



CANNT JOURNAL JOURNAL ACITN

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34 Responsiveness of the patient's perception of hemodialysis scale

By J. Creina Twomey, PhD, RN, Patrick S. Parfrey, MB, BCh, MD, MRCP, FRCPC, Brendan J. Barrett, MB, MSc, FRCPC, David N. Churchill, BSc, MD, MSc, FRCPC, FACP, DABIM, and Christine Y. Way, BN, BA, MSc(A), PhD

46 CONTINUING EDUCATION SERIES Should statins be used to prevent cardiovascular disease in patients on hemodialysis?

By Sannifer Hoi, PharmD student, and Marisa Battistella, BScPhm, PharmD, ACPR

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Revitalization

In this edition of the *CANNT Journal*, Twomey and colleagues look at the use of a tool to examine patient experience on hemodialysis, focusing on support systems, and the meaning of the illness and its treatment to patients undergoing hemodialysis. While a lengthy piece, we felt it was an important publication to include, as we all try to better understand and address what we can do outside of clinical care to make patients' quality of life better on renal replacement therapy. Complementary to that article, Dr. Hercz discusses a challenging patient/staff scenario related to poor attendance at scheduled hemodialysis treatments on page 51. We would encourage you to provide us with feedback about what these contributions have meant to you or how they have assisted you in your practice.

Change is once again afoot at the *CANNT Journal*! Now that the journal is online, we are continuing to move forward; we are offering up an opportunity for change and new vision, as we step down as co-editors of the journal. We believe in succession planning, and the facilitation of new ideas and perspectives that will keep the journal current and fresh for its readers. To that end, we feel that revitalization will be facilitated through new leadership.



Janet Baker



Alison Thomas

This has been a wonderful experience for us. We have met many wonderful contributors, journal editors, and researchers. We have learned so much about the editing process. It is truly amazing to see the effort and dedication that nephrology providers commit in order to bring quality submissions and educational articles to our journal. The support of the Board of Directors and Pappin Communications, who publish the journal, is tremendous and appreciated.

Why not consider putting your name forward to be editor-in-chief or co-editor? This is an opportunity to be involved, to orchestrate change, and to elevate the journal to new heights—as a cornerstone of CANNT. We encourage you to consider it—and feel free to contact us with any questions.

PLEASE SEND ALL SUBMISSIONS, QUESTIONS OR COMMENTS TO:

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Janet Baker: jbaker@haltonhealthcare.on.ca

Alison Thomas: athomas6@cogeco.ca

Revitalisation

Dans ce numéro du *Journal de l'ACITN*, Twomey et ses collaborateurs se penchent sur un outil qui permet d'évaluer l'expérience des patients hémodialysés, notamment leur système de soutien, et de déterminer ce que la maladie et son traitement signifient pour eux. Bien que l'article soit long, nous tenions à le publier en entier, puisque nous sommes tous et toutes à la recherche de moyens, hormis les soins cliniques, d'améliorer la qualité de vie des patients ayant subi une greffe rénale. En complément à cet article, le docteur Hercz traite d'un scénario épineux mettant en scène le personnel d'une clinique et un patient qui ne se rend pas assidûment à ses séances d'hémodialyse à la page 51. Nous vous encourageons fortement à nous faire part de vos commentaires : dites-nous ce que ces articles vous ont apporté ou en quoi ils vous ont été utiles dans votre pratique.

Un vent de changement s'apprête à souffler une fois de plus sur le *Journal de l'ACITN*. Maintenant que le Journal est publié en ligne, nous souhaitons qu'il poursuive sur sa lancée. Céder nos postes de corédactrices est pour nous un moyen de favoriser le changement et le renouvellement de la vision qui sous-tend la publication du Journal. Nous croyons en la planification de la relève et en l'importance des idées et des perspectives nouvelles pour garder le Journal au goût du jour et attrayant pour ses lecteurs. C'est pourquoi nous sommes convaincues que c'est par un nouveau comité de rédaction que le Journal trouvera une vitalité



Janet Baker



Alison Thomas

renouvelée.

Pour nous, l'expérience a été extraordinaire. Nous avons fait la connaissance de tant de collaborateurs, rédacteurs et chercheurs merveilleux! Nous avons aussi appris énormément sur le monde de l'édition et ses rouages. À chaque numéro, nous étions impressionnées par les efforts et le dévouement dont faisaient montre les professionnels en néphrologie qui nous proposaient des articles informatifs et des dossiers, tous de grande qualité. Enfin, nous sommes infiniment reconnaissantes envers notre conseil d'administration et Pappin Communications, l'agence qui publie le Journal, pour le soutien précieux qu'ils nous ont apporté.

Pourquoi ne pas soumettre votre candidature pour devenir rédacteur en chef ou corédacteur? Pour celui qui l'occupe, un tel poste est l'occasion idéale de s'engager, d'incarner le changement et de porter le Journal vers de nouveaux sommets—Journal qui, ne l'oublions pas, est la pierre angulaire de l'ACITN. Nous vous invitons à y réfléchir sérieusement, et n'hésitez pas à communiquer avec nous si vous avez des questions.

Le *Journal ACITN* est la publication officielle de l'Association canadienne des infirmiers/ infirmières et technologues en néphrologie, a/s P.O. Box 10, 59 Millmanor Place, Delaware, ON N0L 1E0, téléphone : (519) 652-6767, télécopieur : (519) 652-5015, Courriel : cannt@cannt.ca. Publié quatre fois par année, ce journal est envoyé à tous les membres de l'Association. L'abonnement annuel est: Canada, 80 \$ (+TVH), E.-U., 90 \$, hors du Canada et E.-U., 115 \$. Les publications antérieures, lorsque disponibles, coûtent 7,50 \$ (+TVH) chacune. Les opinions émises par les auteurs dans ce journal ne sont pas nécessairement partagées par l'Association ni par le corédactrices en chef. Nous invitons les lecteurs à nous faire part de leurs opinions. Toute correspondance devra être envoyée à l'ACITN, P.O. Box 10, 59 Millmanor Place, Delaware, ON N0L 1E0.

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Voici les échéanciers à rencontrer pour soumettre des articles/nouvelles au journal :

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MESSAGE FROM THE PRESIDENT: ROBERTA PRETTIE

Plant a seed, watch it grow



Could it be that spring has finally arrived? After enduring such a long, cold winter it is good to feel the sun and watch the snow melt.

Soon the crops will be sown, the grass will be green, and the flowers in bloom. It is a time of renewal and growth.

Each year in the spring, nurses from across Canada have the opportunity to write the Canadian Nurses Association (CNA) certification examination in their area of specialty. In preparation to write the nephrology exam, many have had to expand their knowledge base, as they learn about disease states and treatment modalities they do not work with daily. Congratulations to all nephrology nurses who wrote the CNeph(C) examination on April 5! Your knowledge and commitment to our profession helps to ensure that quality patient care is provided by knowledgeable professionals in nephrology.

A call for nominations for positions on the Board of Directors closed on May 15. Elected candidates will assume their positions on the board at the fall annual general meeting in Niagara Falls, Ontario. Serving as a member of the board is an excellent learning experience, as we collaborate to promote CANNT's vision of being the keystone of excellence in

nephrology nursing and technological care in Canada.

October 23–25, 2014, will find us “Pursuing the Power Within” in beautiful Niagara Falls. The planning committee has worked diligently to put together a program that promotes the best nephrology care through education, research, and communication. Thank you to all who submitted abstracts for oral and poster presentations and to all of our corporate sponsors for their ongoing support. Program details will be available mid-May at www.cannt.ca

Throughout the month of March, The Kidney Foundation of Canada promotes renal health through public awareness campaigns. During this time, many of you can be found volunteering at information booths and blood pressure clinics nation-wide. This serves as an invaluable teaching opportunity to encourage healthy life choices and to uncover kidney disease. Teaching moments may present themselves at any time. Education does not only happen in the classroom. It may well be a question from a patient or member of the public that plants the seed of curiosity. Seek out the answers and then share them. We learn from each other.

“Develop a passion for learning. If you do, you will never cease to grow.” – Anthony J. D'Angelo

**Roberta Prettie,
CANNT President**

Semer une graine et la regarder pousser



Le printemps serait-il enfin arrivé? Après un hiver aussi froid et aussi long, comme il est bon de sentir la chaleur du soleil et de regarder la neige fondre!

Bientôt, ce sera le temps des semis, le gazon verdira et les fleurs s'épanouiront. Place au renouveau et à la croissance!

Tous les printemps, les infirmières et infirmiers de partout au pays ont la possibilité de passer l'examen d'agrément de l'Association des infirmières et infirmiers du Canada dans leur domaine de spécialisation. En préparation à l'examen sur la néphrologie, bon nombre de nos membres ont dû approfondir leurs connaissances en se renseignant davantage sur les maladies et les modalités de traitement auxquelles ils ne sont pas habitués. Félicitations à toutes les infirmières et à tous les infirmiers en néphrologie qui ont passé l'examen d'agrément (CNeph[C]) le 5 avril dernier! Vos connaissances et votre engagement envers votre profession sont un gage de soins de qualité prodigués par des professionnels qualifiés.

L'appel de candidatures pour les postes du conseil d'administration à combler a pris fin le 15 mai dernier. Les candidats élus entreranno en fonction à l'occasion de notre réunion générale annuelle qui se tiendra l'automne prochain à Niagara Falls, en Ontario. Siéger au conseil d'administration, voilà une excellente expérience d'apprentissage qui permet de collaborer à la promotion de la vision de l'ACITN, c'est-à-dire être le symbole de l'excellence en soins infirmiers et en soins technologiques dans le domaine de la néphrologie au Canada.

Du 23 au 25 octobre 2014, nous retrouverons dans la magnifique

ville de Niagara Falls à l'occasion de notre symposium « Pursuing the Power Within » (Miser sur sa force intérieure). Le comité de planification a travaillé assidûment pour mettre au point un programme qui met en valeur les meilleures pratiques en néphrologie par l'entremise de la formation, de la recherche et de la communication. Nous remercions tous les professionnels qui nous ont fait parvenir le résumé de leur présentation orale ou leur affiche ainsi que tous nos commanditaires de l'industrie pour leur soutien continu. À la mi-mai, nous publierons en ligne les détails de l'ordre du jour à l'adresse www.cannt.ca/fr/index.html.

Tout au long du mois de mars, la Fondation canadienne du rein a fait la promotion de la santé des reins à l'occasion de diverses campagnes de sensibilisation du public. Durant ce mois, bon nombre d'entre vous ont fait du bénévolat dans des cliniques de pression artérielle et des kiosques d'information qui se sont tenus partout au pays. Ces campagnes de sensibilisation constituent autant d'occasions d'enseignement qui permettent d'encourager la population à adopter de saines habitudes de vie et à mieux se renseigner au sujet de la maladie rénale. Les occasions d'enseigner peuvent aussi se présenter à tout instant. L'apprentissage ne se produit pas seulement dans une salle de classe. Une question posée par un patient ou par une personne du public peut faire germer la graine de la curiosité. Trouvez les réponses aux questions que l'on vous pose et faites-les connaître. Nous apprenons tous les uns des autres.

« Nourrissez une passion pour l'apprentissage. Si vous parvenez à le faire, vous ne cesserez jamais de croître. » (traduction libre) –Anthony J. D'Angelo

Roberta Prettie,
présidente de l'ACITN

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- Ottawa Supper Clubs—contact Janet Graham, Nephrology Unit, Ottawa Hospital, jgraham@ottawahospital.on.ca
- September 6–9, 2014. EDTNA/ERCA 43rd Annual International Conference, Riga, Latvia. Email: queries@edtnaerca.org
- September 17, 2014. Nephrology Health Care Professionals Day.
- October 11–13, 2014. ANNA Fall Meeting for Nephrology Nurses, Managers, and Advanced Practice Nurses, Westin Savannah Harbor Resort & Spa, Savannah, Georgia. Website: www.annanurse.org
- October 23–25, 2014. CANNT 47th National Symposium, “Pursuing the Power Within”, Niagara Falls, Ontario. Website: www.cannt.ca

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- Use in pregnancy or women of childbearing potential
- Increased risk of hypersensitivity reactions in patients with any allergies to iron products or multiple (two or more) drug allergies

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CANNT Board in Action

Colleen Wile, RN, BScN, CNeph(C)
CANNT Past President 2013–2014

The Board in Action highlights for our CANNT members the many current and upcoming activities that the Board of Directors (BOD) is involved in on your behalf. The BOD is composed of past president, president, president elect, VPs (Ontario, Atlantic, Western, Quebec and Technical), and the website/financial coordinator. The two co-editors of the journal also sit on the board, as non-voting members.

MEMBERSHIP

There are currently 509 CANNT members. Membership is important to CANNT, as it is an association run by membership. The many benefits to being a CANNT member include:

- Member access to the online *CANNT Journal*
- Access to www.cannt.ca Members Only section
- Reduced rates at the annual Nephrology Symposium/regional events
- Access to CANNT Nursing Standards of Practice (revised 2014) and the CANNT Standards of Technical Practice (revised 2013).
- Promote and support specialty certification
- Provide continuing education opportunities—through the journal and online
- Recognize excellence in practice with yearly awards
- Educational bursaries and research grants
- Promote evidence-based practice
- Collaboration within the nephrology community
- Maintaining your yearly membership in CANNT assists with the long-term viability of our association.

FINANCES

- The CANNT BOD and our office administration staff continue to make every effort to curb spending, and we continue to look for cost savings so we can have a viable association.
- Conference calls are held by the BOD approximately every two months to eliminate the need for multiple face-to-face meetings. We have also looked at moving to a one-day face-to-face meeting prior to the annual conference to help be more fiscally responsible.
- Elections for Board of Director positions are held online, which has reduced the cost of mailing to our 500-plus members.
- The *CANNT Journal* is produced online only now to help decrease the cost of its publication.

JOURNAL

- Our *CANNT Journal* is a peer-reviewed journal and is distributed to members quarterly. The journal continues to be highly recognized as a resource for all nephrology health care professionals and is indexed through CINAHL, MEDLINE, and OVID databases.
- We encourage you to submit a research paper or article you think may be of interest to your fellow CANNT members to the journal. You can find the guidelines for authors on the CANNT website under the “*CANNT Journal*” section.
- The *CANNT Journal* is entirely online. The content of the journal is the same as our previously printed journal, but is only accessible to members online through the CANNT website.
- Alison Thomas and Janet Baker, the co-editors of the *CANNT Journal*, have decided that they will be stepping down at the end of the year. I

would like to sincerely thank them both for all their hard work over the past three years with the journal. If you think this might be something that would interest you, please visit our CANNT website for more details.

STRATEGIC PLANNING

- The BOD continues to develop our new strategic plan for 2013–2018.
- Our goals remain the same: to increase membership, sustain the viability of the association, communication, education, professional practice, research, partnerships and the CANNT Journal.
- All documents have been filed on the association's behalf in advance of the deadline for the new Not-for-Profit Act.

WEBSITE

- The CANNT website continues to be a work in progress. The board is looking at ways to revamp the look and flow of the website while limiting the costs associated.
- As a member, you have access to the “Members Only” section on the website, which provides great information to members on awards and bursaries, information on refined clinical practice groups, discussion groups and career opportunities.
- The discussion forums are a great way to share information with colleagues across Canada.
- One of the newest additions to the website is the “New Year, New Outlook, New Ideas—Messages from the VPs” section. This section is found on the home screen and highlights messages from your regional VPs and VP Technology.
- Links are also available to the different organizations that partner with CANNT.

COMMUNICATION

- Communication continues to be a priority for the CANNT BOD. Communication between the BOD, our members, our corporate sponsors and our valued partners is key to maintaining a viable association.
- Our office administration can be contacted using cannt@cannt.ca, or through our toll free number 1-877-720-2819. Sharon Lapointe will be happy to assist you.
- *The CANNT Connection* is an innovative way for us to communicate with our members. This newsletter is sent to our members monthly via e-mail, and it contains important coming events, dates to remember, and other noteworthy news. It's a way to keep members connected to CANNT and all of our activities.

ANNUAL SYMPOSIUM

- CANNT 2014 will be held in Niagara Falls, Ontario. The theme of this conference is "Pursuing the Power Within", and will be held October 23–25.
- Co-chairs Anita Amos and Cindy Bryson, along with their planning committee, have been working closely with our conference planner Heather Reid to plan a program that is both exciting and informative. We encourage you to register early, as space will be limited.

STANDARDS OF PRACTICE

- The CANNT Standards of Technical Practice (technical standards) were updated in 2013 and have been posted to the website.

- The CANNT Standards of Nursing Practice have been newly revised in 2014 and are now posted to the website. The Board is grateful to Marsha Wood and the rest of her committee who have worked very hard over the past year updating these standards.
- The Standards for both groups can be found on the CANNT website under the heading "Standards of Practice".

AWARDS, BURSARIES AND GRANTS

- CANNT offers numerous awards and bursaries yearly to our members. Information can be found on the CANNT website under the "resources" tab. The deadline for applications is May 1 annually. Consider applying for one of the many bursaries/grants, or consider nominating one of your co-workers for one of the excellence in practice awards.
- There is more than \$26,000 available to our CANNT members in awards and bursaries and these are presented annually at the national conference.

NOMINATIONS COMMITTEE

- The call for nominations for Board of Director positions deadline was May 15, 2014.
- Positions available this year were: President-Elect, VP Western region, VP Ontario, and VP Technologists.
- Membership on the CANNT Board of Directors is a very rewarding

opportunity, and is a great way to meet new colleagues, contacts and friends. Please consider applying for one of our vacant positions.

- Our new incoming board members will be introduced during the national conference in Niagara Falls in October 2014.

CANADIAN NURSES ASSOCIATION (CNA)

- As past-president, I represent CANNT with the CNA Specialty Network. This representation involves teleconferences with the other members of the specialty network. This network consists of more than 40 specialty areas/groups from across Canada, discussing issues affecting both their specialty and nursing in general. This is an excellent forum for sharing information.

NEPHROLOGY HEALTHCARE PROFESSIONALS DAY

- Nephrology Healthcare Professionals Day is September 17, 2014.
- Our theme for Nephrology Healthcare Professionals Day is "Together we make a difference".

CANNT OFFICE OPERATIONS

- Innovative Conferences and Communications is acting as our association office managers. Sharon Lapointe is our contact person for CANNT, and she can be reached at cannt@cannt.ca or by calling our toll-free number: 1-877-720-2819.

"Stay in the Know" at www.cannt.ca

VISIT YOUR CANNT WEBSITE FOR:

- "What's New" at a glance
- nephrology job postings
- educational resources: awards/bursaries/grant applications
- PDF articles of previous CANNT Journal issues
- online continuing education articles that earn you CEU credits
- links to educational and professional affiliate websites
- CANNT merchandise available in our online store
- regional report updates and our annual CANNT/ACITN report
- CANNT Nursing and Technical Practice Standards, revised 2008
- national nephrology certification information and exam preparation support
- regional, national and international educational events information
- National Nephrology Professionals' Day information—discover how colleagues from across Canada celebrate the day
- CANNT National Symposium 2014 details and updates

Join or renew your CANNT membership online today at www.cannt.ca!



This year's conference promises nephrology professionals... nurses, technologists, administrators, researchers, pharmacists and more... many opportunities to learn, share, network, discuss and socialize together.

Experience all that CANNT 2014 has to offer:

- Share in the plenary addresses: be inspired towards peak performance, re-affirm your call to your profession and incorporate leading edge science into your everyday work!
- New this year: "Using the Power Within to Empower Others"—a one-day agenda filled with highly relevant discussions about pediatric care
- Choose from more than 50 concurrent sessions and workshops suited to all interests... with topics ranging from mental health, pregnancy, geriatric nephrology, innovations in practice, technology, research and much, much more.
- Learn from more than 30 poster presentations with contributing authors from across Canada!
- Engage with our corporate partners as they showcase their latest products and services. Come prepared with questions and issues—our exhibitors want to hear from you!

Immerse yourself in this year's conference theme, recognizing the untapped capabilities of both your patients and yourselves. Explore innovative strategies for "PURSUING THE POWER WITHIN"!

Hosted at the beautiful Scotiabank Convention Centre in Niagara Falls, Ontario, this conference will re-energize, motivate and engage you!

Register today! CANNT 2014 information is available as follows:

1. Printed brochure available by contacting Innovative Conferences & Communications: Susan Mason: susanm@innovcc.ca, 519-652-0364 (phone)
2. Downloadable brochure online at www.cannt.ca
3. Program, abstracts, online registration and secure payment on-line at www.cannt.ca

We are excited to welcome Canadian nephrology professionals to Niagara Falls! Come and join us in PURSUING THE POWER WITHIN!

ABSTRACTS

Some of the key strategic goals of CANNT are to disseminate educational materials to CANNT members, profile scientific research, and to provide opportunities for nephrology colleagues to network.

