

CANNT JOURNAL JOURNAL ACITN

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Editor-In-Chief

Jovina Bachynski, MN, RN(EC), CNeph(C) T: (905) 845-2571 ext 6307 Email: cannt.journal1@gmail.com

Managing Editor Heather Coughlin, Pembroke, Ontario

Layout and Design Sherri Keller, Pembroke, Ontario

Advertising Sales

Heather Coughlin, Pappin Communications 84 Isabella St., Unit 2, Pembroke, ON K8A 5S5 T: (613) 735-0952; F: (613) 735-7983 Email: heather@pappin.com Rate card: www.pappin.com

Letter from the Editor

The 50th CANNT National Symposium 2018 (*Our past will guide our future*) in Quebec City capped a very sustainable year for CANNT. The conference showcased the impressive diverse talents in nephrology nursing and technological practice today. The historical perspectives provided by our keynote and plenary speakers during the conference were so edifying. One was left with a much better appreciation of the rich history of nephrology practice in Canada.

I am pleased to publish two such divergent topics in this issue: A cross-sectional study measuring cobalt levels in paediatric CKD patients and Predicting factors of spiritual well-being in patients receiving hemodialysis. Both topics speak to different interests in nephrology nursing and technological practice. CANNT Journal has not had many opportunities to publish on pediatric-related topics, so Wolfs et al.'s study on the effect of cobalt on pediatric patients with CKD is a breath of fresh air. On the other side of the spectrum is the topic of spiritual well-being by our international colleagues from Nepal. Jugjali et al.'s findings on the relationship of spiritual well-being to the different constructs of fatigue, religiosity, and social support in hemodialysis speak to an element of patient care that is not often discussed, yet one that resonates with our holistic approach to patient care. Also included in this issue is an excellent CE article by Diya Nahar (Prophylactic management of contrast-induced acute kidney injury in high-risk patients) that was originally published in ANNA's Nephrology Nursing Journal in 2017. I am grateful to Beth Ulrich, editor of the NNJ, for generously offering to share this

previously published work with the *CANNT Journal* readership.

As befits the time of year, I would like to express deepest gratitude to the individuals who help make the CANNT Journal the internationally acclaimed peer-reviewed journal that it is: the amazing nephrology champions who comprise the CANNT Board of Directors; the dedicated teams at Pappin Communications (publisher) and Lemieux Bédard (translator); our indefatigable association management team (Events and Management Plus, Inc.); our very talented authors; our passionate team of peer reviewers; and, last, our loval readers for whom this journal is dedicated to. I would also like to acknowledge the contributions of Heather Dean and Michelle Trask, past President and Director of Communications, respectively, who continue to prize innovative and out-of-the-box thinking that has helped shape the vision for CANNT and the CANNT Journal. I look forward to working with Krista (President-Elect/Treasurer Smith 2018-2020) and Ethan Holzer (Director of Communications), and to the fresh perspective they bring to the table as we usher in 2019.

On this note, I hope you had a wonderful holiday season in 2018. May we all be invigorated in mind, body, and spirit as we usher in another year of excellence in nephrology nursing and technological practice.



Sincerely, Jovina Bachynski, MN, RN(EC), CNeph(C) Editor, CANNT Journal

Lettre de la rédactrice en chef

Le 50^e symposium national de l'ACITN 2018 (Notre passé guidera notre avenir), qui s'est tenu à Québec, a clôturé une année très active pour notre organisme. La conférence a mis de l'avant des talents diversifiés et impressionnants dans le domaine de la néphrologie en sciences infirmières et des pratiques technologiques d'aujourd'hui. Les perspectives historiques évoquées par nos conférenciers lors de la séance d'ouverture et des séances plénières ont été très édifiantes. Nous en sommes ressortis avec une plus grande appréciation de la riche histoire de la pratique de la néphrologie au Canada.

