SDI countries (1.589-1.597 million vs. 1.202-1.208 million vs. 724.58-726.8 thousand).
Conclusion: The YLDs of CKD were higher in middle-SDI countries, but the YLLs and DALYs of CKD were higher in low-SDI countries.

Keywords：Chronic kidney disease; Hemodialysis; Sociodemographic indices


YLDs of CKD
Middle SDI (Male)
Middle SDI (Female)
Low SDI (Female)
Low SDI (Male)
High SDI (Male)
High SDI (Female)
115
110
105
100
95
90
85
80
1980
1985
1990
1995
2000
2005
2010
2015
2020
YLLs of CKD
Low SDI (Male)
Low SDI (Female)
Middle SDI (Male)
Middle SDI (Female)
High SDI (Male)
High SDI (Female)
800
700
600
500
400
300
200
DALYs of CKD
Low SDI (Male)
Low SDI (Female)
Middle SDI (Male)
Middle SDI (Female)
High SDI (Male)
High SDI (Female)
900
800
700
600
500
400
300
200