CANNT's national conference, **CANNT 2014**, provides an excellent venue for accomplishing these goals of CANNT. However, only a portion of CANNT members are able to attend the national conference annually. Cognizant of this, CANNT is pleased to be printing the abstracts to be presented in both oral and poster format at this year's annual conference as a supplement to this issue of the CANNT Journal.

The following abstracts celebrate the diversity of nephrology topics being investigated and discussed across Canada. It is our hope that CANNT members interested in pursuing a profiled topic will contact our national office at 519-652-6767 or 1-877-720-2819 or cannt@cannt.ca to receive information regarding how to contact the author about the work.

We hope you will carefully review these abstracts!

Alison Thomas and Jan Baker
Co-Editors, CANNT Journal

Building an Online Community for Dialysis Patients

Brady Wood, and Anna Cobian, St. Catharines, ON

Niagara Health System desired more meaningful engagement with its dialysis patient population in order to build trust in the organization, improve communication, and incorporate patient suggestions into future planning. As a pilot, it embarked on research including a survey and a focus group. The results of this research indicated that dialysis patients, on the whole, were engaged and looking for additional forums to interact with hospital and program leadership, as well as give each other support and learn about new research and self-care information. Another interesting finding was that on the whole, a majority of patients were well-versed and frequent users of social media, and, per the findings, approximately 50% were anticipated to join an online discussion group if the hospital aided them in setting one up. Following the analysis of the research findings, communications and kidney care program leadership have embarked on planning a pilot to build greater community for patients including an online Google+ group. This work included a terms of reference, code of conduct, privacy disclaimer, and training program. The moderators of this online group include the program manager, as well as a patient moderator. The group's goals: improving patient satisfaction, as well as improving a specific quality marker. We anticipate that by the date of the CANNT conference we will be in a position to report new information on how the online group has functioned, as well as tips for building online communities in general, while also sharing in greater detail our research approach and methodologies.

Managing Diabetes in Hemodialysis Clients

Ruby Weresch, RN, MN, BScN, CDE, CNeph(C), Hamilton, ON

The most common cause of end stage renal disease is diabetes. Approximately 90% of people diagnosed with diabetes have type 2 diabetes. Type 2 diabetes is a chronic disease associated with impaired glucose tolerance and peripheral insulin resistance. Diabetes is a multisystem disease frequently causing microvascular and macrovascular complications. The main goal of diabetes management is to maintain blood glucose levels within the normal range, which is an enormous challenge even for people without renal disease.

The purpose of this presentation is to provide an overview of three underlying principles in managing clients' diabetes while on maintenance hemodialysis. First, we will consider general factors most clients experience with diabetes management. Second, we will review how insulin metabolism is altered during the hemodialysis treatment resulting in changes in peripheral insulin resistance and insulin clearance. Finally, we will examine the accuracy of the quarterly glycosylated hemoglobin since clients with renal disease have reduced red blood cell survival.

Uremia and hemodialysis can complicate glycemic control. Having a greater understanding of the intertwined multifaceted issues will assist health care providers in supporting clients with diabetes.

From Simple to Complex: Clinical Challenges in Peritonitis Management

Betty Kelman, RN, MEd, CNeph(C), Toronto, ON

This presentation will be a clinically based discussion of three case histories focused on peritonitis management. Included will be an individual with a gram positive organism (coagulase negative staphylococci) who responded well to standard interventions, an individual with a more complex organism (*Pseudomonas aeruginosa*) who had a complicated course, and an individual with culture negative peritonitis. Discussion will review the clinical course, diagnosis, interventions and outcomes, in addition to reviewing the International Society of Peritoneal Dialysis' Guidelines for Management. The intent is to increase knowledge among nephrology nurses in the assessment and care of individuals with bacterial peritonitis, as well as the approach to culture negative or non-bacterial peritonitis.

Use of High Cut-off Dialyzer for Treatment of Kidney Failure in Patients with Multiple Myeloma

Carolyn Bartol, RN, BScN, CNeph(C), and Kati Lynch, RN, BScN, Halifax, NS

Research shows that approximately 20 per cent of patients with multiple myeloma develop kidney failure. These patients produce incomplete immunoglobulins, which contain only the free light chain portion of the immunoglobulin. These free light chains deposit in the kidney, and can cause organ damage.

Use of the High Cut-off (HCO) protein-permeable dialyzer has the potential to significantly improve the treatment of acute kidney failure in patients with multiple myeloma. The HCO dialyzer is particularly effective for the removal of nephrotoxic serum free light chains. It has been investigated in clinical studies that shortening of exposure time of the kidney to toxic serum free light chains may also decrease the risk of the development of chronic kidney failure.





At Capital District Health Authority (CDHA), treatment with hemodialysis, employing use of a high cut-off dialyzer, together with chemotherapy, has been used to successfully treat acute kidney failure with resulting recovery of kidney function in some instances.

This presentation will describe the CDHA experience with care of the patient requiring treatment of kidney failure, related to multiple myeloma, using the HCO dialyzer. Various nursing considerations, including patient assessment, required intra-dialytic monitoring, and appropriate nursing interventions will be outlined.

Details representing the rate of recovery from kidney failure, as well as patient experiences with treatment guidelines and treatment outcomes will be discussed. In addition, benefits and drawbacks experienced with use of the high cut-off dialyzer will be presented.

Reducing the Risk of PD Related Infections: Preventative Care Strategies for Patients on PD Therapy

Susan McMurray, RN, BN, CNeph(C), and Barb Bunker, RN, MN, CNeph(C), Baxter Corporation, London, ON

Wide variability in worldwide peritoneal dialysis infection rates are evident and remain a major cause of patients switching to hemodialysis therapy. In Canada, the rates of peritonitis have improved over the past decade. PD patients have a lower incidence of bacteremia as a complication of modality related infections and better survival compared to hemodialysis patients dialyzed via a central venous catheter. However, PD-related infections are a major reason patients switch to in-centre hemodialysis therapy.

The International Society of Peritoneal Dialysis has published recommendations regarding the management of PD-related infections. Lower rates of infection can be achieved if protocols are implemented to reduce the risk of infection. This presentation will focus on detailing current clinical practice guidelines and preventative care strategies needed to minimize the risk of PD-related infections in an effort to maintain PD patients on their therapy of choice.

Pressure Ulcer Risk Assessment in Outpatient Hemodialysis: A Modified Braden Scale

*Lesley Cotsianis, OT Reg (MB), BMR (OT) Dip PH OT(C),
Winnipeg, MB*

Purpose of study: A large, tertiary care hospital implemented a practice guideline for prevention and treatment of pressure ulcers, which mandated the use of the Braden Scale for risk assessment. Patients with end stage kidney disease may be at increased risk for pressure ulcers, as a result of comorbidities and limited functional status. While the multidisciplinary hemodialysis team felt that pressure ulcer risk assessment was important, the Braden Scale had limitations to its applicability in outpatient dialysis. The dialysis occupational therapist modified the Braden Scale to reflect the outpatient hemodialysis population. The purpose of this study was to establish the inter-rater reliability of a modified Braden Scale for use in outpatient hemodialysis.

Methods: Sixty participants were recruited via a random sampling strategy. Data were collected by three raters, each administering the modified Braden Scale during the patients' regular dialysis treatments. Inter-rater reliability was determined for the overall modified Braden Scale score, as well as for each subsection using a kappa coefficient. Ethical approval was received.

Results: This presentation will discuss the inter-rater reliability of the modified Braden Scale, and the clinical significance of using a dialysis-specific risk assessment tool.

Conclusions: The use of a hemodialysis-specific risk assessment tool for the development of pressure ulcers will assist hemodialysis units in identifying patients at risk for pressure ulcers, and to develop multidisciplinary treatment plans to mitigate this risk.

Implications for nephrology care: Prevention of pressure ulcers in this population can lead to decreased wound treatment costs and decreased social and functional implications for patients.

Transitioning from Central Venous Catheter to Arteriovenous Fistula: The Hemodialysis Patient Experience

Angela Romyn, RN, MSN, CNeph(C), Kelowna, BC

An estimated 200,000 British Columbians are afflicted with some degree of chronic renal disease. Hemodialysis is a common renal replacement therapy. Two types of vascular accesses used for hemodialysis are arteriovenous fistulas (AVF) and central venous catheters (CVC). Limited research is available that discusses why patients choose to dialyze with AVFs or CVCs. No research could be found that addresses the transition experience of patients who have utilized both accesses. The purpose of this study was to explore the experiences of hemodialysis patients who had utilized and transitioned from a CVC to an AVF. Interpretive descriptive design was used. Eleven patients participated in semi-structured interviews. Three main themes were uncovered: impact, coping, and factors influencing impact and ability to cope. Regardless of the access, participants'

lifestyles were significantly affected and superimposed on physical and psychosocial impacts. They coped using a variety of strategies including exercising control, focusing on the positive, and struggling to accept. Participants described several factors that influenced the impact of their vascular accesses and their ability to cope including patient education, trust in health care providers, transportation, and family. Participants' stories of vascular access transition revealed the sense of burden vascular accesses were for self and loved ones, the threat to body image, the all-consuming fear of the unknown, and information challenges. This study elucidates the need for further exploration of issues related to improving the patient experience of vascular access with attention to body image, fear of cannulation, access to resources and trust in health care providers and the information they provide.

Teen Taking Charge: Managing My Transplant Online

Moirra Korus, BA, RN, Elizabeth Cruchley, BA, Jennifer Stinson, PhD, RN-EC, CPNP, Anna Gold, CPsych, Samantha Anthony, MSW, RSW, PhD(c), Margaret van Wyk, BSc(Honours), and Cynthia Nguyen, BSc(Honours), CCRP, Toronto, ON

Background: Canadian adolescents with solid organ transplants (SOT) demonstrate high rates of medication non-adherence and higher rates of graft loss compared to all other age groups. Self-management interventions encompass information-based material and cognitive behavioural therapies (CBT) designed to achieve disease-related learning and changes in the participant's knowledge, understanding and skill acquisition, and provide meaningful social support. Using information obtained from a needs assessment, we developed 3 modules of an Internet-based self-management program for youth with SOT. The purpose of this study was to determine the usability and acceptability of the online program from the perspectives of the youth with SOT.

Methods: Twenty-one adolescent-aged patients (mean age 15) were recruited from pediatric lung, liver, heart, and kidney transplant clinics at one large tertiary care centre in Canada. Three iterative cycles of usability testing took place to refine the website prototype. Study procedures involved finding a standardized list of features and talking aloud about any issues they encountered, followed by a semi-structured interview.

Results: The teens found the content to be trustworthy, felt they would use the website and recommend it to other transplant patients, and found the videos of peer experiences to be particularly helpful. Teenagers had some difficulties finding information within sub-modules and suggested a more simplistic design with easier navigation.

Conclusions and future direction: The development and testing of these modules is the first step in developing a web-based intervention for solid organ transplant patients. In the future, funding will be sought for a randomized control trial to determine the feasibility and effectiveness of a 12-module self-management website on self-management and graft survival.

Novel Access, New Challenges?

Leora Wanounou, MN, NP, and Joyce Hunter, RN, CNeph(C), Toronto, ON

The Hemodialysis Reliable Outflow (HeRO™) device is a subcutaneous graft with an outflow component that bypasses central venous stenosis. This presentation will explore indications, experiences, and challenges when using the HeRO™ graft.

The average age, as well as the incidence of diabetes amongst hemodialysis patients has increased, contributing to challenging vascular access creation and maintenance (Hayakawa et al., 2007). In addition, patients receiving long-term hemodialysis therapy frequently have central venous catheters (CVC). These CVCs can lead to chronic stenosis or thrombosis of central veins, resulting in limited surgical options for access creation. These patients are access-dependent, as they may not be eligible for transplant or peritoneal dialysis.

The HeRO™ vascular access device is indicated for patients on hemodialysis who have exhausted all other access options due to central vein thrombosis, multiple failed previous accesses, or who are receiving less-than-adquate dialysis clearance. Education on the components of the HeRO™ graft, when it is indicated, and how it is used, is beneficial to all health care professionals caring for patients with HeRO™ grafts.

Using a case-based approach, we will illustrate some of these issues, specifically those related to graft thrombosis, anticoagulation and cannulation technique.

The use of novel access devices such as the HeRO™ graft will become more prominent, as people are living longer on dialysis. To date, St. Michael's has inserted seven HeRO™ grafts both for our own patients and for other programs. Providing education on use of this graft and sharing our experiences will help guide future practice and improve patient care.





Kidney Health Education for Youth

Carmen Berglund, RN, BSN, and Tanya Menzies, RD, CDE, Saskatoon, SK

The Chronic Kidney Disease (CKD) Community Outreach team works with youth in Saskatchewan who are at high risk for developing CKD. This includes youth in addiction centres, on reserve, inner city, First Nations and Métis communities. A series of modules was created to teach about chronic diseases, lifestyle choices, and nutrition. The modules have been adapted for use in a variety of settings and with different age groups. Of the 85 (April 2013–Jan. 2014) participants, the majority are First Nations or Métis from remote, northern communities in Saskatchewan. Many of the participants have multiple risk factors for CKD such as family history, substance abuse, tobacco use, food insecurity and poor living conditions. The modules have been well received by participants and staff. Many participants verbalize they would like to change an unhealthy behaviour after attending the education sessions. Participants are able to recall information learned during verbal post-quizzes. The CKD Outreach Team continues to receive invitations back to these centres to present to new participants. Several participants requested the team to present at their hometown schools. Working with high-risk youth will continue to be a priority for the CKD Outreach Team, as there has been such positive response to the modules.

The Nephrology Nurse's Role in Protecting the Peritoneal Membrane for Patients on Peritoneal Dialysis

Gillian Brunier, RN(EC), MScN, CNeph(C), Toronto, ON

A leading cause of treatment failure for patients on peritoneal dialysis (PD) is loss of peritoneal function. Dysfunction of the peritoneal membrane occurs over time for patients on PD, the most prevalent problem being ultrafiltration failure. One study found approximately 23% of patients on PD developed ultrafiltration failure. Once ultrafiltration has occurred, it is usually too late to reverse it and the patient needs to be transferred from PD to hemodialysis. The best strategy is to try to prevent ultrafiltration failure occurring in patients on PD in the first place.

This presentation will focus on helping nurses gain a deeper understanding of ultrafiltration failure. First, the nephrology nurse needs to recognize signs and symptoms of ultrafiltration failure for patients on PD. It is important to rule out PD catheter malposition and leaks. Also, the nurse needs to understand how to perform the ultrafiltration failure test and interpret the results. Second, the nephrology nurse needs to be familiar with important strategies that help protect the peritoneal membrane: preventing peritonitis; decreasing the use of high glucose PD solutions through use of alternative solutions; restricting fluids and salts; using loop diuretics; preserving residual renal function; and finally, minimizing glucose degradation products.

In Canada, we all want to help our patients stay safely on home PD for as long as possible. Ultrafiltration failure can be a major impediment. This presentation will provide nephrology nurses with an increased understanding of why ultrafiltration failure occurs, how to assess for it, and, most important, strategies to help prevent this happening.

An Education Initiative Modifies Opinions of Hemodialysis Nurses Towards Home Dialysis

Matt Phillips, RN, BScN, Karthik Tennankore, MD, FRCPC, and Colleen Wile, RN, BScN, CNeph(C), Halifax, NS

Purpose of study: It has been shown that in-centre hemodialysis (ICHD) nurses prefer ICHD for patients in many situations. However, it is not known if their opinions can be modified. The purpose of this study was to determine if an education initiative (aimed at promotion of home dialysis) modified the perceptions of in-centre and satellite hemodialysis (IC/Sat HD) nurses towards modality selection.

Methods: We surveyed all IC/Sat HD nurses at our institution who attended the education initiative before and after their education session. A total of five sessions lasting approximately three hours were delivered. Telehealth was offered during two of these sessions. Content of the initiative included a didactic review of national trends and provincial targets, benefits of home dialysis, common misconceptions about patient eligibility and cost comparisons of different modalities. A patient testimonial video of home dialysis patients from the institution was also included.

Results: Eighty-eight of 115 IC/Sat HD nurses attended the education session(s). Eighty-seven nurses completed pre and post surveys (99% response rate). Baseline perceptions of IC/Sat HD nurses were favourable towards home dialysis modalities, but even more positive after the education session, (mainly towards the perceived barriers of impaired cognition, poor motor strength and poor visual acuity). Finally, IC/Sat HD nurses felt more comfortable teaching in-centre hemodialysis patients about home modalities after the initiative.

Conclusions and implications for nephrology care: Educational initiatives can modify IC/Sat HD nurse's opinions towards home modalities, and should complement the multitude of strategies aimed at promoting home dialysis.

Laughter Yoga on Dialysis: Exploring the Perspective of Nurses

Trisha Parsons, RPT, BScPT, PhD, Kingston, ON, Paul Bennett, RN(Renal), DipAppScNsg, BN, MHSM, PhD, Ros Ben-Moshe, BA, MPH, Post Graduate Certificate Health Promotion, Melissa Weinberg, BAppSc(Psych) (Hons), PhD, Merv Neal, Karen Gilbert, RN, BN, Helen Rawson, RN, BSc(Hons), MSc, PhD, Cherene Ockerby, BA(Psych) (Hons), Alison Hutchinson, RN, PhD, Paul Finlay, Diploma Applied Biology (DipAppSc), Certified Respiratory Function Scientist (CRFS), Melbourne, Australia

Purpose: Laughter and humour therapy have been associated with positive physical and psychological benefits. Laughter Yoga (LY), a form of laughter therapy, incorporates breathing and movement exercises with self-induced laughter. The purpose of this study was to explore nurses' attitudes towards and perceptions of a LY during dialysis intervention.

Methods: A four-week LY during dialysis intervention was piloted. Fifteen adult (>18 years of age) hemodialysis patients were recruited. Trained LY therapists provided the 30-minute intervention 3x/week over four weeks. A nine-item survey, developed to explore nursing attitudes and perceptions of the LY intervention was administered to all nurses employed in the dialysis unit during the duration of the pilot study (n=18).

Results: The survey response rate was 61%. Respondents were exclusively registered nurses and in the majority had practised for less than 10 years (82%). Only one respondent had previous experience with LY. Eighty-two per cent of respondents either agreed or strongly agreed that LY had a positive impact on their patients' mood and that they would recommend LY to future patients.

Conclusions: LY during dialysis was perceived positively by a cohort of registered nurses. Further work is required to establish the physiological and psychological value of LY within the dialysis context.

Implications for nephrology care: LY is an inexpensive, accessible and low-intensity form of physical activity that was viewed favourably by a cohort of nurses within a dialysis unit. LY has the potential to be a novel method by which to improve dialysis patients' mood and general sense of well-being.

Dialysis Modality Decision-Making for Older Adults with Chronic Kidney Disease

Lori Harwood, RN(EC), PhD(candidate), CNeph(C), London, ON, and Alexander M. Clark, RN, PhD, Edmonton, AB

Purpose of the study: The purpose of this study was to examine the personal and structural facilitators and barriers for home dialysis decision-making for older adults with Chronic Kidney Disease (CKD).

Background: How do people with CKD make modality decisions? Older adults with CKD form a large and growing segment of the dialysis population in many high-income countries, but are less likely to uptake home dialysis despite its benefits.

Methods: This qualitative ethnography framed in social theory included adults with CKD not on dialysis, older than 65 years of age. Thirteen people (seven men and six women, aged 65–83 years of age) took part. Persons with CKD were interviewed and group interviews were conducted with four of their CKD clinic health professionals. Content analysis was used for data analysis.

Results: The factors influencing older adults' CKD modality decisions are similar to younger adults. However, older adults with CKD are in a precarious state with persistent uncertainty. Age imposes some limitations on modality options and transplantation. Modality decisions were influenced by health status, gender, knowledge, values, beliefs, past experience, preferences, lifestyle and resources. Support from family and health care professionals was the largest determinant to home dialysis selection.

Conclusion: Adequate social support, functional status and resources enabled home dialysis selection for older adults with CKD.

Implications for nephrology care: Understanding more about the decision-making processes for older adults with CKD is important for quality interventions and the economic sustainability of dialysis services.

What Does it Mean to Understand and How Do You Know the Learner Got It?

Eleanor Pierre, PhD, Med, BEd, Grimsby, ON, and Lezlie Lambert-Burd, BAdEd, BScN, RN, CNeph(C), St. Catharines, ON

Purpose of the project: To provide an education session that identifies elements of understanding and how it impacts learning, as well as facilitation strategies to evaluate understanding.

Description: Health care practitioners provide information requiring understanding every day. Yet, what does it mean to understand? Is it knowing, competence, wisdom or so much more (Wiggins & McTighe, 2005)? This session will provide an opportunity to explore the concept of





understanding and consider what that means for learning. Strategies will be discussed that can be transferred to the health care setting when teaching staff and patients to evaluate understanding.