Je suis heureuse de publier des articles sur deux sujets si divergents dans ce numéro, soit Une étude transversale visant à mesurer les niveaux de cobalt chez les patients pédiatriques atteints de maladie rénale chronique et Prédire les facteurs de bien-être spirituel chez les patients sous hémodialyse. Ces deux sujets portent sur des champs d'intérêt très différents en matière de sciences infirmières en néphrologie et de pratiques technologiques. Le Journal de l'ACITN n'a pas souvent eu l'occasion de publier des articles sur des sujets liés à la pédiatrie, donc l'étude de Wolfs et ses collaborateurs traitant de l'effet du cobalt sur les patients pédiatriques atteints de MRC est rafraîchissante. À l'autre extrême, nous retrouvons le sujet du bien-être spirituel, provenant de nos collèges internationaux du Népal. Les découvertes de Jugjali et ses collaborateurs sur la relation entre le bien-être spirituel et les différentes dimensions de la fatigue, la religiosité et le soutien social lors de l'hémodialyse examinent un élément des soins aux patients dont on ne discute pas souvent, mais qui fait écho à notre approche holistique en matière de soins aux patients. Ce numéro contient également un excellent article de formation continue de Diya Nahar (Prophylactic management of contrast-induced acute kidney injury in high-risk patients),

originalement publié en 2017 dans le *Nephrology Nursing Journal* de l'ANNA. Je tiens à remercier Beth Ulrich, rédactrice en chef du *NNJ*, qui a généreusement proposé de faire connaître cet article aux lecteurs du *Journal de l'ACITN*.

Comme il sied à cette période de l'année, j'aimerais exprimer ma plus profonde gratitude envers les personnes qui réalisent le Journal de l'ACITN, ce journal évalué par des pairs qui jouit d'une renommée internationale : les incroyables champions de la néphrologie qui composent le Conseil d'administration de l'ACITN; les équipes dévouées chez Pappin Communications (éditeur) et Lemieux Bédard (traducteurs); notre équipe de gestion d'association infatigable (Events and Management Plus, Inc.); nos auteurs talentueux; notre équipe passionnée de réviseurs; et finalement, nos lecteurs fidèles auxquels ce journal est destiné. J'aimerais aussi souligner les contributions de Heather Dean et de Michelle Trask, respectivement ancienne présidente et directrice des communications, qui valorisent sans cesse les idées novatrices et les réflexions créatives contribuant à façonner la vision de l'ACITN et du Journal de l'ACITN. J'ai très hâte de travailler avec Krista Smith (présidente élue et trésorière 2018-2020) et Ethan Holzer (directeur des communications), et me réjouis déjà des perspectives nouvelles qu'ils nous apporteront alors que vous accueillons 2019.

En terminant, j'espère que vous avez passé un merveilleux temps des Fêtes en 2018. Alors que nous entamons une nouvelle année d'excellence en sciences infirmières en néphrologie et en pratiques technologiques, que nos âmes, corps et esprits soient revigorés.



Cordialement, Jovina Bachynski, MN, RN(EC), CNeph(C) Rédactrice, Journal de l'ACITN Le Journal ACITN est la publication officielle de l'Association canadienne des infirmiers/ infirmières et technologues en néphrologie, a/s 4 Cataragui St., Suite 310, Kingston, ON K7K 1Z7, téléphone : (613) 507-6053, télécopieur : 1-866-303-0626, 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 disponsibles, 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, 4 Cataraqui St., Suite 310, Kingston, ON K7K 1Z7.

1-877-720-2819; Site web: www.cannt.ca

Le Journal ACITN accepte des articles (manuscrits) de façon continue.

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Rédactrice en chef

Jovina Bachynski, MN, RN(EC), CNeph(C) T: (905) 845-2571 ext 6307 Courriel: cannt.journal1@gmail.com

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Heather Coughlin, Pappin Communications 84 Isabella St., Unit 2, Pembroke, ON K8A 5S5 T: (613) 735-0952; F: (613) 735-7983 Courriel : heather@pappin.com Publicité : www.pappin.com

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President-Elect, Treasurer/Président-Élue, Trésorière: Krista Smith, MN, RN CANNT.presidentelect@gmail.com

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Western Region Vice-President/ Vice-Présidente de l'Ouest : Rick Luscombe, RN, BScN, CNeph(C) T: 778-828-9985 CANNT.vpwestern@gmail.com

CANNT Journal Editor-In-Chief/ Rédactrice en chef: Jovina Bachynski, RN(EC), MN-NP Adult, CNeph(C), T: 647-974-4711 cannt.journal1@gmail.com

Greetings from your new CANNT President!

I am honoured and excited about the opportunity to serve as President of the Canadian Association of Nephrology Nurses and Technologists 2018–2020. Over the past four years, I have been very fortunate, as a member and on the executive committee, to come to know many of you. I would like to take this opportunity to say how very honoured I am to be your newly elected president. I humbly accept the many challenges ahead and I am ready to continue the great work that CANNT has accomplished since our association's inception 50 years ago.

Throughout our diverse renal communities and healthcare institutions across Canada, our common journey is not only what we do for those we care for, but what we aspire to accomplish, and how we can improve our practice and what we can learn. We want to make a difference. We strive to help, have an impact, and make the lives of those living with kidney disease better.

I write this as I reflect on our 50th Anniversary CANNT conference, held in beautiful Quebec City,



From left to right: Janice MacKay (CANNT President) and Heather Dean (CANNT 2019 Co-Chair)

in October. I met so many of you, and was impressed to find that our attendees included educators, staff nurses, managers, researchers, technicians, administrators, and practitioners. This year's conference presented varied facets of nephrology care, research, and innovation in nephrology nursing and technology. It truly provided us with a panoramic view of where we have been and where we are headed.



From left to right: Dr. Tamara Marie Kear (ANNA President-Elect), Janice MacKay (CANNT President), and Maria Teresa Parisotto (EDTNA Secretary)

My sincere thanks for the commitment and hours spent by the planning committee in coordinating a conference with energy, warmth, excellent speakers, and evidence-based information in take-home ideas to improve our nephrology practice. Very inspirational.

I am tremendously motivated to continue with moving the work of the Board of Directors forward in promoting the best nephrology care and practice through education, research, and communication. Our management team, Events & Management Plus Inc., and the CANNT Board of Directors are invaluable in keeping us on track to accomplish the important work we are doing with CANNT.

In the coming year, the leadership team will focus on exploring partnerships to support growth in our educational offerings to the membership.

Membership recruitment continues to be an important activity for our organization's future, and will include evaluating ways to improve our membership numbers. We will draw on the expertise of every one of you through meetings, working groups, conversations, and if necessary, member-wide surveys.

Whether you participate as a member on our committees, as a conference/webinar presenter, or as a newcomer who would like to know more, I strongly encourage you to join in.

I would like to leave you with a few thoughts... Whether you are interested in strengthening your nephrology network, furthering your nephrology career, strengthening your knowledge, or maybe just want a few more friends, membership in CANNT is a great option for you. Start by making a commitment to join me at the CANNT conference in Edmonton, Alberta in 2019.



With warm regards and most sincerely, Janice MacKay CANNT President 2018-2020

CANNT REPRESENTATIVES/ CONTACTS; REPRÉSENTANTS/ CONTACTS ACITN

CNA Liaison/Liaison pour AIIC : Janice MacKay, RN, CNeph(C), CCRP T: 402-210-7439 CANNT.president@gmail.com

Kidney Foundation of Canada, MAC Representative/Fondation du rein—Comité de médical consultatif : Janice MacKay, RN, CNeph(C), CCRP T: 402-210-7439 CANNT.president@gmail.com

Bursary Committee/ Comité des Bourses : Janice MacKay, RN, CNeph(C), CCRP T: 402-210-7439 CANNT.president@gmail.com

CANNT Administrative Office/ Bureau National de l'ACITN : 4 Cataraqui St., Suite 310 Kingston, ON K7K 127 Phone: 613-507-6053 Same Toll Free: 1-877-720-2819 Fax: 1-866-303-0626 General email: cant@cant.ca

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Journal advertising contact/Personne contact pour la publicité du Journal : Heather Coughlin Pappin Communications, 84 Isabella Street, Pembroke, ON K8A5S5 T: 613-735-0952; F: 613-735-7983 heather@pappin.com Rate card: www.pappin.com

Salutations de votre nouvelle présidente de l'ACITN!

Je suis à la fois honorée et excitée d'avoir l'opportunité de servir à titre de présidente de l'Association canadienne des infirmières et technologues en néphrologie (ACITN) pour les années 2018 à 2020. Au cours des quatre dernières années, j'ai eu la chance, à titre de membre siégeant au Conseil exécutif, d'avoir rencontré un grand nombre d'entre vous. Je voudrais profiter de cette occasion pour vous dire à quel point je suis honorée d'être votre présidente nouvellement élue. J'accepte avec humilité les défis qui m'attendent et je suis prête à continuer l'excellent travail accompli par l'ACITN depuis la création de notre association il y a 50 ans.

Notre objectif commun, à l'échelle des diverses communautés rénales et des établissements de soins de santé du Canada, comprend non seulement ce que nous faisons pour ceux dont nous avons soin, mais aussi ce que nous souhaitons accomplir, comment nous pouvons améliorer notre pratique et ce que nous pouvons apprendre. Nous voulons faire une différence. Nous cherchons à aider, à avoir un impact, et à améliorer la vie de ceux qui vivent avec une maladie rénale.