Evaluation/outcomes: Elevating health care provider's definition of understanding informs their practice by enabling the practitioner to utilize tools that will assist the learner or patient to maximize information or learning for understanding.

Implications for nephrology: Nephrology professionals provide information that impacts on the well-being of individuals, groups and communities every day. It is imperative that they seek to continually develop their skills in teaching and learning to optimize understanding.

Home Hemodialysis Tech Assistant—Evolution of the Home Team

Richard Sit, St. Catharines, ON

With the growth of a home hemodialysis program there is an increased demand of the home hemodialysis technologists. Typical home technologists have a lot of responsibilities. What would be an efficient and cost-effective way to help the demands of a growing home program? Introduce the "Home Hemodialysis Tech Assistant"!

The Niagara Health System introduced a home tech assistant in mid 2013. The role has proven to be an important part of the home hemodialysis team. Some responsibilities of a tech assistant include monthly home visits, collecting samples, and organizing equipment moves and supplies, to name a few. This allows the home technologist to focus on technical issues. The tech assistant is also involved with patient training and can answer minor technical questions. Our collaborative team approach allows our patients access to the help they need from the proper team member.

The presentation demonstrates the home hemodialysis tech assistant's involvement in the NHS home hemodialysis program. It will provide insight to this new role and how it can benefit your home program.

Navigating the Chronic Kidney Disease Continuum: Empowering Health Care Providers

Anaïle Soriano, MN-NP, Toronto, ON

This presentation will discuss how health care providers can help navigate children who have chronic kidney disease (CKD) and their families, into their journey along the continuum of pediatric CKD, with a focus on growth and nutrition.

Although there is limited information on the epidemiology of CKD in children, those who develop CKD early in life present unique challenges to their families and health care providers. A brief overview of pediatric kidney disease leading to CKD, how complications of CKD can pose challenges in managing children with CKD, and implications on the child's growth and development, will be discussed. Health care providers play a crucial role in managing common health issues such as hypertension and anemia, malnutrition and growth failure, bone demineralization, and infections in CKD. The transition from CKD to adulthood, and transition from managing CKD to renal replacement therapies (RRT) such as dialysis or transplant affect children with CKD in all developmental stages.

It is crucial for a coordinated multidisciplinary team to help children and their families manage kidney disease, so that they have as healthy and normal a life as possible while preserving optimum renal function. It is through increasing awareness that health care providers can help children who have chronic kidney disease, and their families, so that we can achieve better outcomes through managing CKD complications with available renal replacement therapies and improving overall quality of life.

Don't Be a Baby About It, Just Baby Them: Infant Hemodialysis, Technology and Education Review

Rosaleen Nemec, RN, BScN, CNeph(C), Toronto, ON

Purpose: This presentation will discuss how advances in hemodialysis technology, medication, nutrition, and nursing care have supported infants. This gives a child the best chance to grow, develop, and flourish.

Description: Some of the most vulnerable patients are the infants affected by kidney insufficiency. It is a difficult struggle for parents to stand by and watch their baby fight for life. Improvements in technology, hemodialysis machines, dialyzers, medicine, and nutrition have allowed infants to grow and meet their milestones of infancy. This presentation will follow the journey of two infants from the neo-natal unit, to the nephrology inpatient unit, and then transitioning to outpatients. Examination of their nutrition and medication status and dialysis regimen will allow practitioners to observe their current practice. The infants have different life stories, but similar hemodialysis care. Identifying key aspects of their care will help other practitioners to relate and reflect on their own professional practice.

Evaluation/outcomes: Education of new products and practice will help inspire nurses, dietitians, and other members of the multi-disciplinary team to provide excellence in support and nurturing to the infants in their journey of life. This presentation will allow nurses to examine their current practice, technology, equipment and existing policies. Providing optimal care will allow infants to meet their growth milestones and minimize hospitalizations.

Peritoneal Dialysis in Pediatric Patients: Essential Pediatric Considerations

Susan Ackerman, RN, and Elizabeth Piva, RN, Toronto, ON

Purpose: To provide an overview of peritoneal dialysis tailored to the needs of infants and toddlers.

Description: Infants with end stage renal disease present with unique challenges. Severe gastro-esophageal reflux, vomiting, tissue fragility, exit site leaks and hernias are some issues that require frequent adjustments to the dialysis prescription in order to achieve adequate dialysis during these vital years of rapid growth.

We will share complications, challenges and advances in dialysis care using a multidisciplinary team approach.

Implications for nephrology practice/education:

By collaborating and sharing best practice with other pediatric centres we hope to achieve a common goal: to improve long-term well-being, optimize growth and development, and preserve peritoneal membrane function in children who may face decades of renal replacement therapy.

Nutrition Care for Children Across the Spectrum of CKD and Dialysis

Vivian Cornelius, RD, Toronto, ON

Purpose: The purpose of this session is to become familiar with current practice in nutrition assessment, provide and achieve optimal nutrition management, and to learn different diet modifications for pediatric chronic kidney disease (CKD) patients.

Description: Malnutrition is often observed in children with CKD and early and routine interventions are critical in achieving nutritional goals. Growth failure etiology is multifactorial reflecting factors such as protein-energy malnutrition, metabolic acidosis, salt-wasting, bone mineral disease and abnormalities in growth hormone. CKD children are at high risk of vitamin deficiency due to inadequate dietary intake, limited sun exposure, uremia, deficient kidney function and increase losses during dialysis. Common problems that hinder optimal nutrition are nausea and vomiting, gastrointestinal dysmotility, poor appetite, feeding disorders and restrictive diets.

Accurate nutrition assessment, specifically measurement of dry body weight, is challenging in pediatric patients receiving hemodialysis due to constant changes in hydration status. Normalized protein catabolic rate (nPCR)

gives an objective value that has been used as a measure of nutritional status and daily protein intake amongst older children.

Some of the early interventions to achieve optimal nutrition management are periodical nutritional assessment, formula manipulations, gastrointestinal medications, tube feeding, nutritional and vitamin supplementation and dietary modifications to control electrolytes.

Conclusion: Achieving optimal nutritional status not only ensures proper development and growth, but also malnutrition is a significant consequence of CKD in children associated with increased morbidity and mortality.

Atypical Hemolytic Uremic Syndrome:

A Case Study

Anita Babu, BScPhm, RPh, and Alexandra Eden-Walker, NP-PHC, MScN, Toronto, ON

Atypical hemolytic uremic syndrome (aHUS) is a rare, life-threatening, chronic, genetic disease of uncontrolled alternative pathway complement activation and is characterized by a triad of non-immune hemolytic anemia, thrombocytopenia and renal failure. In this case study we will discuss the presentation, diagnostic evaluation, management, prognosis, and outcomes of a seven-year-old pediatric patient diagnosed with complement mediated HUS due to familial genetic inheritance. This patient's dramatic initial presentation, treatment with plasma exchange, double limb amputation, progression to end stage renal disease, and subsequent complicated deceased donor transplantation will be explored. The complement cascade will also be discussed and highlighted with reference to the use of Eculizumab, a monoclonal antibody to C5 that prevents cleavage of C5 to C5b, thus preventing the formation of terminal complement attack complexes responsible for microangiopathic hemolytic activity.





Using Sodium Polystyrene and Sevelamer Carbonate to Pre-Treat Enteral Feeds

Andrea Aquilina, RD, Toronto, ON

Purpose: This presentation will discuss guidelines for pre-treating enteral feeds with sodium polystyrene and sevelamer carbonate, experience with their use at our centre, and the development of a policy for pre-treating feeds in hospital.

Description: Infants and children with renal failure are at increased risk of hyperkalemia and hyperphosphatemia. Sodium polystyrene and sevelamer carbonate are medications used to treat these electrolyte disorders. Sodium polystyrene is used in treating hyperkalemia. Sevelamer carbonate is used in treating hyperphosphatemia when the use of other phosphate-binding agents has been ineffective. Both medications come in powder or suspension form for oral administration, but are not recommended to be given through enteral feeding tubes. Pre-treating enteral formula with these medications is a safe and effective method of reducing the potassium and/or phosphate content of the formula before it is given to the patient.

Evaluation/outcome: Educating nurses and dietitians from other pediatric centres across Canada will hopefully unify treatment for hyperkalemia and hyperphosphatemia for the vulnerable G-tube fed pediatric nephrology population. Sharing practical information through policy and procedures will allow others to evaluate their current practice.

Levodocarnitine Supplementation: Is There a Role in Chronic Kidney Disease and Dialysis?

Anita Babu, BScPhm, RPh, Toronto, ON

Levodocarnitine is an amino acid derivative that plays a key role in fatty acid metabolism and energy production. Secondary levodocarnitine deficiency has been described in chronic illness, including chronic kidney disease, and

may be due to higher metabolic requirements, decreased dietary intake and impaired carnitine production. Patients on dialysis are also at higher risk of carnitine deficiency due to dialysis losses. Free carnitine levels are depleted through dialysis, resulting in an increase in acyl-carnitine and an acyl-to-free carnitine ratio (>0.4). Acyl-carnitine accumulation can inhibit key enzymes involved in cell energy production and may also lead to insulin resistance. Clinically, levocarnitine deficiency may contribute to the development of anemia (erythropoietin-resistant), hyperlipidemia, cardiomyopathy, and skeletal-muscle weakness and fatigue. Current evidence supporting the use of levocarnitine in pediatric kidney disease/dialysis patients is limited and its use is not widely employed in practice.

This presentation will review the role of levocarnitine, current evidence for its use in pediatric chronic kidney disease and dialysis, and treatment options for supplementation, highlighting our centre's experience in this area.

Evaluation of Hemodialysis Central Venous Catheter Dysfunction Protocol

Paula Mossop, RN, CNeph(C), Jo-Anne Wilson, BScPharm, ACPRPharmD, Steven Soroka, BMus, MD, MSc, FRCPC, EXTRA Fellow CHE, Niall Sheehy, Jeannette Squires, and David Hirsch, MD, FRCPC, Halifax, NS

The major complications of central venous catheters (CVC) used for hemodialysis (HD) include thrombosis and infection. Catheter locking solutions such as recombinant tissue plasminogen activator (rt-PA) are used to treat and prevent clotting of the catheter. Evidence to guide the use of rt-PA is limited. This quality assurance (QA) project evaluated the effectiveness and cost of a new CVC dysfunction protocol for rt-PA in HD patients.

A three-month retrospective chart review of 22 patients was completed, to determine the rate of rt-PA use for catheter malfunction, the rates of catheter-related bacteremia and the cost of rt-PA per total catheter line days. The rate of rt-PA consisted of the number of HD sessions during which a patient was administered rt-PA for catheter malfunction and the period at risk in catheter days. The total dose of rt-PA used was determined (mean dose per patient). Bacteremia rates were calculated using the number of catheter-related bacteremia events and the period at risk in catheter days. The cost of rt-PA was calculated per total catheter line days for the study period. The rate of rt-PA use: 8%, mean dose / patient / line = 2.99 mg (range 0.8 - 8.7 mg). The rate of bacteremia: 0.06/1,000 CVC line days and the cost of rt-PA \$9.20/total line days.

This QA project demonstrated that the Hemodialysis CVC Dysfunction Protocol resulted in low rates of catheter dysfunction and bacteremias. It also provides an indication of costs associated with this protocol.

Instrument Refinement: The Patient's Perception of Hemodialysis Scale

Creina Twomey, PhD, RN, Christine Way, PhD, RN, Patrick Parfrey, MB, BCh, MD, Cork MRCP, FRCPC, and Brendan Barrett, M, B MSc, FRCPC, St. John's, NL, David Churchill, BSc, MD, MSc, FRCPC, FACP, DABIM, Hamilton, ON, and Tom Hutchinson, MB, FRCP(C), Montreal, QC

Objective: To examine data quality and to refine the Patient's Perception of Life on Hemodialysis Scale (PPHS).

Methods: Using a cross-sectional design, data collection was completed in three hemodialysis units. A convenience sample (N = 236) was obtained for this study. Item inclusion was based on findings from a multi-trait/multi-item correlation matrix and Ware and Gandek's (1998) criteria for Likert scale assumptions and data quality.

Results: Inter-item correlations greater than 0.3 were kept in the scale. There was a minimal amount of missing data, and data indicators approximated normalcy. Ceiling and floor statistics suggested that subjects experienced the entire scope of the trait of interest. Item correlations supported divergent and convergent validity. Five subscales and 32 items were removed.

Conclusion: The subscales are distinct, yet similar in terms of their ability to measure the main concepts. The high Cronbach's alpha supports the internal consistency of the instrument. As a result of this approach to item refinement, the overall PPHS scale is stronger in terms of its validity and reliability and can be considered an appropriate indicator of the patients' perceptions of life on hemodialysis.

The Eye of the Storm: Collaborative Practice

Lezlie Lambert-Burd, BAdEd, BScN, RN, CNeph(C), St. Catharines, ON

Purpose of the project: To illustrate the teamwork it takes to prevent becoming unhinged in a year of chaos.

Description: In 2013, the Niagara Health System took on what seemed to be an insurmountable amount of change, extending even deeper within the Kidney Care Program. The Niagara Health System built a new hospital, resulting in realignment of its services from at least four sites into one. Due to this transformation, our program opened two new dialysis units within a span of three weeks, as well as replacing all the hemodialysis machines across three sites just prior, during and after the move. The inpatient nephrology program relocated to the new hospital and changed its model of care to be emulated throughout the premises. As if that wasn't enough, the year of change and learning continued with launching capabilities of the new machine to improve patient care. The program also introduced a new machine for home hemo, initiated parallel dialysis at one of its sites, had a pregnant client successfully carry a child to term, deferred dialysis for a patient with multiple myeloma by using the Theralite™ dialyzer, and staff still had to go home and care for their families at the end of the day!

Evaluation/outcomes: In order to prevent coming unhinged in light of all this change, a team needs collaboration, communication and a lot of heart!

Implications for nephrology practice: To continually work on your abilities to be an effective team for the betterment of patient and staff satisfaction.

Can a Machine be Patient-Centred?

Lezlie Lambert-Burd, BAdEd, BScN, RN, CNeph(C), St. Catharines, ON

Purpose of project: To demonstrate a machine with biofeedback capabilities for fluid removal is a patient-centred approach.

Description: Fluid removal in hemodialysis focuses on a set ideal weight and determination of this number has not changed much since inception of the practice of hemodialysis (Meade, 2011). Fluid removal on hemodialysis can result in cramps, hypotension, hypovolemia, nausea and vomiting. While not enough fluid removal results in hypertension, edema, shortness of breath, and decreased cardiac efficiency. Attempts to improve fluid removal over the past have utilized various approaches, profiling of sodium and or ultrafiltration rate, ultrafiltration only. The health care professional hypothesizes the approach to fluid removal based on patient response and past outcomes. Biofeedback, on the other hand, offers an opportunity to remove fluid based on the patient's body response as the fluid becomes available, resulting in a more objective pattern of fluid removal than can be administered by the nephrology practitioner.

Evaluation/outcomes: Improving on the ability to remove fluid in a more patient-centred approach offers hemodialysis patients an opportunity for an individualized approach for fluid removal due to dialysis machines' ability to interpret patient specific data over traditional methods of fluid removal.

Implications for nephrology practice/education: Use of biofeedback in fluid removal has resulted in patient reports of increased feeling of wellness, feeling more in control of thirst between dialysis treatments and increased activities of daily living—all elements that can be identified as important to the patient and, hence, a patient-centred approach.





Patient–Clinician Lifeline: Deployment of a Communication Infrastructure to Support Peritoneal Dialysis Patients and their Health Care Team

Marsha DeFrancesco, RN, CNeph(C), and Karen Brunetta, RPN, Sault Ste. Marie, ON

The Algoma Regional Renal Program's (ARRP) peritoneal dialysis (PD) program faces the challenge of servicing a medically and socially diverse group of patients distributed over an extensive geographic area. To address these challenges, the ARRP is piloting a communication infrastructure consisting of mobile- and web-based platforms that connect renal care staff with their patients. The infrastructure enables standardized clinical documentation from patients undergoing PD and digital upload of these data to their clinicians. The pilot study will examine the effect of the infrastructure on patient self-care, clinical process management, and inventory tracking. The infrastructure will be deployed to 10–12 PD patients and their renal clinicians for three months. Outcome measures will be gathered through extensive pre- and post-study questionnaires and interviews. Data about patient and clinician use of the infrastructure will also be gathered throughout the trial. Expected outcomes include improved tracking of patient progress, improved troubleshooting, and inventory ordering with the availability of more accurate and complete data versus conventional paper logs. Improvements in patient quality of life and self-management are also expected. This study will provide evidence for the effectiveness of a new communication and clinical documentation infrastructure that supports patients and simplifies independent dialysis while providing clinicians with access to secure, up-to-date patient health and treatment information. In place of paper records that can only be accessed during home or clinic visits, the infrastructure aims to provide a lifeline from patients to their health care providers, which may translate to increased confidence and independence at home.

Facilitating Insertion of Urgent Peritoneal Dialysis Catheters: Developing the Process

Lorrie Hudd, RN(EC), MN, NP-Adult CDE, and Cynthia van der Woerd, RN, BScN, BA, CNeph(C), Hamilton, ON

The goal was to develop a standardized process that facilitated acute peritoneal dialysis insertions in patients who require urgent renal replacement therapy.

A working group was established to review current practice, as well as targets and strategies from the Ontario Renal Network. An audit of previous unplanned starts to address gaps in the current model was completed. The working group established a process for identifying patients needing urgent renal replacement therapy, a method for urgent modality and access education, and coordination of urgent peritoneal dialysis catheter insertion when chosen. This process included a plan for educating staff regarding the new process and encouraging referral and decision support for patients who require urgent dialysis.

The initiative resulted in twelve urgent peritoneal dialysis starts over a twelve-month period. Provincial targets of 100% of patients receiving modality education prior to starting dialysis and 100% of patients assessed for access prior to starting dialysis were achieved. An algorithm and standardized operating procedure was created to formalize the process and address gaps in previous practice. Seventy percent of targeted nursing, allied and medical staff were educated through in-services with the aim to provide awareness of the new process, increased knowledge of home therapies and identification of urgent starts.

Patients starting dialysis urgently will now be appropriately identified, educated in dialysis modality options, encouraged and provided with decision support from all staff. Patients will have access to peritoneal dialysis acutely where the culture has always been one to default to hemodialysis for all urgent dialysis needs.

Nurturing the Nurse: A Survival Guide in Nocturnal Hemodialysis Nursing

Neil Penalosa, RN, BSN, CNeph(C), Barbara Carter, RN, CNeph(C), and Carolyn St. Germain, RN, Vancouver, BC

The In-centre Nocturnal Dependent Hemodialysis program is a nurse-led service that has garnered accolades for the evidence-based benefits to its 30 patients.

A few months following the program's launch in January 2011, the issue of staff retention caused sporadic concern for those involved with the program. Hence, some operational strategies were implemented. Nevertheless, fragments of concerns have continuously enchanted the nocturnal nursing team, with both unique and common experiences.

The poster is aimed at promoting awareness on the commonly identified factors that influence one's perception with nocturnal nursing, based on Maslow's Hierarchy of needs. It is our hope that such realization would stimulate self-evaluation, to determine its influence to the quality of nursing services being delivered and its effects to one's well-being and to those with whom we interact.

Moreover, it is hoped that with the identified survival strategies, each professional nurse will find satisfaction in realizing that being part of a team that delivers exemplary care services is, indeed, a privilege and can be a potentially rewarding career.

It's never too late to save oneself for the greater benefit of the recipients of our services and for the people around us.

Intradialytic Heparinization Reduction Study

Rajneet Atkar, RN, MN, CNeph(C), Calgary, AB

Background: The unfractionated heparin dose on hemodialysis (HD) is based on a nurse's subjective assessment of the post dialyzer degree of clotting (scale from 0 to 4). Most heparin protocols are biased towards increasing heparin dose to avoid clotting with little focus on achieving the minimum dose. The objective of this study was to determine: 1) if a heparin reduction protocol could achieve a lower cumulative heparin dosage (CHD) without affecting clearance in chronic HD patients, and 2) if an objective measure of dialyzer clotting (Δ FBV) can be correlated to nurses' subjective dialyzer clotting score.

Methods: Prospective study following the implementation of a heparin reduction protocol over a two-week period in which the fibre bundle volume (FBV), dialyzer clotting scores and CHD were obtained. FBV is an ultrasound derived technique that is based on the transit time of a saline bolus passing through the dialyzer to give the volume of blood within hollow fibres.