Alors que j'écris ces lignes, je songe à notre conférence célébrant



De gauche à droite : D^{re} Tamara Marie Kear (présidente élue de ANNA), Janice MacKay (présidente de l'ACITN) et Maria Teresa Parisotto (secrétaire de l'EDTNA)



De gauche à droite : Janice MacKay (présidente de l'ACITN) et Heather Dean (coprésidente de l'ACITN 2019)

le 50^e anniversaire de l'ACITN, qui a eu lieu dans la magnifique ville de Québec en octobre dernier. J'ai rencontré un grand nombre d'entre vous et j'ai été impressionnée de constater que nos participants incluaient des éducateurs, des membres du personnel infirmier, des gestionnaires, des chercheurs, des techniciens, des administrateurs et des praticiens. La conférence de cette année a présenté les différentes facettes des soins, de la recherche et de l'innovation dans les sciences infirmières et les technologies en néphrologie. Elle nous a vraiment montré d'où nous venons et vers où nous nous dirigeons.

Un merci sincère au comité organisateur pour leur engagement et toutes les heures passées à coordonner cette conférence avec énergie et chaleur, et pour avoir offert des conférenciers hors pair et de l'information probante à apporter à la maison pour améliorer notre pratique en néphrologie. Ce fut très inspirant.

Je suis très motivée à continuer le travail du Conseil d'administration en poursuivant la promotion des meilleurs soins et pratiques en néphrologie par le biais de la formation, de la recherche et de la communication. Notre équipe de gestion, Events & Management Plus inc. et le Conseil d'administration de l'ACITN nous apportent une aide inestimable pour que l'on demeure sur les rails afin d'accomplir le travail important que nous réalisons avec l'ACITN.

Au cours de la prochaine année, l'équipe de direction se concentrera sur l'exploration de partenariats visant à soutenir la croissance de nos offres éducatives pour nos membres.

Le recrutement de membres demeure une activité importante pour l'avenir de notre organisation et, à cet effet, nous prévoyons une évaluation des moyens visant à accroître le nombre de nos membres.

Nous nous appuierons sur l'expertise de chacun d'entre vous par le biais de réunions, de groupes de travail, de discussions et, au besoin, de sondages auprès de tous les membres.

Que vous participiez à titre de membre de l'un de nos comités, de conférencier ou présentateur de webinaires, ou de nouveau participant qui aimerait en apprendre plus, je vous encourage fortement à vous joindre à nous.

Avant de vous quitter, j'aimerais vous donner matière à réfléchir... Que vous souhaitiez renforcer votre réseau en néphrologie, faire avancer votre carrière en néphrologie, parfaire vos connaissances ou simplement vous faire quelques nouveaux amis, l'adhésion à l'ACITN représente une belle option pour vous. Faites le premier pas en vous engageant à vous joindre à moi à l'occasion du congrès de l'ACITN qui se tiendra à Edmonton, en Alberta, en 2019.



Salutations les plus cordiales, Janice MacKay Présidente de l'ACITN 2018-2020

NOTICE BOARD

• Canadian Nurses Association (CNA) Exam Timeline.

https://www.nurseone.ca/certification/renewing-your-certification#sthash.IDBqg5i7.dpuf

	Spring 2019	Fall 2019
Initial exam or renewal by exam application window	Jan. 10–March 1, 2019	June 3–Sept. 12, 2019
Certification exam window	May 1–15, 2019	Nov. 1–15, 2019
Renewal by continuous learning application window	Jan. 10-Nov. 1, 2019	

N.B. CNA will provide 20% discount for initial certification, re-certification, and re-write examination fees in 2019 to active members of CANNT. Details to follow in early 2019.