Δ FBV = $(\text{FBV post HD} - \text{FBV pre HD}) \times 100 / \text{FBV pre}$

Results: Nineteen chronic HD stable patients: 68% males, aged 59 +/- 14 years, baseline, 84% AVE, on Rexeed AX dialyzers. There was a 39% reduction of cumulative heparin dose from run one to run six, $p < 0.001$ without affecting the KT/V (1.40 ± 0.3 run 1, 1.34 ± 0.35 run 6; $p = .157$) over the study period. Delta FBV was correlated with the dialyzer clotting score, $r = -0.61$, $p = 0.007$ and $r = -0.54$, $p = 0.02$ for mid-week runs.

Conclusions: Current anticoagulation protocols should be re-evaluated to achieve minimal heparin. FBV may be an important tool to help validate dialyzer clotting scores and achieve lower heparin.

Improving Culture-Negative Peritonitis Rates in Peritoneal Dialysis

Judith Flaherty, RN, CNeph(C), Paula Eyles, BScN, MHSc, Hamilton, ON, and Susan McMurray, RN, BN, CNeph(C), (Baxter Healthcare), Mississauga, ON

Objective: To improve culture-negative peritonitis rates in the peritoneal dialysis program at St Joseph's Healthcare Hamilton.

Background: In 2011, our peritoneal dialysis program reported a peritonitis rate of 1:36 patient months using the Baxter Clinical Monitoring System (POET). Statistics showed that 24% of all peritonitis episodes were culture negative.

Culture-negative peritonitis can result in delay of treatment or treatment with the inappropriate antibiotic, thereby jeopardizing a patient's well-being by resulting in unnecessary peritoneal catheter removal, hospitalization and insertion of a central venous catheter.

Approach: Our program set a goal to meet or exceed the ISPD North American target, that culture-negative peritonitis should not be greater than 20% of episodes. To achieve this goal, a collaborative, working team consisting of the program medical director, educator, unit statistician, infectious disease physician, and microbiology lab supervisor convened. Current practice of collection of dialysate was reviewed. Three areas of improvement were identified: method of dialysate collection, revision of current policies and procedures, and education of peritoneal dialysis and hospital nephrology nursing staff. Embedded in these changes were improving the ability of nurses to interpret peritonitis laboratory results, ensuring supplies were available and coordinating with the laboratory to measure improvement.

Results: Culture-negative peritonitis rates using POET improved from 24% to 16.7%.

Conclusion: By adapting a widely accepted and evidence-based practice of dialysate specimen collection and standardizing this practice with ongoing education to PD nurses, we were able to achieve a reduction of culture-negative peritonitis in our program. This presentation will describe the practice changes implemented leading to these improved outcomes.

Managing your Diabetic Patient on Peritoneal Dialysis (PD)

Sharon Fairclough, RN, BN, MN(c), CNeph(C), and Roxanne Krystia, RN, BSN(c), CNeph(C), Baxter Healthcare, Mississauga, ON

With the increasing prevalence of diabetes in Canada, diabetic nephropathy has become the major cause of end stage renal disease (ESRD). As a therapy option, peritoneal dialysis (PD) is considered to be beneficial treatment





for those patients with diabetes. Though there is a concern related to the cardiovascular risk factors associated with use of glucose-based solution for these patients, this concern can be minimized, as glucose exposure in PD is a modifiable risk factor. The use of glucose-sparing solutions in PD has been shown to preserve residual renal and peritoneal membrane function in patients with diabetes. Therefore, management of your diabetic patient on peritoneal dialysis can be achieved.

This presentation will provide a guide to optimizing the care of your diabetic patient on peritoneal dialysis. It will look at the benefits of PD and the effects of glucose-sparing strategies in reducing metabolic risks, preservation of the peritoneal membrane, improved glycemic control, fluid management, as well as the quality of life issues sometimes associated with living with diabetes and dialysis.

Partnering to Improve our Peritoneal Dialysis (PD) Patient Care and Experience

Janet Baker, RN, BN, CNeph(C), Janet Daniels, RN, BScN, CNeph(C), Sharon Fairclough, RN, BN, CNeph(C), (Baxter Healthcare), Mirjana Mesic, RN, BHScN, CNeph(C), and Dianne Moseley, RN, BAS, CNeph(C), Oakville, ON

Purpose of the project: Trillium Health Partners (THP) and Halton Healthcare Services (HHS) are two regional chronic kidney disease (CKD) programs offering PD within the Mississauga Halton Local Health Integration Network (MH LHIN). Both programs interface with many of the same community agencies to provide PD support to our patients. We identified an opportunity to align our two programs and support our community partners to enhance the consistency and quality of care for our PD patients.

Description: The initial step of the project involved collaboration between our two CKD programs to blend the best of our PD education and training tools into one standardized set of material for patients, staff and

community agencies within our LHIN. Our next step was to provide a two-day education event for Community Care Access Centre (CCAC) staff using our merged training program and materials. We provided the education with the expertise and support of subject matter experts to CCAC educators and in-patient representatives. All attendees completed a competency certification assessment.

Evaluation/outcomes: Through this partnership we have implemented one standard for care, which promotes a consistent, seamless and quality care delivery system for PD patients within our LHIN. This newly aligned model of care was also welcomed in the long-term care facility that provides care to patients from both regional centres.

Implications for practice: Streamlined evidence-based model of care and creation of better health care for all peritoneal dialysis patients in the MH LHIN regardless of where they dialyze.

The Diabetes and Kidney Care Food Guide

Sarah Bouchard, RD, Nancy Hunter, RD, and Linda Ross Stringer, RD, CDE, Orillia, ON

In response to the frequent comment “there is nothing for me to eat”, registered dietitians at Orillia Soldiers’ Memorial Hospital’s (OSMH) Diabetes Education Centre and the Regional Kidney Care Program Simcoe/Muskoka developed a meal planning tool to assist people manage both diabetes and chronic kidney disease (CKD). The Diabetes and Kidney Care (DKC) Food Guide consists of a Poster, a Food List and an Educator’s Guide.

The DKC Food Guide was designed to provide continuity from the Canadian Diabetes Association’s meal planning system, “Beyond the Basics”. The full colour picture poster may be individualized based on treatment for diabetes and CKD (stages 3-5), laboratory results and goals. It is divided into food groups based on carbohydrate content, with sub groups based on the phosphorus, potassium and sodium content.

The food list provides nutrient data on the key nutrients and is intended for use by the health care professional and/or motivated patients. The educator’s guide is intended for use by health care professionals.

The poster has been used at OSMH, including five dialysis satellites, since May 2013. The development of the food guide included an initial and final evaluation survey. Feedback was incorporated into the final version. A sister project that was developed was the Kidney Care Food Guide, a poster for individuals with CKD without diabetes. Feedback from patients and educators has been extremely positive. Both posters are professionally printed and may be obtained by contacting the authors, whereas the food list and educator’s guide are available on the OSMH website www.osmh.on.ca.

Integrating Research with Clinical Practice: The Centre for Renal Research: Information Technology, Innovation, Quality and Education (CR2ITIQuE)

Olusegun Famure, MPH, MEd, CHE, Nicholas Phan, BSc, Heebah Sultan, BSc, MPH, and Joseph Kim, MD, PhD, MHS, FRCPC, Toronto, ON

Learning objectives: The concept of CR2ITIQuE originated from the Kidney Transplant Program, Toronto General Hospital, to facilitate: (1) a collaborative environment for the integration of clinical research to health care practices; and (2) develop avenues for continued learning of health care professionals (HCPs)/trainees, patients and the public in matters related to kidney transplantation.

Activities, methods, innovations: Since its inception, CR2ITIQuE has established: (1) a patient health information (PHI) system for quality improvement and research purposes; and (2) structured educational programs for HCPs and trainees and an integrated framework involving HCPs and research staff for the conduction of clinical trials (CT) and development of patient education tools.

Outcomes, results, lessons learned: Both the PHI system and CT have led to improvements in the management of clinical and other patient-related data for programmatic quality initiatives in addition to the generation of new scientific knowledge. The educational programs have been instrumental in improving the knowledge of HCPs/trainees in the areas of research methodology and kidney transplantation. Furthermore, patient education and engagement has significantly improved with the introduction of a bi-annual newsletter and bulletin.

Conclusion: The adoption of such framework models is essential in health care teams to facilitate seamless integration of research into practice through collaborative research and knowledge translation initiatives.

Performance Measures for the Evaluation of Patients Referred to the Toronto General Hospital's Kidney Transplant Program

Olusegun Famure, MPH, MEd, CHE, Nicholas Phan, BSc, Heebah Sultan, BSc, MPH, Joseph Kim, MD, PhD, MHS, FRCPC, and Julie Van, BSc, Toronto, ON

Goals and objectives: The objectives of this project were to: (1) to assess waiting times from referral to initial evaluation and initial evaluation to final disposition as performance measures for the pre-transplant process; and (2) to compare these waiting times across various patient characteristics.

Methodology: This was a retrospective cohort study of all adult patients who were referred for a kidney transplant at TGH from January 1, 2003, to December 31, 2011, and followed up until December 31, 2012. Data for this study were retrieved from our in-centre research database, the Comprehensive Renal Transplant Research Information System (CoReTRIS). Performance metrics at specific time periods in the assessment of patient eligibility for kidney transplantation were studied.

Results: A total of 2,290 patients (2,316 referrals) were included in the study. Of the 2,316 referrals, 1,794 (77.5%) initiated evaluation and 1,692 (73.1%) received a final disposition. The median waiting time from referral to initial evaluation was 3.7 months with the median time from initial evaluation to final disposition set at 6.6 months. Patients who presented with diabetes and polycystic kidney disease had the highest median wait times of 7.3 months.

Conclusion and implications for nephrology care: The benefits of the project are geared towards: (1) transplant centre management team; (2) staff at referring sites; and (3) the referred end stage renal disease patients. It was important to identify deficient areas of the referral process at our centre in order for the KTP to prioritize appropriate resources and critically formulate programmatic changes to improve the process of advancing patients through the transplant evaluation journey.

Collaborative Model Integrating Community Nephrologists into the Long-Term Care of Post-Transplant Kidney Patients

Olusegun Famure, MPH, MEd, CHE, Heebah Sultan, BSc MPH, Joseph Kim, MD, PhD, MHS, FRCPC, and Myra Caballero, BSc, Toronto, ON

Goals and objectives: The objectives of our study are to: (1) describe the barriers experienced by general nephrologists (GenNephS) in the long-term care of kidney transplant recipients (KTRs); and (2) provide evidence of practical solutions to address the gaps that exist in the current model of care for KTRs.

Methodology: A self-reported cross-sectional survey was used to systematically collect information from GenNephS to assess GenNephS's subjective attitudes and beliefs on matters pertaining to the clinical management of post-transplant kidney recipients. The questionnaire consisted of eight domains: (A) attitudes, (B) patient care, (C) collaborative care, (D) experience, (E) resources, (F) continuing medical education, (G) training, and (H) general information. The pilot has already been completed with the actual study currently underway.





Results: For the pilot, the survey was initially distributed electronically to 25 GenNeph's of which 19 responded (76% response rate). Thirteen GenNeph's (68%) provided follow-up care to KTRs. About one half of the GenNeph's (54%) provided care to more than 10 KTRs. A lack of comfort managing immunocompromised patients (88%), followed by limited clinic or hospital resources (76%) and clinical overload with other nephrology patients (65%) were perceived as the most common reasons for the reluctance of some GenNeph's to provide care to KTRs.

Conclusion and implications for nephrology care: The ultimate goal of our study is to develop a collaborative care practice model that effectively coordinates the management of KTRs' chronic care needs in the community with their acute care needs at the transplant centre. The results will be used to support a high-quality, accessible and sustainable health care delivery system that is able to meet the demands of the growing population of KTRs in Canada.

Performing Parallel Kidney Dialysis to Enhance Reduction in Oxalate Levels

Kim Rak, RN, Welland, ON

Purpose: To increase the surface area of hemofiltration during dialysis in an attempt to significantly reduce oxalate levels in a patient with primary hyperoxaluria.

Description: This case study is a hemodialysis patient who had primary hyperoxaluria with associated kidney failure. It was necessary to have a substantial reduction in her oxalate levels to improve her candidacy status for transplantation. The primary nephrologist in this case requested that a parallel kidney dialysis system be created in order to achieve a higher surface area of hemofiltration in an attempt to achieve lower blood levels. The renal technicians constructed and built a parallel kidney system specially designed for this patient. Once the system was constructed, the CKD team formulated a treatment strategy on how to safely deliver dialysis treatment using the parallel kidney system. The physician, technicians, nurse educator and dialysis nurses were there for the first several treatments

closely monitoring the patient. Important considerations were to monitor for hypotensive or cardiac episodes due to larger blood volumes being filtered and calculations of rinse back volumes. The patient received parallel dialysis over the course of several months and their oxalate levels were monitored.

Evaluation/outcome: The patient experienced continued hypotensive episodes while receiving parallel dialysis. These episodes were managed on dialysis. After several months of treatment, her blood levels showed a remarkable reduction in blood oxalate levels.

Implications for nephrology practice/education: The future use of parallel kidneys for enhanced hemofiltration to improve clearances of oxalate levels in dialysis patients.

Ambulatory Blood Pressure Monitoring in an Outpatient Hemodialysis Unit: Feasibility and Logistics

Cindy Cockram, RN, CNeph(C), Dana Foisy, RN, BScN, CNeph(C), Cheryl Ralph, RN, BScN, CNeph(C), Sara Kilcollins, RN, BScN, CNeph(C), Barbara Drodge, RN, Jan Mooney, RN, CNeph(C), Norman Briault, RN, BScN, Swapnil Hiremath, MD, MPH, and Marcel Ruzicka, MD, PhD, FRCPC, Ottawa, ON

Purpose: In patients with end stage renal disease (ESRD) treated with hemodialysis (HD), hypertension is highly prevalent (>90%). However, blood pressure readings taken before, during, and post HD in the HD unit, from technical standpoint, are far from optimal (quiet room, resting, sitting with back support, etc.). Forty-four-hour ambulatory blood pressure monitoring (ABPM) can provide precise assessment of a patient's overall blood pressure and variability. The purpose of this program was to study barriers in implementing a 44-hour ABPM program in a busy tertiary care hospital-based HD unit.

Description: Two ABPM monitors were dedicated to the program, and four HD registered nurses (RN) were trained in the technique. The HD RN explained the rationale and technique during the dialysis run; the first two readings were taken at the end of dialysis. The ABP was then monitored during the 44-hour interdialytic interval and returned at the next dialysis.

Evaluation/outcomes: Over the period of 10 months, 28 ABPM recordings were carried out from a maximum possible 160 (18%). The major factors for this relatively low utilization rate were the low number of RNs trained to educate and initiate ABPM.

On the other hand, while this test is reported by patients as "demanding", 78% of patients who underwent 44-hour ABPM completed the test.

Implications for nephrology practice/education: Forty-four-hour interdialytic ABPM represents an excellent opportunity to capture overall blood pressure load in the majority of patients. Based on our experience, it is important to train enough RNs to facilitate its implementation.

Revitalizing a Renal Vascular Access Service: Results of a Large Multicentre Redesign

Karen Mahoney, MSN, Ruth Burns, Mirita Zerr, RN, Cathy Guan, BN, Edith Fernandez, RN, and Jan Olsen, BN, New Westminster, BC

In 2011, the Fraser Health Renal program was lagging behind other British Columbia renal programs in our renal vascular access (RVA) outcomes. Some of the barriers included inadequate internal resources, surgical and interventional radiology constraints, and a large geographical, multi-centre spread. A quality improvement process was initiated, which has resulted in an improvement in RVA outcomes, moving our arteriovenous fistula/graft prevalence (chronic HD pts with AVF/G) rates from 50%-60% and incidence rates (starting HD with a AVF/G) from 23%-47% respectively.

The redesign was structured around improvements in patient identification and referral (renal internal processes), access to surgical teams (creation of an RVA fast track process) and interventional radiology referral and tracking processes. Implementation has been phased in over the course of two years, and we are currently experiencing a steady improvement in our RVA outcomes, with the intent of further improving our AVF/G prevalence rates to 80% and incidence rates to 50%. This presentation will describe the various initiatives in detail.

What's New in Hemodialysis in Canada?

Sarah Thomas, BSN, CNeph(C), and Mary Lewis, BScN, CNeph(UK), Vancouver, B.C.

Purpose: To share preliminary clinical experience, insight and practice learned while piloting a new hemodialysis system and its associated training materials.

Description: Offering choice in home dialysis therapies is critical. In December 2013, supported by the B.C. Renal Agency, the Vancouver Regional Home Hemodialysis (HHD) program began a one-year pilot study to evaluate a HHD system introduced to the Canadian market in 2013. Four training sites in B.C. were used. Eleven patients were selected: six prevalent patients and five new patients. The unique characteristics of this system purport to simplify set-up, operation, clean-up and maintenance, making it an attractive HHD machine. A disposable cartridge with pre-attached dialyzer makes for easy handling. The integrated water purification and dialysate production system does not require traditional filter changes and disinfection. Water consumption is reduced. Preventative maintenance and repair are managed by a service swap. A system exchange is made within 24 hours of notification.

Evaluation: Our preliminary evaluation will focus mainly on clinical and educational tips and new concepts that may help if your renal program is considering undertaking an evaluation of this hemodialysis system.

Implications for nephrology practice/education: This presentation will help nurses better understand new technology, implement change initiatives and provide choice and best care for their patients.

A Serious Consequence of Head Banging in a Patient on Hemodialysis

Usha Dinesh, RN, BScN, Toronto, ON

Background: Patients on hemodialysis (HD) have a higher risk of hemorrhage primarily due to the disturbance of the coagulation system in the setting of uremia, which is further enhanced by the use of anticoagulation during HD. We report a patient on HD with a subgaleal hemorrhage attributed to chronic head banging in the context of disease and treatment-related increased risk of bleeding. Subgaleal hematoma is usually associated with a substantial head trauma. It typically occurs in newborn infants when the galea gets pulled in a vertical direction by external force, e.g., forceps, vacuum extraction.

Case history: We report the case of an 11-year-old girl with global developmental delay and dialysis dependent renal disease due to Focal Sclerosing Glomerulosclerosis (FSGS). She had a longstanding history of self-stimulatory behaviour with head banging from infancy. She commenced HD three times a week on a standard heparin regimen (10u/Kg). She presented with red eyelids without signs of viral infection or head trauma. One day later she developed multiple diffuse swelling of the scalp and a CT scan revealed a subgaleal hematoma overlying the vertex. She received heparin-free HD and was treated with Olanzapine with improvement in her head banging behaviour. Anticoagulation with heparin was resumed with no evidence of re-bleeding.

Conclusion: To our knowledge this is the first report of subgaleal bleeding as a complication of chronic HD and head banging. This case highlights the importance of assessing the bleeding risk for every hemodialysis patient individually and repeatedly.





Understanding Chaos Through the Continuum of Renal Failure

Julie Émelie Boudreau, RN, MN, CNeph(C), Anik Dubé, RN, PhD(C), and Vanessa Hickey-Dargavel, RN, Moncton, NB

Purpose of the project: Conceptual frameworks are used to enhance the understanding of a nurse's role within the health care system. The Advanced Practice Nurse (APN) plays a pivotal role within the interdisciplinary team to manage and provide effective individualized care to clients' living with end stage renal disease (ESRD) and their families.

Description: This conceptual framework guides the APN's practice within a provincially funded nephrology program. It highlights the integration of theory, research, and nursing practice at an advanced level. The framework was developed to guide the APNs practice in nephrology nursing in an integrated approach reflecting the needs of clients living with ESRD and their families.

Outcomes: This framework guides the APNs systematic approach to provide health care services effectively and efficiently to clients living with ESRD. Chaos theory was used to describe the intricate relationships between a client's environment and his or her quality of life (QOL). Therefore, the APN's role in the context of ESRD is to optimize QOL in relation to the client's medical condition and treatment modalities such as physical, social, and psychological by creating a supportive and quality-based environment.

Implications for nephrology practice: Clients who suffer from ESRD are surrounded by chaos, unpredictable factors, and elements of uncertainty described by the Chaos Theory. The APN implements Chaos Theory to acknowledge and understand the dynamic and complex nature of ESRD and its impact on daily life. Therefore, the APN can better recognize and understand the patterns created by clients living with ESRD and by their families.

Clinical Efficiencies and Savings Through the Use of Pre-Filled Saline Syringes in Hemodialysis

Billie Hilborn, RN, CNeph(C), BScN, MHSc, Anita Amos, RN, BScN, CNeph(C), and Lynda Galama, Toronto, ON

Bringing evidence to practice improves clinical outcomes and reduces clinician risk, while driving economic and clinical efficiencies. The Infusion Nurses Society (2011) recommends that "Single-use systems include single-dose vials and prefilled syringes, and are preferred choices for flushing and locking". Previous practice utilized a 12-step process involving the collection of supplies and a bedside clinical process to prepare and administer the flush to the vascular access. This process presented an identified risk of contamination to the flush solution and needle-stick injury to the fast-paced clinician.

Utilizing the principle of Lean Six Sigma to measure clinical time variances with manual filling as compared to the newly implemented pre-filled 10 mL flushing technique showed both clinical and economic efficiencies. Eliminating the time spent manually filling reduced nursing and support worker time by 1,807 hours per annum, enabling more time for direct patient care activities.

Six months post implementation of the 10 mL pre-filled saline syringes, additional education sessions took place to maximize clinical benefits and promote adherence to Sunnybrook Health Sciences best practice initiatives. Anticipated outcomes include: 1) reduced central venous catheter occlusions and use of thrombolytic medications; 2) reduced vascular access-related infections; 3) continued clinical efficiencies; and 4) decreased needle-stick injuries.

An Innovative Initiative to Advance the Patient Experience

Susan Scott, MSW, RSW, Sandra Bartlett, RN, BEd(c), and Donald Bester, London, ON

Introduction: Chronic Kidney Disease (CKD) is a diagnosis for which there is no cure. People living with CKD require accurate information to live well with chronic illness. Information is available in print, DVD, audiotape and electronic format via the world wide web. The challenge for renal programs is to have information from a patient's perspective. Peer support networks offer opportunities for patients to share with one another in person or by phone. Some patients are not comfortable with one-to-one interaction. Patient experience is one of four strategic initiatives currently under development at London Health Science Centre (LHSC). The LHSC Renal Program acknowledges the need for CKD information that focuses on the patient experience, and responds to this initiative with the development of the LHSC Renal Patient Website.

Needs assessment: A Patient Website committee formed, bringing together leadership, clerical, nursing and allied health professionals. Brainstorming activities ensued, with many ideas as to perceived patient needs for content on the website. LHSC corporate communications recommended a patient-focused group session to determine

actual patient needs from a website. Patient names from across the continuum of renal patient care were gathered, and 12 individuals attended a focus group session.

Learnings: The feedback was extremely valuable, and has provided the committee with ongoing focus for the website. Many patients who attended the focus group session volunteered to share their “story” in videotaped interviews that are available for viewing throughout the website. The template for the renal website was provided by LHSC corporate communications, to provide a consistent patient experience when navigating other LHSC websites. Written content that was required for the site came from each discipline in the renal program, with many volunteers providing submissions for the site. At the time of writing, the site was at review with our patient focus group and steering committee for content, as well as patient testimonials, with a planned “Go Live” date of April 2014.

Dedicated Transplant Nurse

Winnie MacPhee, RN, CNeph(C), Peterborough, ON, and Lee-Anne Hyer, RN, BScN, CNeph(C), Toronto, ON

Can one nurse make a difference? Yes they can. In 2009 the Peterborough Regional Health Centre created the role of a transplant nurse facilitator in the renal program. Since that time, the number of patients from PRHC who are assessed, listed and transplanted at Toronto General Hospital has grown. In a poster presentation, we will display the medical directives that PRHC uses to assess patients for transplant and statistics revealing an increase in the number of patients receiving transplants. In collaboration with University Health Network’s renal transplant assessment, the efficiencies and advantages of having a dedicated transplant nurse will be discussed. According to Trillium Gift of Life, kidney transplantation is the preferred form of renal replacement. Through a dedicated transplant facilitator in the dialysis program at PRHC, every patient is given the opportunity to be assessed for kidney transplant. The transplant team requires ongoing communication between the transplant team and dialysis team caring for the patient. The transplant team relies on information updates from the dialysis centres to proceed with live donor transplant in a timely manner and to keep the patient active on the transplant list. The efficient exchange of information between the transplant centre and the dialysis unit maximizes the opportunity for transplant for all candidates. In this poster, we will demonstrate how collaboration is enhanced through the work of a dedicated transplant nurse on the dialysis program.

Enhancing Transitions in Care: The Inpatient Nurse Practitioner Role in Bridging Communication to the Outpatient Dialysis Units

Leora Wanounou, MN, NP, Toronto, ON

People with end stage renal disease (ESRD) on dialysis are a vulnerable population with frequent hospital admissions related to their ESRD, dialysis, or other co-morbidities. Common admissions related to dialysis are vascular access failure, line or other infections, peritonitis, and

volume status. At St. Michael’s Hospital (SMH) there is a dedicated nephrology ward that admits patients who present to the hospital with dialysis-related issues. While in hospital these patients are followed by the inpatient team and, once well, are discharged home with instructions to return to their regular dialysis routine. With these transitions in care, the home dialysis unit (HDU) and hemodialysis (HD) unit found that there was a lack in communication. One reason for the gap in communication was that many of the medical residents would only be on the nephrology ward for one or two weeks, and they would not be familiar with the HDU and HD patients, staff and routines. Clear communication in relation to patient discharge, issues while in hospital, changes to medications and dialysis prescription, and what issues needed follow-up was lacking. In order to help bridge this gap, SMH hired a nurse practitioner (NP) to work permanently in both the inpatient unit and HD unit with the nocturnal dialysis patients. This poster will review how the NP has helped to bridge the communication gaps through verbal and written means, and by forming various relationships with both the HDU and HD. Staff and patient feedback will also be incorporated into the poster.

Falls Prevention in the Hemodialysis Population

Jane Kirkwood, RN, BScN, MN, CNeph(C), and Krista Morgan, RN, BScN, Peterborough, ON

Falls for hemodialysis (HD) patients can result in greater complications, morbidity and mortality than in the general population. The Peterborough Regional Renal Program required a falls prevention strategy in order to pass accreditation. Falls prevention in most health care facilities doesn’t take into consideration the unique challenges that HD outpatients face when dealing with screening for and preventing falls. As a result, a falls prevention program and screening tool was developed by the HD program. The tool takes into consideration the increased falls risk of this population by assessing orthostatic





hypotension related to treatment, poly-pharmacy, changes in mental status and having to interrupt treatment to go to the bathroom. The tool provides a score that indicates whether the patient is at low or high risk for falls. Screening identified 56% of the HD population is at high risk for falls.

As result of this initiative, at-risk patients are now identified with a coloured arm band. The work flow changes were implemented to prevent falls while the patient is at HD. At-risk HD patients are escorted to and from their dialysis chair. The hospital's new electronic incident reporting system is programmed to ensure falls that do occur are dealt with quickly and statistical data can be tracked easily. A pamphlet titled Ambulatory Care Fall Prevention was developed and given to HD patients. All of these measures met the accreditation standard. Next steps are to see whether there has been a drop in falls in the HD unit, as a result of practice changes and to provide more education about falls in the HD patient's home.

Impact of Toronto Ice Storm on Our Nephrology Program: Lessons Learned

Jane Shirley Drayton, RN, BA, Gillian Brunier, RN(EC), MScN, CNeph(C), Raquel Bersamira, RN, Janette Sviridov, RN, BScN, CNeph(C), Winnie Chan, RN, BScN, CNeph(C), and Amy Kim, RN, BScN, CNeph(C), Toronto, ON

On Saturday, December 21, 2013, an ice storm hit Toronto. Trees fell, hitting power lines and 800,000 people were left without electricity. Our hospital was affected and was running on emergency generators only. Moreover, our home dialysis unit is closed on weekends with on-call nurse coverage. Our program has 60 peritoneal dialysis (PD) patients and 11 hemodialysis (HD) patients.

Approximately 80% of these patients lost electricity. The on-call nurse was paged for advice and emotional support. Toronto Hydro was unable to inform any of us when the power would be restored.

We took a proactive stance to ensure that all of our home dialysis patients would be safe. Our team contacted every patient by phone. We created a schedule and came to the hospital on the weekend to provide eight hemodialysis treatments for patients without power. Our continuous cycling peritoneal dialysis (CCPD) patients, who had no power, were given instructions on continuous ambulatory peritoneal dialysis (CAPD). We organized for five PD patients to be admitted, after they had no power for more than three days and their PD solutions had become extremely cold.

Effective communication, strong teamwork, and collaborative problem solving enabled our team to cope with this emergency. Many patients expressed their appreciation for the support they received during this very scary time. We acknowledged that this crisis will enable us to review our disaster plans and improve our responses during crisis events.

The Power of Self-Cannulation

Peggy Kajah, RN, BScN, MSN(c), CNeph(C), Hamilton, ON

Teaching patients how to needle or cannulate an arteriovenous fistula (AVF) access can be a challenge to overcome hurdles of needle anxiety, the sight of blood, and fear of damaging the vascular access that is considered their "lifeline". Evidence supports AVF access survival is preserved with the client as the needling expert, increasing this technique will save health care dollars with fewer medical interventions and hospitalizations over time (Mott & Moore, 2009). Clients also reported improved physical well-being and sense of autonomy allowing them to thrive, as a result of self-care with cannulation on home hemodialysis (Wise, Schatell, Klicko, Burdan, & Showers, 2010). Cannulation of the AVF access is an invasive and personal procedure that must be addressed with a client-centred approach to teaching and learning (Ball, 2013). To foster successful self-care rehabilitation with CKD management, it is imperative to provide clients' educational opportunities to gain knowledge and skill of AVF access care incorporating formal educational resources, as an important aspect of treatment. Currently there is lack of documented educational programs that support the skill of self-cannulation of the AVF that meets the patient needs in the dialysis setting (Hudson & MacDonald, 2010). The need for a structured teaching resource for self-cannulation has also been identified in the literature to prevent complications and infiltrations of the AVF access (Mott & Moore, 2009). The purpose of this project was to develop a hemodialysis self-cannulation competency-based resource tool for patient education, to facilitate new knowledge and skills needed to promote self-management and self-efficacy with care and cannulation of the AVF access for patients to be independent with HHD modality in a community setting, to be evaluated by content experts and patient satisfaction report.

Urgent Start Peritoneal Dialysis at London Health Sciences Centre

Carolyn Ingram, RN, BSc, CNeph(C), and Michele Ivanouski, RN, London, ON

At London Health Sciences Centre (LHSC) between 30%–50% of patients start dialysis urgently with or “sub-optimally” where they have started dialysis without any previous renal care, or have suffered an acute insult that has caused an underlying renal dysfunction to progress rapidly. Historically 100% of these patients started hemodialysis (HD) with a central venous catheter (CVC), and are at risk for all the complications of CVC usage. Patients who start HD urgently may never consider treatment with peritoneal dialysis (PD).

LHSC has developed processes that facilitate these people who start dialysis urgently the option of starting peritoneal dialysis without ever needing a central venous catheter.

For an urgent peritoneal dialysis start, many members of the team are involved in successful initiation from the urgent indication to start dialysis, the patient and family modality education, placement of the peritoneal dialysis catheter to successful PD treatments at home.

Urgent PD starts have risk of peri-catheter leaking, higher risk of peritonitis, and exit site infection. LHSC has had great success, more than 20 patients have started PD urgently. We will describe the course of one patient’s journey, as well as outline the prevalence of leak and infection from LHSC’s urgent PD cohort from 2012 and 2013.

Patient and Family Centred Care: Planning and Implementing a Patient and Family Advisory Council

Angela Andrews, RN, BScN, and Deborah Bezaire, RN, BScN, MHS, London, ON

Patient and Family Centred Care (PFCC) is an approach to the planning, delivery, and evaluation of health care that is grounded in mutually beneficial partnerships among health care providers, patients, and families. Bringing the perspectives of patients and families directly into the delivery of health care improves quality and safety, which is what patient and family centred care is all about (Institute for Patient and Family Centered Care, 2011).

The renal program at a major teaching hospital has embraced the philosophy of PFCC in an effort to improve the patient experience. We have endeavoured to change the way we provide health care by including patients and family in decisions about how care in our program is delivered. This has led to the creation of a Renal Patient and Family Advisory Council (RPFAC). This patient-led council is composed of patient and family volunteers who have received care from all areas of the renal program, as well as the program director, a physician and several staff members.

The goal of this project is to improve patient care by listening to the patient and family perspective, and to implement change based on the discoveries made. We will

evaluate the outcomes by monitoring feedback and measuring overall patient and family satisfaction with the care they receive from the renal program.

The objective of the poster presentation is to outline the process of creating an RPFAC, and to explore the positive and negative experiences associated with this journey.

Low Hanging Fruit: A Dual Access Strategy to Decrease Prevalent Central Venous Catheters in a Busy In-Centre Hemodialysis Unit

Patty Quinan, RN, MN, CNeph(C), Kunjal Desai, RN, and Jennifer Duteau, RN, MScN, Weston, ON

Purpose of the project: To develop a collaborative approach for patients with dual accesses central venous catheter (DA) (CVC) and arteriovenous fistulas (AVF) or arteriovenous grafts (AVG) that would lead to safe and timely removal of central venous catheters (CVC).

Description: A barrier to CVC removal for DA patients at our centre is achieving successful cannulation. A chart review by the body access coordinator (BAC) was conducted in January 2014 of all DA patients (38) and the findings demonstrated that assessment, utilization (successful cannulation), reporting, and documentation of secondary accesses (AVF or AVG) were inconsistent. DA is considered low hanging fruit. Conversion of DA patients to AV access would result in a 10% reduction in CVC, and achieve the provincial goal of decreasing prevalent CVC rates.

In February 2014, a team consisting of the resource nurse, educator, manager, and BAC was formed and weekly meetings were scheduled to formulate strategies for quality improvement aimed at improving cannulation. Strategies include creating a DA area (pod), developing a team of skilled cannulators, and resource nurse assigning nurses to DA pod.

Evaluation/outcomes: Over the project period (February to September, 2014), evaluation of project outcomes include tracking number of successful cannulations, CVC use, time to catheter removal, CVC rates, and recording testimonials from patients and nurses.



Implications for nephrology practice/education:

Nurses play a vital role in optimizing patient outcomes. We anticipate that the DA project will provide opportunities for nurses to improve cannulation skills and patient outcomes through the provision of a structured, planned approach to vascular access.

First Eighteen-Month Performance Evaluation of an Organic Scavenger in the Application of Water Purification for Dialysis

Donna Broley, BSc, DT, Jose Lloyd, EET, DT, and Jackie Wilson, EET, DT, Orillia, ON

The technical community struggles with the effects of total organic carbons (TOC) on the efficiency of the employed carbon media to remove chlorine and chloramines. The analysis of daily logs and monitoring of TOC levels on the carbon tanks located post organic scavenger has shown the successful elimination of premature breakthrough, proving the removal of TOC from the water system can enhance the performance, resulting in operational cost savings.

The initial data successfully showed the positive impact this technology can bring to the pretreatment in water purification. The original data collection and analysis continues to ensure no change in original observations. Over the following 18 months we have overcome the initial challenges of flow restrictions by employing different combinations of tanks and plumbing while still being able to evaluate the impact of organic scavenger technology on new RO membranes, from data analyzed related to flows, feed and product water conductivities, and total dissolved carbon dioxide along with the water quality analysis.

The carbon tanks under analysis have surpassed the six-month timeline, which has added another level of monitoring, microbiology, which is done monthly on each carbon.

The assessment of utilizing Organic Scavenger technology for dialysis has had a positive impact. As the evaluation is refined, it becomes evident that this application will serve to improve the delivery of pretreatment quality that will result in operational cost savings in both the hospital and home settings.

Nursing at Moosonee Health Centre after the Fire of 2012

Joycelyn Callender, RN, Moosonee, ON

The Moosonee Health Centre (MHC) provides essential health care for more than 5,000 people in the community, mostly Cree Nation. Moosonee has a significant number of people needing dialysis. The MHC provides first line care for these patients. In December 2013, the building was rendered uninhabitable by a fire, forcing administrators to relocate the clinic to the Moosonee Curling Club. The EMAT team was activated and a “MASH” unit provided health care services to the community in the aftermath. The purpose of this poster abstract is to highlight the journey of how the nursing staff at Moosonee Health Centre have adjusted and continue to provide health care services to the community “after the fire”. This experience epitomizes how challenges can be overcome by working together towards a common goal of providing excellent care to one’s community.

An Inpatient Nephrology Unit’s Journey to Providing the Best End-of-Life Care

Lisa Robertson, RN, BScN, CNeph(C), Megan Carter, RN, BScN, Leah Fennema, RN, BScN, Peter Malcolm, RN, BScN, Violetta Marck, RN, BScN, and Jennifer McKay, RPN, Hamilton, ON

The main focus of health care is on curative measures, which often leaves health care providers struggling to manage care of the palliative patient. The nephrology nursing council, consisting of six to eight nurses, looked at ways to bridge this gap with the goal being to provide the best end-of-life care for patients and their families, as we have one bed dedicated to palliative care on our 24-bed inpatient unit. They also looked at ways to ensure nurses felt comfortable and competent providing end-of-life care.

The council developed a palliative care nursing documentation flow sheet that incorporates pertinent palliative care assessments and interventions. A patient education booklet was developed that explains what palliative care is and what can be expected in the final days. A poster of frequently asked questions was created and posted in the suite. New hires to the unit meet with a palliative care clinical nurse specialist to learn about the basics of palliative care and are provided with a couple of orientation shifts in the palliative suite with a mentor. They are required to complete a checklist of items specific to palliative care during these orientation shifts. Education was provided to all nurses through in-services and covered four different palliative care topics with future in-services to come. Nurses were also provided opportunities to attend palliative care workshops. Next steps include implementing further items from the RNAO best practice guideline on end of life care and a family and staff satisfaction survey.



Responsiveness of the patient's perception of hemodialysis scale

By J. Creina Twomey, PhD, RN, Patrick S. Parfrey, MB, BCh, MD, MRCP, FRCPC, Brendan J. Barrett, MB, MSc, FRCPC, David N. Churchill, BSc, MD, MSc, FRCPC, FACP, DABIM, and Christine Y. Way, BN, BA, MSc(A), PhD

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ABSTRACT

Objectives: To assess hemodialysis (HD) patients' physical health, social supports, psychosocial well-being and the inter-relationship among patients' experiences, demographics, illness characteristics, and biochemical indicators of health. To determine responsiveness of the Patient's Perception of Hemodialysis Scale (PPHS) to change in health status and critical events.

Methods: Using a longitudinal design HD patients ($n = 85$) were assessed at two time periods. Data analysis included measures of central tendency and tests of difference to assess inter-relationships and responsiveness of the PPHS.

Results: There were no significant changes in PPHS's subscale scores between measurement times or groups based on demographic variables. Significant differences were found in the number of co-morbid illnesses, illness severity, albumin, and urea reduction. The Psychosocial Distress subscale varied significantly in relation to time on HD, reason for admission to hospital, and number of admissions. Physical Health scores were significantly different for subgroups divided by illness, illness severity, number of illnesses, age, albumin and reason for admission. PPHS subscale mean scores were responsive to positive events in the predicted direction most of the time and appeared to have had more of an effect on the PPHS scores than negative critical events.

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Conclusion: The PPHS is responsive to a change in physical health and positive critical events, but results were unsubstantiated for patient's reaction to negative critical events. The PPHS is reliable, valid, and responsive to physical changes and positive critical events. This instrument offers health care professionals a viable method for assessing important factors capable of predicting quality outcomes.

Key words: responsiveness, quality outcomes, hemodialysis, instrument development

INTRODUCTION

The revised Patient's Perception of Hemodialysis Scale (PPHS) is a valid and reliable instrument for measuring kidney disease-specific experiences of life on hemodialysis (HD). The tool was developed specifically to capture factors influencing quality outcomes.

After an extensive review of the literature, various instruments were identified that measure different aspects of quality outcomes and living with end stage renal disease (ESRD) and HD. Some researchers have investigated the role that physical and psychological stressors play in the lives of patients on HD (Curtin, Bultman, Thomas-Hawkins, Walters, & Schatell, 2002; Gregory, Way, Hutchinson, Barrett, & Parfrey, 1998; Yeh & Chou, 2007). Other research supports that physical stressors have a greater impact on the lives of HD patients than psychological concerns (Curtin et al., 2002; Kutner, Zhang, & McClellan, 2000). Depression and anxiety, two psychological symptoms, have been the focus of several research studies that conclude that mental stressors are more intrusive than physical stressors (Cukor, Coplan, Brown, Peterson, & Kimmel, 2008; Johnson & Dwyer, 2008; Kimmel et al., 1995; Kimmel et al., 1996; Kovac, Patel, Peterson, & Kimmel, 2002; Son, Choi, Park, Bae, & Lee, 2009). After many years of research, it appears as if the types of stressor and their impact on the lives of HD patients remain uncertain, and the discussion continues. The inconsistency in the research findings may be impacted by variable scales and difference in populations.

The role of social support and its effect on chronic illness and ESRD is prevalent in the research literature. Bury (1982) states that chronic illness interferes with familial and social roles because people are incapable of maintaining normal activities. Studies on the HD population provide evidence for the conjecture that having a strong circle of family, friends, and formal support improves the likelihood of experiencing positive outcomes (Cohen et al., 2007; Plantinga et al., 2010; Rambod & Rafii 2010; Spinale et al., 2008; Untas et al., 2011).