- March 16–19, 2019. 39th Annual Dialysis Conference (ADC) 2019, Sheraton Dallas Hotel, Dallas, TX. www.annualdialysisconference.org
- March 14, 2019. World Kidney Day Kidney Health for Everyone Everywhere
- April 14–17, 2019. American Nephrology Nurses' Association (ANNA) National Symposium, Hilton Anatole, Dallas, TX. www.annanurse.org
- June 1, 2019. Canadian Nurses Association (CNA) Annual General Meeting, Vancouver, BC. www.cna-aiic.ca
- June 13–16, 2019. 56th European Renal Association European Dialysis and Transplant Association (ERA-EDTA) Congress, Budapest, Hungary. www.era-edta.org
- June 27–29, 2019. Renal Society of Australasia Annual Conference: *Asking the Hard Questions*, Cordis Auckland Hotel, Auckland, New Zealand. http://www.renalsociety.org/eventdetails/2168/2019-rsa-annual-conference
- September 14–17, 2019. 48th Annual European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA) International Conference: *New Pathways I the Renal Setting Caring Together by Integrating Modern Technology Based on Knowledge and Education*, Prague, Czech Republic. www.edtna-erca.com
- **September 18, 2019.** Nephrology Health Care Professionals' Day (celebrated every third Wednesday of September annually)
- October 24–26, 2019. Canadian Association Nephrology Nurses and Technologists (CANNT) 51st National Symposium 2019: *Sharing our Stories Down by the River*, River Cree Resort and Casino, Edmonton, AB. www.cannt.ca
- November 5–10, 2019. The American Society of Nephrology (ASN) 2019 Kidney Week, Walter E. Washington Convention Center, Washington, DC. www.asn-online.org



Nephrology Certification Registration Status Report 2018

Initial and Renewal by	Renewal by Continuous	Total of Initials	Due
Exam to Renew in 2018	Learning (CL) Hours	and Renewals	
51	124	175	256





CANNT ACITN 2019 October 24-26 EDMONTON Alberta



CALL FOR ABSTRACTS

CANNT-ACITN invites you to join us in Edmonton in 2019!

Abstracts are currently being accepted for ORAL and POSTER presentations for CANNT-ACITN 2019 – *"Sharing Our Stories Down By The River"*. This annual national meeting of the Canadian Association of Nephrology Nurses and Technologists will be held October 24–26, 2019 in Edmonton.

Abstract submissions should incorporate the theme—sharing our knowledge and experience—appropriate for the novice through to the advanced practice professional. Topics of interest may include: clinical research, innovative projects and solutions, ethics, case presentations and clinical reviews. All abstract submissions must be evidence-based.

Consistent with our theme, all poster and oral presenters will be encouraged to make their presentation within a story-telling framework.

ABSTRACT SUBMISSION GUIDELINES:

Deadline: February 15, 2019

All abstracts <u>must</u> be submitted online (<u>www.cannt.ca</u>) through the online submission form.

Submissions must include the following:

Abstract Title

must accurately reflect the content of the presentation

Abstract Text

- should be no longer than 250 words
- include all author names and affiliations
- should be as informative as possible
- define **all abbreviations** the first time they appear in the abstract
- use only the generic names of drugs
- do not identify companies and/or products in the body or title of the abstract

If research-based, must include:

- purpose of study
- methods
- results
- conclusions
- implications for nephrology care

If practice/education-based, must include:

- purpose of the project
- description
- evaluation/outcomes
- implications for nephrology practice/education

PRESENTATION INFORMATION:

- identify preferred format of presentation (ORAL or POSTER)
- full names and credentials of authors
- biography (250 words max.) and headshot of first author
- contact information for first author must include: full name, e-mail address, fax number, mailing address with postal code, home and work telephone numbers

LEADING EDGE TOPICS IN:

Transplant	Pediatrics
Mental health and CKD	Ethics and elderly care
Cardiovascular disease and CKD	Medical assistance in dying
Future directions of CKD and treatment	Technical advances in dialysis equipment
Pregnancy with renal disease	Home therapies

IMPORTANT NOTES:

Only **COMPLETE** submissions received by **FEBRUARY 15, 2019** will be considered.

- All correspondence will be with the first author only.
- Acceptance of abstract does not waive attendance fees (registration, transportation, accommodations).
- Notification regarding selection decisions will be provided by April 1, 2019.
- Should the abstract be selected for presentation, the author(s) authorize(s) the publication of the abstract submitted for publication in the CANNT-ACITN Journal.
- The presentation shall not make comparison to companies or products for any purposes of product marketing, nor will topics or materials used discredit companies or products.
- The abstract, and associated authors, should make full disclosure of corporate employment and/or funding sources.
- Abstracts not in the required format will be returned to the author for revision. Please review the sample abstract on the website as a guideline.