Research on adaptation, adjustment, psychosocial health, and living with a chronic disease and HD also illuminate the struggle that patients encounter. Living with ESRD and the physical and psychological outcomes have been measured by examining these concepts (Cukor, Cohen, Peterson, & Kimmel, 2007; Lew & Patel, 2007). Similar constructs, “quality of life” and “health-related quality of life,” have also been measured, as indicators of quality outcomes in HD patients (Kimmel & Patel, 2006; Kutner, 2004; Hsieh, Lee, Huang, & Chang, 2007; Lew & Patel, 2007; Wu et al., 2001).

The variety of concepts used to identify concerns with this population and the amount of information can be overwhelming. In reviews of quality-of-life research, numerous authors agree that the problem with trying to measure such an indistinct construct is that a multitude of research has been completed using different measures with dissimilar findings; this has added confusion to an already elusive topic (Danquah, Wasserman, Meininger, & Bergstrom, 2010; Kimmel & Patel, 2006; Prutkin & Feinstein, 2002; Rettig et al., 1997).

Prior research has approached the measurement of patient experiences or perceptions of life on HD in a fragmented fashion, focusing on topics such as stressors, anxiety, depression, quality of care, social supports, adaptation, and quality of life without trying to integrate all the separate components. Despite the logic of the approach to instrument development, researchers continue to fall short in their goal to holistically measure adjustment to living with ESRD and HD and its impact on patients’ adjustment and overall quality outcomes. Our research team decided the best method to assess the patient’s experience was to conduct a qualitative research study and build an instrument on the resulting database. The intention was that the rating tool developed in this multilevel national study, the PPHS, would be different from most measurement instruments in that it would be grounded in the patient’s experience and would not be from the point of view of physicians, nurses, or previous research. Although the qualitative research was completed in 1999, the constructs maintain their relevance today and, in fact, are derived from more recent information than many of the generic and ESRD-specific instruments available to researchers at present. The scales are novel in that they measure a variety of concepts including the physical, social, and psychosocial aspects of the patient’s experience. As well, the PPHS is designed to be used as a clinical monitoring tool to assess the HD patient’s progress over time, so the testing process is shorter and more user-friendly than it would be if using a variety of other instruments.

The focus of this paper is the HD population’s physical health, social supports, and psychosocial health at two time periods and the interrelationship among aspects of the patient’s experience, demographics, illness characteristics, and biochemical indicators. The second purpose of this paper is to present results that address the responsiveness of the PPHS.

BACKGROUND

In 1992, using a grounded theory approach, the research team investigated the patient’s perception of life on HD (Gregory, 1998; Gregory et al., 1998). Results from this study were used to develop a substantive theory on the experience of people living with ESRD and HD. Three major theoretical constructs emerged from the theory: *illness and treatment experiences*, *social supports*, and *adjustment to a new normal*.

Illness and treatment experiences integrates concepts related to dealing with the stress of living with ESRD, its symptoms, co-morbid conditions, ambivalence, and the conflict between knowing what to do to stay healthy and leading a healthy life. *Social supports* focuses on the perceived usefulness of informal/family supports and formal supports such as physicians, nurses, and HD technicians. *Adjustment to a new normal* incorporates content related to emotional well-being and psychosocial distress resulting from the burden of decision-making associated with adapting to living with disease and the HD environment (Gregory & Way, 2008). The substantive theory linking these three constructs describes the interrelationship among the variables and how they all relate to quality outcomes. A change in one area may result in a change in any of the other main constructs and, ultimately, quality outcomes.

The term quality outcome is defined as an end result of the ever-changing subjective and objective experience of living with and adapting to life on HD. The subjective aspect relates to satisfaction with life and living with HD, whereas the objective elements are morbidity and mortality. The concept is not new and is often used interchangeably with other domains such as psychosocial adaptation and quality of life, two constructs extensively studied in research on patients with ESRD. This theory is reflective of concepts identified in the literature on ESRD as influencing quality outcomes. However, it is distinct in its approach to defining the interrelationship among the main constructs.

The purpose of this research project was to develop a feasible method to measure and follow change in how people experience life on HD. In doing so, we hoped to identify (a) ways in which people interpret the meaning of their illness and/or treatment, (b) strengths and weaknesses in their support systems, and (c) overall adjustment to life on HD. These areas may be amenable to interventions capable of facilitating adaptation to life on HD and enhance the emergence of a positive self-concept with resulting improvement in quality outcomes.

Our purpose is unique in that it takes a broad focus and does not narrowly limit itself to “quality-of-life”, but focuses in addition on how meaning of the illness and treatments, strengths and weaknesses in support systems, and adjustment to life on HD overlap. To achieve our goals, the scales developed had to be capable of differentiating people with regard to their status at a point in time, as well as being responsive to change through natural evolution or planned intervention. In previous research the PPHS was refined and reduced in size from 64 to 36 items (Twomey, 2012). Many items were removed from the original PPHS,

as they had poor psychometric properties. The new subscale, Supports, focuses only on health care practitioners. Adjustment to a new normal was quantified in a scale titled Psychosocial Health that consists of two subscales labelled Emotional Well-being (EWB) and Psychosocial Distress (PSD).

The hypotheses being tested are:

1. There will be a difference in PPHS scores between T1 and T2.
2. There will be a difference in the PPHS subscale scores amongst subgroups based on patients' demographics, biochemical indicators, the number of co-morbid illnesses, and illness severity at T2.
3. There will be a difference between PPHS subscale scores among patients who experience a change in their health status, biochemical indicators, and/or positive or negative critical events at the second measurement time.

METHODS

Research design

Using a longitudinal design, the PPHS's ability to assess physical stressors, social supports, and adjustment was examined. Additionally, the scale's sensitivity was assessed in relation to a change in status or the occurrence of critical events. The research included a two-phase procedure. Data were collected at time one (T1), and approximately six months later at time two (T2), patients were re-interviewed.

Sample

The target population was all patients with ESRD who were on in-centre HD in Newfoundland and Ontario. The accessible population was restricted to patients meeting the following inclusion criteria: (a) on in-centre HD for at least 12 weeks, (b) mentally competent, (c) not experiencing an acute illness episode, (d) over the age of 19, and (e) able to understand and speak English. A convenience sample ($n = 236$) was obtained at T1, and healthy patients who were willing to be re-interviewed ($n = 85$) were assessed at T2. The projected T2 sample was 120. Some patients refused to be tested again, others were sick, and some patients had died between measurement times. No record was maintained regarding nonparticipation at T1 or T2. The focus of the analysis is the paired sample of patients re-interviewed at T2 for whom all measurements were available.

Instruments

Data presented in this paper were collected utilizing the following instruments: the PPHS, a personal data extraction form, a co-morbidity scale, and a critical events checklist. Instruments were administered while patients were receiving HD.

The PPHS has been found to be a reliable and valid instrument (Gregory & Way, 2008; O'Brien-Connors, 2003; Wells, 2004). It was used to identify events/concerns related to Physical Health, Social Support, or Psychosocial health. Items were rated on a five-point Likert scale and included the five subscales: EWB, PSD, Nurse Support (Nurse), Physician Support (Physician) and Physical Health (PH).

The personal data extraction form was developed by the team of researchers for use in the larger study. It included questions pertaining to patient demographics and illness and treatment information such as age, gender, dialysis start date, cause of ESRD, major co-morbidities, and hospitalizations in the previous six months. Biochemical indicators such as urea reduction ratio, hemoglobin, albumin, and phosphate level were recorded. A score for each biochemical indicator was determined by taking the average value for all biochemical indicator measurements over the previous three months. In the absence of any specific rule and after a discussion with clinicians, it was decided that the serum average over three months would be a more accurate gauge of biochemical levels than one month's recording. Information from the personal data extraction form was used to calculate the illness severity index score using a scale developed by Barrett et al. (1997). The score is based on a variety of factors that allow the researcher to calculate an illness severity score ranging between 1 and 22, with a score of 0 to 4 suggesting low risk of mortality, a score of 5 to 9 suggesting moderate risk, and a score of greater than 9 suggesting high risk of mortality within the next six months. These forms were completed at T1 and T2.

The critical events checklist was administered at T2 since the intent was to assess positive or negative changes during the six months between T1 and T2. Gregory (1998) defined critical turning points/events as significant moments that separately or cumulatively affect the individual depending on his or her situation. The research team developed the critical events checklist and divided it into four sections reflecting constructs in the substantive theory (*illness and treatment experiences, social supports, and adjustment to a new normal*). Each section has 10 to 16 items relating to the following areas: illness experiences, treatment experiences, social support, and adjustment to changes in the sense of self. Patients were required to give a yes/no response to indicate the presence or absence of each of the 48 critical events. Examples of an illness event are a change or loss of renal function, as indicated by no or minimal urine output or increased time on dialysis, and having a predictable illness course. Treatment event items related to a well-functioning dialysis access site and the absence of travel worries. Support items asked about the presence or absence of confidence in physicians and nurses. The last section of the checklist documented events related to self events, such as feelings of hopelessness, uncertainty, and a positive or negative attitude.

Procedure

This study was approved by the research ethics boards at each site, and updated as required. Initial contact with the potential participants was made by the HD unit nurse to decrease any pressure the patients may have felt about their decision to become involved in the research study. If the client agreed, an interview was arranged, and the assistant explained the purpose of the research and obtained written consent for participation at T1 and T2. Each interview took approximately 60 to 90 minutes depending on the client

and dialysis events. The data extraction form was administered first, and then the PPHS followed by the critical events checklist at T2.

Data analysis

The data were entered into the Statistics Package for Social Sciences (SPSS).

Indices of central tendency were calculated and alpha was set at $p < .05$. A weighted mean was calculated for each PPHS subscale by summing the score for items in the subscale and dividing the total by the number of items.

Table 1a: Illness and treatment-related characteristics (n = 85*)		
Characteristic	Number	Percent
Cause of ESRD		
Diabetes	17	20.0
Glomerulonephritis/autoimmune	17	20.0
Renal vascular disease	14	16.5
Polycystic kidney disease	7	8.2
Congenital/hereditary renal disease	2	2.4
Other (unknown, acute renal failure, cancer)	28	32.9
Time on hemodialysis		
< 1 year	40	47.1
1–3 years	26	30.6
> 3 years	19	22.4
* Note: Sample size may vary depending on missing data.		

Table 1b: Illness/treatment-related characteristics T2 (n = 85*)		
Characteristic	Number	Percent
Number of co-morbid illnesses		
0	30	35.3
1–2	35	41.2
> 2	19	22.4
Co-morbid illness		
CHF on exertion ^a	25	29.4
CHF at rest ^b	8	9.4
New angina > 6 months	30	35.3
Unstable angina < 6 months	6	7.1
Arrhythmia	6	7.1
Peripheral vascular disease	10	11.8
Diabetes	22	9.3
Cancer	12	14.1
Lung disease	8	9.4
Stroke	7	8.24
* Note: Sample may vary depending on missing data.		
^a Heart failure symptoms with strenuous or prolonged activity or prior to heart failure.		
^b Heart failure symptoms with ordinary activity or at rest or recurrent admissions to hospital in heart failure.		

Paired t tests and Pearson's correlation coefficients were used to examine the relationship or difference between the PPHS subscale scores at T1 and T2. These statistics were also used to examine changes in the biochemical indicators, the number of co-morbid illnesses, and the illness severity index.

Independent t tests or their non-parametric equivalents were calculated to compare the PPHS scores for subgroups at T2. Continuous variables were divided into approximately equal subgroups for the analysis. Groups were categorized around the mean score for the following variables: age, amount of time on HD, and the number of co-morbid illnesses.

The critical events checklist included nominal level data which recorded the presence or absence of occurrences. To examine the PPHS's sensitivity, the mean and standard deviation of relevant PPHS scores at T1 and T2 were calculated separately for those reporting a critical event versus not reporting a critical event. If the patient said yes to a positive event, the PPHS score at T2 should be higher than at T1. When the patient experienced a negative occurrence during the previous six months, the PPHS subscale mean score should be lower at T2. If the subscale score remained the same or if a score could be rounded to make the scores equivalent, they were considered equal. Each mean score that either stayed the same or moved in the predicted direction was counted as one positive change. Only the critical events associated with a specific subscale were included in the final tally. For example, PH scores were inspected in relation to illness critical events, the Nurse or Physician subscale scores were examined subsequent to a positive or negative support occurrence, and the EWB and PSD subscales were examined after personal critical events.

RESULTS

This section presents an overview of study findings with respect to demographic and illness/treatment-related variables. Descriptive findings are presented for key PPHS study variables followed by an examination of the PPHS's sensitivity to a change in the patients' status and critical events.

Table 1c: Illness/treatment-related characteristics T2 (n = 85*)		
Characteristic	Number	Percent
Illness severity ¹		
< 4	46	54.8
4.1– 9	35	41.7
> 9.1	3	3.6
Number of hospitalizations past six months		
1	16	18.8
2	10	11.8
≥ 3	4	4.8
* Note: Sample may vary depending on missing data.		
¹ Illness severity index is based on prediction of early death in ESRD patients on HD as defined by Barrett et al. (1997).		

Demographic characteristics of 85 study participants are as follows: All participants spoke English, and the mean age was 59 years with a range from 22 to 84 years. Ninety per cent lived with a significant other and the majority (71%) resided in Newfoundland. The characteristics of patients who participated at both T1 and T2 (the repeat subjects) are reflective of the total sample at T1 in terms of the key demographic variables; the only exception was living arrangement. Significantly fewer of the repeat subjects lived alone.

Tables 1a to 1c include a breakdown of the illness and treatment-related characteristics of the participants. The three main causes of ESRD were diabetes, renal vascular disease and glomerulonephritis/autoimmune disease. Most patients had been on HD for approximately two years. Thirty-six per cent of the subjects had no co-morbid illness, and 41% had one or two co-morbid illnesses with diabetes and cardiovascular/peripheral vascular disease being the most prevalent. Fifty-five per cent of the patients had an illness severity index less than 4 with only 4% scoring higher than 9.2. Between T1 and T2 30 subjects were hospitalized and 14 were admitted more than once.

Measures of central tendency and *t* values are used to describe and compare demographic variables and the PPHS scores between T1 and T2 (see Table 2). At T2, patients had significantly more co-morbid illnesses than at T1. The

increased morbidity is mirrored in the illness severity index that is also significantly different between measurement times. Albumin, an indicator of illness severity, and urea reduction, a marker for dialysis clearance, were both significantly higher at T2.

There was no significant change in the five PPHS subscales scores between measurement times. The scores range from 0 to 4 with higher scores being indicative of a more positive response. A score of 2.5 or above in each of the five subscales would suggest that a patient was *sometimes* to *often* satisfied or had few concerns with that specific area.

In Tables 3a and 3b, PPHS scores are compared across subgroups. Subgroups are based on demographic characteristics, number of co-morbid illnesses, illness severity score, and biochemical indicators. Patients over 59 years old scored significantly lower on the PH subscale than younger patients. Patients with a higher number of illnesses scored significantly lower on the PH subscale. Patients with congestive heart failure on exertion, new angina, and unstable angina also had significantly lower PH scores.

Length of time since initiation of HD played a key role in patients' ratings of their psychosocial distress and the evaluation of nurses' support (see Table 3a). Patients were divided into two approximately equal groups based on mean time on HD (1.8 years). Forty-nine patients had

Table 2: Co-morbidity, Biochemical Indicators and PPHS Scores at T1 and T2 (n = 85)

Variable	T1	T2	
	Mean (SD)	Mean (SD)	t
Co-morbidity			
Number of co-morbid illnesses	1.2 (1.3)	1.5 (1.5)	-3.5***
Illness severity score	4.0 (2.4)	4.6 (2.9)	-4.1***
Biochemical parameters			
Hemoglobin (g/L)	113.7 (15.2)	116.0 (14.3)	-1.8
Albumin (g/L)	36.9 (5.7)	37.3 (4.5)	-2.7***
Urea reduction rate (%)	69.2 (6.2)	71.1 (4.9)	-3.6***
Phosphorous (mmol/L)	1.9 (0.55)	1.8 (0.52)	1.3
PPHS Subscales			
Physical Health	2.22 (.82)	2.19 (.68)	-.99
Social Supports	3.36 (.54)	3.34 (.52)	.14
Nurse	3.35 (.55)	3.40 (.55)	-1.2
Physician	3.25 (.71)	3.25 (.68)	-.52
Psychosocial Health	2.71 (.65)	2.75 (.67)	-.14
Emotional Well-being	2.99 (.68)	2.98 (.67)	-.06
Psychosocial Distress	2.50 (.87)	2.57 (.87)	-.02
PPHS	2.82 (.52)	2.81 (.48)	-.27
Note: **p < .05, ***p < .001			

Table 3a: Demographics, co-morbidity, and PPHS subscales at T2: Independent t tests

Variable	PH	Nurse	Physician	PSD	EWB
Age (< 59 years and > 59.1)	2.5**	0.17	0.70	1.28	-.25
Gender	-0.89	0.46	-0.06	-0.86	-1.48
Province	0.56	-.35	-3.8***	-0.25	-1.71
Living arrangements	-0.06	-0.41	0.13	0.49	-0.94
Time on HD (< 1.8 years and > 1.81)	1.88	2.2**	0.29	2.9**	0.98
Number of co-morbid illnesses (0 to1 and 2 to7)	2.8**	0.98	-0.06	0.49	0.10

Note: **p < .05, ***p < .001

PH = Physical health, Nurse = Support: Nurse, Physician = Support: Physician, PSD = Psychosocial Distress and EWB = Emotional Well-being

Table 3b: Co-morbidity, biochemical indicators, hospitalization and PPHS subscales at T2: Independent t tests

Variable	PvH	Nurse	Physician	PSD	EWB
CHF on exertion ^a	3.5***	1.17	-1.88	-0.37	0.45
CHF at rest ^b	1.97	-0.83	-1.42	-0.19	0.88
New angina > 6 months	2.8**	2.7**	0.52	0.71	0.77
Unstable angina < 6 months	2.2**	1.11	0.05	0.59	0.55
Arrhythmia	1.7	0.21	0.32	0.16	-0.30
PVD/gangrene	0.22	0.66	1.35	1.03	-0.16
Diabetes	0.47	0.21	0.20	0.13	-0.38
Cancer	-0.36	0.98	0.74	-0.91	-0.68
Lung problems	189 MWU ^c	0.62	202 MWU	-0.47	-0.29
Stroke	0.79	-0.10	257 MWU	-1.55	-0.81
Albumin (< 37.6 and > 37.7)	-2.5**	-2.7**	-2.7**	-1.86	-1.94
Hemoglobin (< 116.4 and >116.5)	0.36	0.11	-0.17	0.50	-0.88
Percent urea reduction (< 71 and > 71.1)	1.49	1.47	1.17	-1.18	-0.91
Phosphate (< 1.9 and > 1.91)	0.57	-0.46	0.07	0.67	0.70
Hospitalization	0.74	-0.18	1.0	0.95	-0.62
Admissions (1 vs ≥ 2)	-1.4	0.55	-0.17	3.1**	0.82
Illness versus surgery	3.0**	0.86	-0.97	0.55	0.54

Note: **p < .05, ***p < .001

^a Heart failure symptoms with strenuous or prolonged activity or prior to heart failure.

^b Heart failure symptoms with ordinary activity or at rest or recurrent admissions to hospital in heart failure.

^c MWU = Mann-Whitney U

PH = Physical health, Nurse = Support: Nurse, Physician = Support: Physician, PSD = Psychosocial Distress and EWB = Emotional Well-being

been on HD for less than the mean and 34 had been on longer than 1.81 years. Patients' perception of their PSD was affected by time. Patients who had been on dialysis less than 1.8 years had significantly lower distress levels. As well, patients on HD for fewer than 1.8 years gave nurses a higher score than their counterparts. The mean ratings for nurse support were over 3, indicating that both subgroups were *quite to extremely* satisfied with their care.

Patients with a co-morbid illness scored significantly differently on the subscales. As indicated in Table 3b, patients with cardiac disease and lung problems showed changed scores.

Examination of the effects of albumin levels indicated that when the sample was divided into two groups, based on the mean albumin level, a significant difference was noted in the PH subscale. Patients with higher albumin levels (over 37.1) had significantly better PH scores and were more positive in their rating of the nurses' and physicians' support at T2. PPHS subscale scores between subgroups showed no differences in hemoglobin, phosphate, and urea reduction rate (see Table 3b).

There was no significant difference in the PPHS subscale scores between those who were hospitalized and those who were not. However, there was a significant difference in the PH subscale for patients who had been admitted for illness versus a surgical procedure; patients admitted for surgery scored one point higher on the PH subscale. Additionally, patients who were admitted to hospital two or more times experienced significantly more stress, as indicated by the PSD score (see Table 3b).

Critical events

Critical events, or turning points, include positive and negative incidents that relate to the four major constructs in the substantive theory on living with ESRD. Subjects completed the critical events checklist and informed the researcher of the presence or absence of positive and/or negative illness, treatment, support, and self-events for the previous six months.

At T2, patients reported having experienced more negative illness events than positive illness events. Illness events such as unpredictable illness ($n = 28$) and a decline in health and well-being ($n = 19$) were the most common negative events. Despite these negative events, 51 patients stated that they had a predictable illness course, and 34 stated that their health status and well-being had improved.

In the section related to treatment, patients reported more positive than negative events. Fifty patients reported that they had a well-functioning dialysis access site and 49 stated that they felt good during HD. Treatment events such as feeling unwell during HD ($n = 28$) and problems with HD access site ($n = 25$) were the most frequently reported negative experiences.

Patients reported having had more negative ($n = 63$) than positive ($n = 42$) support events. The loss of fellow patients was the most commonly reported negative

occurrence ($n = 34$). Subjects acknowledged the trust they had in nurses and physicians and the support they received from fellow HD patients ($n = 58$) and family ($n = 57$).

In terms of personal events, 61% reported one or more positive events while 42 patients reported one or more negative events. Frequently reported positive events were the ability to continue to live independently ($n = 48$), having a positive attitude ($n = 53$), and feeling hopeful ($n = 49$). The more commonly identified negative self-events were uncertainty ($n = 29$) and dissatisfaction with social activities ($n = 24$).

Examination of the specific critical events and the effect these occurrences had on the PPHS subscales included an assessment of mean scores at T1 and T2. The subscale scores at T2 were assessed to determine if the score had increased after a positive event or decreased after a negative critical event in relation to the individual's score at T1. It was hypothesized that answering yes to a positive event would be associated with a higher score in the PPHS subscales at T2 and yes to a negative event would be associated with a lower score in the PPHS subscales at T2. In the absence of critical events, the PPHS might not be expected to change, and, as such, responding no to critical events was not included in the analysis. Higher scores on each PPHS subscale are more desirable, as an elevated score indicates a higher degree of satisfaction or less concern with that variable.

In total, 240 mean PPHS subscale scores were examined. Sixty-three per cent of the change scores for the entire checklist were in the predicated direction with 37% moving in the opposite direction. Affirmative responses to positive events resulted in increased PPHS subscale scores 83% (100 out of 120 events) of the time. Negative events were associated with decreased mean scores on PPHS subscales 44% of the time.

Specific assessment of the individual events and the most likely affected subscales were examined. The PH subscale and negative illness events resulted in scores moving in the predicted direction one out of five times, as shown in the column labelled Physical Health. Conversely, positive illness events were associated with an increased PH score five out of five times. Mean scores changing in the correct direction are bolded (see Tables 4a & 4b).

Treatment concerns were most closely related to the PH subscale. The PH subscale mean scores changed in the desired direction one out of five times for a negative treatment event, while positive treatment events produced a correct change in the PH subscale scores for three out of a possible five times.

The Support subscales, Nurse and Physician, were examined in relation to support critical events. Negative support events resulted in a change in the Nurse subscale one out of six times, while the Physician subscale only changed in the desired direction twice. The Nurse subscale mean score changed in the predicted direction after a positive event five out of six times and the Physician subscale changed in the predicted direction four out of six times.

The eight self events were hypothesized to affect the two Psychosocial Health subscales, EWB and PSD. Negative self-events produced a change in the correct direction for the EWB three out of eight times and the PSD mean scores changed in the predicted direction four out of eight times. A positive event caused a change in the EWB subscale mean scores eight times and the PSD subscale four times. (Data not shown for all events, but available upon request).

DISCUSSION

Data collection for this research study was completed in 2000. However, the sample characteristics of the population at T1 (N = 236) are fairly consistent with demographics of

the Canadian HD population in terms of their age, gender, and form of renal replacement therapy (CIHR, 2011). The use of a convenience sample limits the generalizability of the findings to the national HD population, and the results should be interpreted with caution. The only significant difference among the demographic variables between the original sample (N=236) at T1 and the repeat sample subset (n=85) at T2 was the HD patients' living arrangements. Fewer of the repeat sample subjects lived alone. This suggests that the repeat participants may have had more informal support, as they were more likely to be living with a spouse, another adult, a parent, or a child. Based on examination of patients who lived alone versus those who lived

Table 4a: Means and standard deviations for the PHHS subscale and yes responses to illness-related critical events at T2

Critical Event (- or +) ^a	n ^b	EWB Mean (SD)		PSD Mean (SD)		Nurse Mean (SD)		Physician Mean (SD)		Physical Health Mean (SD)	
Negative events		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
1.1 Loss of renal function (-)	16	2.9 (.72)	2.8 (.69)	2.6 (.91)	2.6 (.66)	3.6 (.38)	3.5 (.48)	3.1 (.87)	3.1 (.89)	2.1 (.89)	2.3 (.58)
1.2 Loss of alternate Rx (-)	1	3 (0)	3 (0)	1.5 (0)	1.2 (0)	3.5 (0)	3.8 (0)	1.6 (0)	2.8 (0))	1.8 (0)	2.2 (0)
1.3 Unpredictable illness (-)	28	2.9 (.72)	2.8 (.82)	2.4 (.94)	2.3 (.86)	3.3 (.68)	3.3 (.68)	3.1 (.87)	3.1 (.78)	2.1 (.77)	2.2 (.71)
1.4 Decline in health (-)	19	2.9 (.9)	2.9 (.85)	2.4 (.92)	2.4 (.85)	3.2 (.64)	3.2 (.62)	3.2 (.87)	3.2 (.91)	1.9 (.64)	2 (.77)
1.5 Reduced motivation (-)	6	2.8 (.82)	2.9 (.74)	2.4 (.86)	2.4 (.82)	3.3 (.69)	3.5 (.63)	2.7 (1.2)	2.4 (1.2)	1.8 (.61)	2.1 (.56)
Note ^a . - = negative event											
Note ^b . n = Sample who responded to critical event											

Table 4b: Means and standard deviations for the PHHS subscale and yes responses to illness-related critical events at T2

Critical Event (- or +) ^a	n ^b	EWB Mean (SD)		PSD Mean (SD)		Nurse Mean (SD)		Physician Mean (SD)		Physical Health Mean (SD)	
Positive events											
2.1 Improved renal function (+)	4	2.8 (.21)	2.7 (.8)	2.6 (1.1)	2.4 (1.1)	3.2 (.89)	3.5 (.44)	3.1 (.74)	3.4 (.34)	2.2 (.83)	2.4 (1.2)
2.2 Alternate treatment (+)	13	2.8 (.86)	3 (.73)	2.2 (.71)	2.4 (.84)	3.1 (.9)	3.3 (.87)	2.8 (1.1)	3 (.82)	2.2 (.75)	2.6 (.77)
2.3 Predictable illness (+)	51	3 (.64)	3 (.55)	2.6 (.78)	2.7 (.83)	3.3 (.58)	3.4 (.55)	3.3 (.73)	3.3 (.62)	2.2 (.73)	2.3 (.68)
2.4 Improved health (+)	34	3.1 (.69)	3.2 (.56)	2.8 (.81)	2.7 (.96)	3.3 (.62)	3.5 (.54)	3.3 (.75)	3.4 (.61)	2.2 (.62)	2.2 (.65)
2.5 Increased motivation (+)	10	3.1 (.56)	3.4 (.44)	2.7 (1)	2.6 (1.4)	3.1 (.98)	3.5 (.89)	3.1 (.89)	3.3 (.8)	2.2 (.56)	2.3 (.8)
Note ^a . + = positive event											
Note ^b . n = Sample who responded to critical event											

with another person, there were no significant differences in any of the PPHS subscales. However, with such a small sample and unequal group sizes, there was not sufficient power for inferential analyses.

The PPHS subscales did not change significantly between measurement periods. These findings support rejection of the first hypothesis. In our population, time between measurement periods may have been too short for a significant change to occur in the patients' health, support or adjustment.

When the PPHS subscales were examined in relation to groups of subjects, it was not surprising that older patients were significantly sicker and had lower PH subscale mean scores. Research on age suggests that older patients are more likely to have decreased physical health, higher incidence of congestive heart failure, and poorer quality of life (Canaud et al., 2011; Germin-Petrović et al., 2011; Liang et al., 2011).

Time on HD had an impact on the Nurse Support and PSD subscales. Patients who had been on HD less than 1.8 years gave significantly higher ratings to the perceived supportiveness of nurses. However, both groups' ratings were above 3, which implies that all of the HD patients participating in the study were *quite* to *extremely* satisfied with the nurses. The PSD score was also significantly different for the two groups. Patients on HD for less than 1.8 years had a significantly better PSD score, which is suggestive of less stress early in the HD period. Bohlke et al. (2008) found a negative relationship between time on HD and the physical component summary score on the SF-36. Yamana (2009) found the opposite to be the case with patients on HD for five years or longer having better coping skills and finding dealing with stressors less challenging than patients on HD for five or fewer years. While psychosocial distress and coping with stressors are not one and the same, there are many publications linking the two constructs.

In terms of illness and treatment characteristics, there were some significant differences between T1 and T2. By T2, there had been a decline in health or an increase in illness, which was reflected by the expected changes in PH subscale scores. Patients with more co-morbid illness, congestive heart failure on exertion, new angina, and/or unstable angina scored significantly lower on the subscale. These findings provide support for the fact that the PH subscale is sensitive to a change in physical status. Although other PPHS subscale scores also decreased in response to increasing co-morbidity, these changes failed to achieve statistical significance. This supports mild sensitivity, as the EWB and PSD were slightly affected by the decreased PH score. The research hypothesis that a change in co-morbidity between the first and second testing would be reflected in an appropriate increase or decrease in the PH subscale score at T2 was supported. The hypothesis that a change in co-morbidity would affect the other PPHS subscales was rejected. Therefore, it appears as if the PH subscale is sensitive to an alteration in physical health.

Changes in the illness severity index show that patients were, on average, sicker at T2. Significantly fewer subjects

had a score on the index below 4, and approximately 3% more of the subjects had a score between 4.1 and 9. Most of the patients were in the medium illness severity level, as their scores were between 4 and 9 on a scale from 1 to 22. (A score of 1 is associated with a low risk of early death, and a rating of 22 is associated with a high risk.) Individuals who had higher illness severity scores at T2 also showed a significant decrease in their PH subscale score. Again, the hypothesis that a decrease in physical status, as indicated by the higher illness severity score, would result in a decrease in the PH subscale score was accepted. The significant effect of the higher illness severity index, the increased morbidity, and the subsequent lower ratings of PH suggest there is sensitivity to actual changes in one's physical status.

There was a significant difference between T1 and T2 in two of the four biochemical indicators: albumin and urea reduction rate (PRU). Albumin levels for both T1 and T2 were within the normal range. However, patients with high albumin levels rated their physical health and the perceived supportiveness of physicians and nurses significantly higher than those with lower albumin levels. Research supports the conclusion that lower levels of albumin are associated with increasing illness severity, decreasing physical functioning, and declining overall health (Kimmel et al., 1998; Kovac et al., 2002; Kring & Crane, 2009; Kutner, et al., 2000; Wells, 2004). The urea reduction level, one measure of dialysis adequacy, is correlated with other measures such as dialysis urea concentrations. The proportions cited in Table 3b did not meet minimal targets of 65% clearance at each time point. The change in the PRU levels was minimal and may not have had any impact on the patients. As well, despite the statistically significant difference, there was a very small change in the mean PRU scores. This may or may not be clinically significant for the HD patients and may not be a good test of sensitivity.

At T2, 35% of the HD patients had been hospitalized during the previous six months; 16 were admitted for surgery, 11 for illness, and three for more than one reason. Admission to a hospital implies that these subjects were sicker at T2 than they were at T1. Admission to hospital did not affect the PPHS subscales scores, and the research hypothesis that there would be a difference was not supported. However, when the patients are divided into groups based on the reason for their admission, illness versus surgery, the patients hospitalized for illness had significantly lower PH scores. Without knowing the type of surgery or whether the surgery was planned or was performed because of an emergency, conclusions based on this information are suspect.

The increased illness severity, urea clearance levels, and number of co-morbid illnesses at T2 all contribute to the patient feeling unwell. These changes may have influenced admission to hospital. There was a significant difference in the PH subscales (but none of the other PPHS subscales), as a result of the change in the physical status. Looking at the substantive theory, the PH subscale is the most likely to be affected by illness and is an indication of the subscale's sensitivity. Changes in the PH, PSD, Nurse, and Physician

subscales, as a result of changes in the patients' age, albumin, time on dialysis, type, and the number and severity of co-morbid illnesses support the substantive theory, sensitivity of the PPHS, and the second hypothesis.

Critical events

The purpose of the critical events checklist was to record the presence or absence of events related to illness, treatment, support, and the sense of self. All responses are either positive or negative, so there is no means to evaluate the intensity of items listed in the scale. Loss of family and good rapport with fellow patients and loss of alternate treatment modality are worth equal value in a summative score, yet each may have a completely different effect on the patient's overall well-being. As well, there is no way to determine when the event occurred. An event may have taken place just after administration of the PPHS at T1 and the patient may have had six months to adapt to the change. So, even though the event occurred, the patient may no longer have been feeling better or worse. Hypothesizing that there would be a significant change in any of the PPHS subscales scores as the result of a critical event makes the assumption that each event is contextualized in the manner that the researchers expected. An example is the loss of a fellow patient: individuals experience grief in different ways and the level of grief depends on the level of attachment. Whether or not the fellow patient was a friend or someone they knew might make a difference in their response. Most long-term HD patients know of another patient who has died, yet they may not have been friends. On the other hand, loss of a fellow HD patient who is a friend may cause the person to re-evaluate their own sense of mortality. Assessing responsiveness of the PPHS based solely on change related to the presence or absence of a critical event should be interpreted with caution, and a lack of sensitivity may be a result of the items included in the critical events checklist and timing of the event versus lack of responsiveness of the PPHS.

All PPHS subscale scores were evaluated based on the mean and standard deviation of the patients' subscale scores at T2 and whether they increased or decreased in comparison with T1 and the occurrence of a critical event. Secondly, the scores for positive versus negative events were assessed in relation to their ability to affect PPHS subscale scores in the predicted manner.

Specific assessment of the critical events was accomplished by looking at the events and the subscales most likely to change as a result of the presence or absence of that classification of event. There was no predicted change in the PH score associated with the negative illness events. Few people reported negative illness events, with an unpredictable illness having the largest response, yet none of the scales moved in the predicted direction. One explanation may be that patients may be used to the erratic highs and lows of living with a chronic disease and its treatment. As Yamana (2009) stated, patients become accustomed to dealing with the symptoms and complications of HD. Alternatively, positive illness events resulted in an

increased PH score for all items included in the category, suggesting that positive critical events had more impact on the patients' physical health.

Treatment negative events did not seem to have an effect on the PH scale. Of note is that two negative events had fewer than seven responses. Again, patients may have become used to coping with these critical events. However, four times out of five, positive treatment events produced an increase in the PH mean subscale scores. The PH subscales appear to be responsive to specific treatment events.

It was expected that changes in the patients' perception of support would result in a change in one of the two Support subscales. Of the six negative critical events, only two were directly related to formal supports, and these occurrences had a very low response rate, less than four affirmatives, which suggests that the patients did not have many negative support critical events. When patients had lost a family member or a friend, the Nurse and Physician subscales scores decreased indicating the patients' perceived less support from their health care providers. Overall, negative support events resulted in a desired change in the Nurse subscale five times out of six times and in the Physician subscale twice. Patients were less likely to rate the support of their physician as positive when they had experienced a negative event. This response was tricky to interpret, either there was less support or during a difficult time the patients perceived less support. Both the Nurse and Physician subscales scores changed in the predicted direction, as a result of the occurrence of positive support events. The Nurse and the Physician subscales increased their mean scores five out of six times with positive events. Patients were likely to be more appreciative of the health care professional's support when they felt better.

This section had one of the highest response rates in the critical events checklist, and patients consistently rated their support very favourably. The Nurse and Physician subscales are sensitive to specific critical events relating to the support of the nurse and the physician.

Self-events were hypothesized to affect the two PSD subscales, EWB and PSD. Negative self-events produced a change in the predicted direction for two PSD scores and two EWB scores out of eight possible events, whereas self-positive occurrences caused a change in the PSD subscale mean score three times and the EWB subscales six times.

With the exception of the statement regarding finances, all critical events produced a change in one of the two core constructs, PSD and EWB, related to adapting to life on HD. Results from this examination again support that the PSD and EWB subscales are sensitive and proficient in monitoring a change in patients' status.

In all sections of the critical events checklist assessment, positive events were more likely to result in a change in the predicted direction. This suggests that positive events were more likely to have an impact on patients. It is possible that patients are more likely to suppress a negative memory than a positive one. However, each category of events is based on one of four constructs from the original substantive theory, and specific items may be more indicative of an

actual critical event and more specific than assessing the category of positive or negative responses. The hypotheses related to the occurrence of a critical event and subsequent changes in relevant PPHS subscale scores were partially supported. What was strengthened was the notion that the subscales are sensitive to critical events, but more research is required to assess these assumptions.

Limitations

The use of a convenience sample with mainly Caucasian English-speaking patients certainly creates a selection bias. However, this is the first examination of this instrument in the eastern part of Canada where the majority of the population are Caucasian English-speaking people. Our sample is similar to the HD population, as described by CIHI (2011) with the exceptions that there are fewer ESRD patients on HD than in 1999 and there has been growth in the proportion of elderly patients and patients with diabetes and other co-morbidities. This change in the population's method of renal replacement therapy doesn't negate the importance of having an instrument to measure outcomes in the HD population. In 2008, 17,765 patients were receiving HD as their type of renal replacement therapy. Another difference between our sample and the Canadian HD population is in the number of cases of ESRD caused by diabetes. In 2011, CIHI reported that diabetes was the primary cause of ESRD in 48% of prevalent cases; in our study only 23% were on HD a result of diabetes. This may be a more a reflection of society, dietary choices, obesity, and the number of young people diagnosed with diabetes. This variation does not affect the applicability of the PPHS to measure HD dialysis patients' experiences. The subjects in this study were slightly older than the national population with no patients less than 19 years of age and fewer patients older than 75. Another limitation is that the HD environment may have been too close for subjects to feel comfortable about giving the physicians or nurses a low rating. The research assistant assured the subjects that all responses were confidential and staff would not know about their specific response.

In terms of the instruments used to examine sensitivity, there were a few limitations with the critical events checklist. First, the use of the term *event* may be misleading, as some items related to a state of being versus a change/event. For example, living independently was listed as a positive critical event, yet if the individual had been living without assistance for many years it was not a change, or an event, as much as a continuation of the norm. So, saying yes to this item may not have had any effect on the PPHS subscales score and may not be a valid test of the PPHS's sensitivity to change. Second, the nominal level rating scales did not measure intensity, so there was no way to identify the impact of any event. Third, not all questions in each section of the checklist were relevant to a PPHS instrument, as we excluded items relating to treatment and family. There was no examination of reliability or validity. Finally, there was no means to capture when the event took place, so patients may have had time to adjust to the change, which would not be captured by the PPHS subscales. These limitations infer that the critical events checklist may not be the measure to use when assessing sensitivity. In future longitudinal work, one could advocate for fine tuning the instrument and more frequent assessment by PPHS to try to capture dynamic change.

CONCLUSION

The PPHS is a reliable and valid measurement instrument for monitoring HD patients' physical, social, and psychological health. Examination of the PPHS's response to changes in the patient's physical health status and positive critical events implies that the tool is sensitive to some events. The PPHS requires further examination using the new 36-item instrument with a different and larger population to allow the opportunity for further psychometric assessment. Using a larger population and having three versus two measurement times may allow for more significant changes in the patients' health and well-being and allow for further instrument testing.

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Should statins be used to prevent cardiovascular disease in patients on hemodialysis?

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LEARNING OBJECTIVES

After completing this CE Activity, the reader will be able to:

1. Identify the appropriate use of statin therapy in hemodialysis patients based on the current evidence
2. Summarize the latest KDIGO recommendations on statin use in patients on hemodialysis
3. Review the dosing and administration of statin therapy

INTRODUCTION

Statins have become the principal therapy used in the prevention of cardiovascular disease (CVD) from atherosclerosis in the general population (Stone et al., 2013). Statins, as inhibitors of 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase, the rate-limiting step in cholesterol biosynthesis, provides its benefits through lowering the low-density lipoprotein cholesterol (LDL-C) level in the plasma (Sellers et al., 2007). Randomized controlled trials have shown that statins reduce the incidence of myocardial infarctions and mortality by 20–25% in the general population, as well as in patients of chronic kidney disease (CKD) stages 1 to 3 (CTT, 2010; Tonelli et al., 2004).

Patients receiving hemodialysis have routinely been prescribed statins similar to the general population. These statins were previously believed to aid in protecting against CVD, the leading cause of mortality in patients on hemodialysis (National Kidney Foundation, 2003). However, large recent prospective trials have disproved this belief, and the negative results from these trials are shifting clinical practice (KDIGO, 2013). The purpose of this article is to

summarize this latest evidence and recommendations with regards to statin therapy in patients on hemodialysis and to review the dosing and administration of statins.

CLINICAL EVIDENCE FOR USE OF STATINS IN PATIENTS ON HEMODIALYSIS

There have been several studies demonstrating that statins provide no benefit in the prevention of cardiovascular disease in patients on hemodialysis, despite what was previously believed (KDIGO, 2013). The three landmark trials that evaluated statin use in hemodialysis patients are 4D (Die Deutsche Diabetes Dialyse Studie), AURORA (A Study to Evaluate the Use of Rosuvastatin in Subjects on Regular Hemodialysis: An Assessment of Survival and Cardiovascular Events), and SHARP (Study of Heart and Renal Protection).

The first of these trials, 4D, involved 1,255 type 2 diabetics on maintenance hemodialysis, who were randomly selected to take either 20 mg of atorvastatin per day or a placebo. Although the atorvastatin group had a 43% reduction in LDL-C, there was no difference in the incidence of the cardiac endpoints between the atorvastatin and placebo group. Conversely, the atorvastatin group had an increased risk in fatal stroke (Wanner et al., 2005).

The second trial, AURORA, was conducted after 4D to clarify these previous negative findings. A total of 2,776 prevalent hemodialysis patients were started on either 20 mg of rosuvastatin per day or a placebo. Similarly to 4D, a 40% reduction in LDL-C level was observed in patients on rosuvastatin, but this did not provide any benefit in terms of cardiovascular outcomes. However, AURORA did not detect any increase in stroke risk in the rosuvastatin group, contrary to 4D (Fellstrom et al., 2009). Additionally, post-hoc analysis of diabetic patients from AURORA confirmed that there is no increase in stroke risk from the use of rosuvastatin (Holdaas et al., 2011).

SHARP was the latest and the largest trial among the three, consisting of 9,270 patients. Contrary to the previous two trials, SHARP showed positive cardiovascular benefits with statin use. Patients received the combination of 20 mg of simvastatin and 10 mg of ezetimibe per day, and were found to have a 17% lower rate of atherosclerotic events when compared to those on a placebo. However, caution is needed in applying the positive findings to patients on

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hemodialysis for the following reasons: the majority of trial patients were with CKD stage 3 or 4, and only one third of the patients were on maintenance hemodialysis at baseline. In addition, the positive statin benefit disappeared when examining only the hemodialysis patients in a subgroup analysis of this trial (Baigent et al., 2011).

Considering the results from all three trials, there is a strong suggestion that the initiation of statin therapy offers no cardiovascular benefit for patients on hemodialysis. A possible explanation to this finding is that the etiology of CVD in patients on hemodialysis extends beyond atherosclerosis. Other factors such as left ventricular hypertrophy, cardiac fibrosis, cardiac microvascular disease, sympathetic over-activity and vascular calcification are also known risk factors for cardiovascular disease in hemodialysis patients (Massy & deZeeuw, 2013). Therefore, it is reasonable to advise against initiating statin therapy on all hemodialysis patients. In spite of this, clinicians may be inclined to prescribe statins in certain patient situations; for example, patients on hemodialysis who are at high risk for cardiovascular events, such as high LDL-C (>3.76 mmol/L) or a recent MI (KDIGO, 2013; Marz et al., 2011). The decision to initiate statin therapy should, thus, lie on clinical judgment and patient preference, recognizing that the benefits from statins remain uncertain or insignificant in these clinical situations.

RECOMMENDATION: KDIGO 2013

The latest KDIGO guidelines, published in November 2013, have incorporated the three landmark trials and suggest not initiating statin therapy in hemodialysis-dependent CKD patients. However, for patients already on statin at the time of hemodialysis initiation, KDIGO suggests continuing therapy, as previous studies did not show any increase in significant adverse events in this population.

When using statins or statin/ezetimibe therapy, the KDIGO guideline recommends a “fire-and-forget” approach for CKD patients. Clinicians no longer have to dose titrate the statin therapy until a certain LDL-C treatment target is met, as this has not been shown to be beneficial in any clinical trial. Therefore, it is not necessary to routinely conduct follow-up lipid panel labs, unless the follow-up lipid panel would alter management such as assessing patient adherence to therapy.

Refer to Table 1 for the complete list of KDIGO recommendations on statins in adult patients with CKD.

DOSING AND ADMINISTRATION OF STATINS

How should statins be dosed in patients on hemodialysis?

Patients on hemodialysis are at high risk of medication-related adverse events; there are signals of slight increase in myopathy from statin therapy (Baigent et al., 2011). Therefore, KDIGO guidelines recommend that statins should be dosed based on regimens that have been shown to be safe in trials done specifically in CKD populations. Patients who are tolerating higher statin doses do not need to be switched to the regimens in Table 2, but these patients should be monitored closely for myopathy (KDIGO, 2013).

How should we monitor patients taking statins?

Patients treated with statins should be counselled to report any new onset of muscle discomfort or weakness. In the presence of myopathy, statin therapy should be held, and creatine kinase (CK) levels should be performed to evaluate more severe forms of myotoxicity, such as myositis or rhabdomyolysis (Stone et al., 2013). In addition to myopathy, statins have been associated with elevation in hepatic transaminases with an incidence rate of 0.5% to 2.0% in patients treated with statins in the general population.

Table 1: KDIGO 2013 recommendations on statin therapy in adult patients with CKD

Patient Group	Recommendation	Level of recommendation*
≥50 years with eGFR ≤ 60 ml/min/1.73 m ²	Treatment with a statin or statin/ezetimibe combination	1A
≥50 years with CKD and eGFR ≥ 60 ml/min/1.73 m ²	Treatment with a statin	1B
18-49 years with CKD	Treatment with a statin if ≥ 1 of the following: <ul style="list-style-type: none"> known coronary disease (myocardial infarction or coronary revascularization) diabetes mellitus prior ischemic stroke estimated 10-year incidence of coronary death or non-fatal myocardial infarction >10% 	2A
Hemodialysis-dependent CKD	No initiation of any statin or statin/ezetimibe combination (2A)	2A
Hemodialysis-dependent CKD, already receiving a statin or statin/ezetimibe combination at the time of hemodialysis initiation	Continuation of the statin or statin/ezetimibe combination (2C)	2C
Kidney transplant recipients	Treatment with a statin	2B
*Level of recommendation: the strength of recommendation is indicated as Level 1 ('we recommend') or Level 2 ('we suggest'); the quality of supporting evidence is shown as A (High), B (Moderate) or C (Low)		

However, it is not recommended to routinely monitor hepatic transaminases. Indeed, whether statins cause hepatotoxicity remains controversial (Pasternak et al., 2002).

How should statins be taken?

Statins, in general, should be taken in the evening or at bedtime, as the majority of the cholesterol synthesis appears to occur at night. Atorvastatin and rosuvastatin can be taken any time of the day because they have longer half-lives compared to the other statins (CPhA, 2013).

Which drugs interact with statins?

Drug interaction potential is not the same among all statins. It is of particular concern for those that are substrates of the cytochrome P450 system 3A4 iso-enzymes

(CYP3A4), such as atorvastatin, lovastatin and simvastatin. Medications that are inhibitors of CYP3A4 may reduce the metabolism of these statins and increase statin blood levels and the risk of myopathy. Some examples of CYP3A4 inhibitors are fibrates, nicotinic acid, amiodarone, azole antifungals (e.g., itraconazole), macrolide antibiotics (e.g., clarithromycin), protease inhibitors (e.g., ritonavir), non-dihydropyridine calcium antagonists (e.g., diltiazem). Strategies to avoid drug interactions include temporary discontinuation of statins for the duration of the interacting medication or switching to a non-interacting statin (e.g., pravastatin) (CPhA, 2013; Stone et al., 2013).

Can statin be taken with grapefruit juice?

Grapefruit juice inhibits CYP3A4, but daily consumption of a glass or less of grapefruit juice or half a grapefruit is not known to cause any adverse interactions with atorvastatin, lovastatin and simvastatin in patients without CKD (Bailey et al., 2013). Given the increased risk of adverse reactions in hemodialysis patients, those on statin therapy should be cautioned against any consumption.

SUMMARY

There now exists current evidence that the initiation of statin therapy in patients on hemodialysis does not provide the same cardiovascular benefit as in non-hemodialysis patients. The KDIGO guidelines suggest not to initiate statin therapy in hemodialysis-dependent CKD patients, but to continue therapy in patients who are already on a statin at the time of hemodialysis initiation. A closer monitoring of myopathy is warranted for hemodialysis patients on a statin therapy.

Table 2: KDIGO 2013 recommendations on statin dose in adult patients with CKD stage 3 and above, including patients on hemodialysis

Statin	Recommendation (mg/day)
Lovastatin	- ¹
Fluvastatin	80
Atorvastatin	20
Rosuvastatin	10 ²
Simvastatin	40 or 20 with 10 ezetimibe
Pravastatin	40

¹Lovastatin has not been studied in this population.
²Rosuvastatin should not be dosed more than 10mg/day in patients with CKD stage 4 and above due to its potential to accumulate (AstraZeneca, 2013).

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Should statins be used to prevent cardiovascular disease in patients on hemodialysis?

By Sannifer Hoi, PharmD student, and Marisa Battistella, BScPhm, PharmD, ACPR

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1. Statins have been demonstrated to have which of the following effect(s) in patients on hemodialysis?
 - a) LDL-C reduction
 - b) risk reduction in cardiovascular events
 - c) increased risk in myopathy
 - d) a and c
 - e) b and c
2. Which of the following statements about 4D, AURORA and SHARP trials is **false**?
 - a) SHARP is the latest and largest trial among the three
 - b) all three trials contained patients on hemodialysis in their study population
 - c) majority of the patients in SHARP are non-hemodialysis patients with CKD stage 3 to 4
 - d) all three trials examined the cardiovascular benefits of atorvastatin 10-20 mg/day
 - e) the comparative arm in all trials was placebo
3. Based on the results of 4D, AURORA and SHARP, which of the following statement(s) is correct?
 - a) there is likely no benefit in initiating statin in patients on hemodialysis
 - b) the use of statin in patients on hemodialysis is generally safe, except a slight increase in the risk of myopathy was shown in SHARP
 - c) statins should be discontinued in all patients on hemodialysis due to no benefit
 - d) a and b
 - e) a and c
4. A 65-year-old man with a significant cardiovascular history is being started on hemodialysis. Upon review of his medications, it is realized that he is on atorvastatin 40 mg/day. What is the most appropriate action regarding his statin therapy?
 - a) discontinue atorvastatin 40 mg/day since there is likely no benefit
 - b) decrease the dose to atorvastatin 20 mg/day
 - c) continue atorvastatin 40 mg/day and alert patient to report any new onset of muscle discomfort or weakness
 - d) switch to simvastatin 20 mg/day plus ezetimibe 10 mg/day
 - e) switch to ezetimibe 10 mg/day
5. How do statins lower LDL-C?
 - a) inhibit the HMG-CoA reductase
 - b) decrease the half-life of cholesterol in the body
 - c) reduce the absorption of cholesterol in the intestinal brush border
 - d) all of the above
 - e) none of the above
6. What is the recommended maximum dose of rosuvastatin (Crestor) in patients on hemodialysis?
 - a) 5 mg
 - b) 10 mg
 - c) 15 mg
 - d) 20 mg
 - e) 40 mg
7. What side effects should be monitored in hemodialysis patients on statin therapy?
 - a) muscle soreness and weakness
 - b) hypernatremia and hyperkalemia
 - c) vitamin B12 depletion and peripheral neuropathy
 - d) a and c
 - e) b and c
8. Patients on hemodialysis should be cautioned against grapefruit juice consumption if they are on which of the following statin(s)?
 - a) simvastatin
 - b) atorvastatin
 - c) rosuvastatin
 - d) a and b
 - e) a and c
9. A hemodialysis patient on simvastatin 20 mg/day has been prescribed clarithromycin XL 500 mg for 10 days for an upper respiratory infection. Clarithromycin is a CYP 3A4 inhibitor. Which of the following statements is **false**?
 - a) the patient may be at increased risk of myopathy due to the potential drug interaction
 - b) concomitant administration of clarithromycin blocks the metabolism of simvastatin and, thereby, increases the serum concentration of simvastatin
 - c) to avoid the potential drug-interactions, simvastatin should be held for 10 days
 - d) to avoid the potential drug-interactions, clarithromycin should be switched to an alternative antibiotic that is not an inhibitor of CYP 3A4
 - e) none of the above is false
10. Which statins are preferably dosed in the evening or at bedtime?
 - a) atorvastatin, rosuvastatin
 - b) atorvastatin, simvastatin
 - c) rosuvastatin, simvastatin
 - d) rosuvastatin pravastatin
 - e) simvastatin, pravastatin

CONTINUING EDUCATION STUDY
ANSWER FORMCE: 2.0 HRS CONTINUING
EDUCATION

Should statins be used to prevent cardiovascular disease in patients on hemodialysis?

Volume 24, Number 2

By Sannifer Hoi, PharmD student, and Marisa Battistella, BScPhm, PharmD, ACPR

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The absentee hemodialysis patient

By Gavril Hercz, MD

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QUESTION

We have a patient who is proving to be a bit of a challenge for our hemodialysis staff. She often does not show up for her scheduled appointments in dialysis without notifying us. This causes concern on a number of levels:

- 1. From a financial perspective, we have to waste the primed circuit and supplies that have been used to prepare for her treatment.*
- 2. From a scheduling perspective, we are not always able to accommodate other patients in their requests for preferred time slots, as we are not sure when she will come for treatment.*
- 3. We care about her, and are concerned about her well-being and the impact of her sporadic attendance at dialysis.*
- 4. She is listed as a transplant candidate and her lack of interest in working with the health care team in our unit leads to questions about her candidacy for transplant.*

We have tried to engage her and let her know that we are concerned about her well-being. We have also offered a different dialysis schedule to her hoping that it may be less invasive to her time, allowing her to attend more regularly. We have not been able to help her, and do understand that this is also her decision. How do we reconcile this ourselves, and is there anything else we can do to help her?

RESPONSE

Thank you for a thought-provoking issue. As a start, this situation is not unusual and I might venture that every program is grappling with a similar problem. This is especially important these days, as growing fiscal constraints put increasing pressure on our programs to be run as efficiently as possible. Not only does a patient absence impact on wasted materials, but also it impacts on nursing duty allocations and scheduling. It would not be unusual to feel pressure from your management hierarchy to try and identify these patients and intervene before the absence impacts the program. This, in itself, is enough to create stress, which may modify how we might react to the patient. As well, a patient who does not appear and does not call raises practical issues of how the unit should respond. Does your unit have a procedure in place, which includes calling families and potentially alerting the police to enter her lodging in case she became very ill? Having a protocol in place might allay some anxieties.

This topic also raises profound ethical issues, as it impacts on a scarce resource that is not available in an open-ended fashion. Each program has only so many slots available. As well, you allude to the conflict that is aroused by a seemingly “uncaring”

patient, whose non-use of a slot blocks the ability of providing the treatment to a “more needy” patient. This kind of pressure can easily trap us in judging the “no-show” patient, especially when we are caring for an adherent patient who shows up for his treatments dutifully and all he/she would like is the empty slot. All too easily we can go down a slippery road of blaming the absent patient for all of her problems, as having brought her issues upon herself. As well, we may give an outlet to our own frustration by advocating that the patient be removed from the transplant list. At these moments, as we feel ourselves becoming more judgmental, it is important to step back from the issues and ponder how we might connect with the patient and understand the reasons for her missing the treatments. Is it a matter of denial, i.e., if I don’t go for dialysis then I don’t need to be on dialysis? Is it a form of suicide, a withdrawal from active medical therapy that has not been verbalized? Is it a reluctance to be dependent on the nurses, the machines and, therefore, home dialysis might be a better option? Or is it...

The multitude of explanations highlights the need not to foreclose any possibilities. Only by connecting with the patient in a nonjudgmental, open-ended manner can we hope to bridge the gap and evolve her care.

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We welcome letters to the editor concerning recently published manuscripts, association activities, or other matters you think may be of interest to the CANNT membership.

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We prefer manuscripts that present new clinical information or address issues of special interest to nephrology nurses and technologists. In particular, we are looking for:

- Original research papers
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Nous acceptons les articles portant sur des manuscrits récemment publiés, des activités de l'Association ou tout sujet d'intérêt pour les membres de l'ACITN.

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Nous préférons des manuscrits qui présentent de nouveaux renseignements cliniques ou qui traitent des enjeux propres aux champs d'intérêt des infirmières et infirmiers et des technologues en néphrologie. Nous recherchons plus particulièrement :

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Comment les manuscrits doivent-ils être présentés ?

Forme : Le manuscrit doit être présenté à double interligne avec une marge de 1 po et une numérotation consécutive des pages dans le coin supérieur droit de la page. Les articles plus formels de recherche ou d'études cliniques doivent compter de 5 à 15 pages. Les articles moins formels, tels que textes narratifs, questions-réponses ou revues, doivent compter moins de 5 pages.

Style : Le style du manuscrit doit être conforme au manuel de publication de l'Association américaine de psychologie (AAP), 6^e édition (2009), offert dans la plupart des librairies universitaires.

Page titre : La page titre doit inclure le titre du manuscrit ainsi que les renseignements suivants : nom de chacun des auteurs (incluant prénoms au complet), titres professionnels (c.-à-d., inf., B.Sc. Inf., CNéph[C]), titre du poste occupé, nom de l'employeur, adresse, numéros de téléphone et de télécopieur et adresse courriel. L'adresse privilégiée de correspondance doit aussi être indiquée.

Résumé : Sur une page distincte, les articles formels de recherche ou d'études cliniques doivent être accompagnés d'un résumé de 100 à 150 mots, reprenant brièvement les principaux points du manuscrit.

Texte : Les sigles, abréviations ou acronymes doivent être écrits au long la première fois qu'ils apparaissent dans le texte, suivis de l'abréviation entre parenthèses; p. ex., Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN). Les noms génériques des médicaments doivent être employés. Les unités de mesure doivent être indiquées selon le Système international d'unités (SI). Les références doivent être citées dans le texte en utilisant le format de l'AAP. Une liste de références comprenant la bibliographie complète de toutes les références utilisées doit suivre le texte.

Tableaux/Figures : Les manuscrits ne doivent inclure que les tableaux et figures (incluant schémas, illustrations, croquis, etc.) visant à clarifier certains détails. Les auteurs qui utilisent des tableaux et des figures qui ont déjà fait l'objet d'une publication doivent fournir l'autorisation écrite de l'éditeur d'origine et la joindre au manuscrit soumis.

De quelle manière doit-on soumettre les manuscrits ?

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Veuillez inclure une lettre de présentation en précisant les coordonnées de l'auteur principal ainsi qu'une notice biographique d'une phrase (incluant titres de compétences, titre du poste actuel et lieu de travail) pour chaque auteur.

Quel est le processus de sélection des manuscrits pour publication dans le Journal de l'ACITN ?

À la réception de chaque manuscrit, un accusé de réception est envoyé. Les articles de recherche et d'études cliniques sont envoyés à deux membres du comité de révision du **Journal de l'ACITN** afin d'être révisés suivant un processus à double insu. Tous les articles peuvent être retournés aux auteurs pour révision et nouvelle soumission par la suite. Les manuscrits acceptés pour publication peuvent subir des changements éditoriaux; toutefois, les auteurs pourront approuver ces changements. Les critères d'acceptation pour tous les manuscrits comprennent l'originalité des idées, l'actualité du sujet, la qualité du matériel et l'attrait des lecteurs.

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Aide-mémoire à l'intention des auteurs

- ☒ Lettre de présentation
- ☒ Article
 - Page titre incluant les renseignements suivants:
 - Titre de l'article
 - Nom de chaque auteur (incluant prénoms au complet)
 - Titres de compétences
 - Titre du poste actuel
 - Nom et adresse de l'employeur
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 - Texte de l'article avec résumé, s'il y a lieu à
- **double interligne et pages numérotées**
- Références (sur une feuille distincte)
- Tableaux (un par page)
- Figures (une par page)
- Lettre d'autorisation pour tout matériel ayant déjà fait l'objet d'une publication

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