SUBMIT ABSTRACTS TO:

ONLINE: www.cannt.ca

QUESTIONS:

EMAIL: cannt@cannt.ca

Your Board in Action

For my first "Your Board in Action", I would like to take this opportunity to send a huge 'hello' to you. My name is Krista Smith, and I am your President-Elect/Treasurer for CANNT for the next two years. I am so extremely excited to network, meet, and chat with many of you through my term.

Currently in my new role, I am learning as much as I can so that I am able to best serve our membership. I am looking forward to working with our amazing CANNT Board of Directors! With their guidance and wealth of experience, I am sure I will have a smooth transition.

I am also hoping to hear from you, our membership. Please connect with me at any point—I value the unique experiences and viewpoints each of you brings. Our membership is why we, the Board, do what we do. CANNT's mission is to "provide leadership and promote the best nephrology care and practice through education, research and communication." This cannot be achieved without you, the CANNT members.

MEMBERSHIP

We have a membership of 337 renal professionals as of December 2018. The Board of Directors continually evolves to provide enduring benefits to all our members. I am seeking input from our valued membership, and I would like to hear from you on ways to increase our association membership. Please share your thoughts with us by contacting the CANNT office team at: **cannt@cannt.ca** or 613-507-6053.

Membership is vital to CANNT, as it is an association run by membership. There are many advantages to becoming a member of CANNT:

- Member access to the online CANNT Journal
- Access to www.cannt.ca "Members' Only" section
- Reduced rates at the annual nephrology symposium
- Access to CANNT Nephrology Nursing Standards and Practice Recommendations and the CANNT Standards of Nephrology Technical Practice
- Promotion of and support for specialty certification

- Continuing education opportunities—through the journal and online webinars
- Opportunities to recognize excellence in practice with yearly awards
- Access to educational bursaries and research grants
- Promotion of evidence-based practice
- Collaboration within the nephrology community
- Maintaining your yearly membership in CANNT assists with the longterm viability of our association.

JOURNAL

Guidelines for journal article submission can be found under the "CANNT Journal" section of the CANNT website. We prefer manuscripts that present new clinical information or address issues of special interest to nephrology nurses and technologists.

E-mail your manuscript to Jovina Bachynski at **cannt.journal1@ gmail. com**

Include a cover letter with contact information for the primary author and a one-sentence biographical sketch (credentials, current job title and location) for each author.

The *CANNT Journal* is published four times per year in electronic versions. The journal is a refereed publication and accepts only original, peer-reviewed articles. Advertising opportunities and corporate sponsored education opportunities are available.

COMMUNICATIONS

We continue to develop new strategies for engaging our members, and communicating timely and relevant information to our membership. *Your CANNT Connection* is our bi-monthly email that works to provide strategic, targeted, personalized, and properly segmented information to our members. Additionally, we try to keep the content simple, direct, to the point, and useful with a goal to engage members on a continual basis. If you have a question, idea, or event to promote, please speak to our Director of Communications, Ethan Holzer.

CANNT website (www.CANNT.ca) Twitter: @CANNT1



ANNUAL CONFERENCE

CANNT 2018, "Our Past Will Guide Our Future", took place in Quebec City from October 25-27, 2018. It was inspiring to hear from healthcare providers and patients who have experienced and worked through various stages of kidney care delivery. It is incredible to see where we have been, how we continue to advance, and where we are today. The creativity, innovation, and fearlessness demonstrated by our colleagues, throughout the kidney care history, were thought-provoking, encouraging, and simply amazing! Our colleagues continue to innovate and create, showing all of us to challenge the status quo, think outside the box, and not to fear failure. Without failure, there is no progress!

The planning committee outdid themselves! Thank you to the planning committee for all of their hard work and dedication to delivering an extremely dynamic conference.

FINANCES

As a "Not for Profit" professional association, our objective is to provide value to our members that aligns with our mission and vision. We continue to explore development, collaborative and lucrative opportunities to assist in maintaining the viability of the association. Transparency improves the coherence and cohesion of our association, and provides our association membership with the 2018 Annual Report on the CANNT website (https://www.cannt.ca/en/about/ major-activities).

Krista Smith CANNT President-Elect/Treasurer 2018–2020

Votre conseil à l'œuvre

À l'occasion de mon premier « Votre conseil à l'œuvre », je souhaite vous accueillir avec un très chaleureux « Bonjour ». Je m'appelle Krista Smith et je suis votre présidente élue et trésorière de l'ACITN pour les deux prochaines années. Je suis très emballée à l'idée de réseauter, de rencontrer et de discuter avec plusieurs d'entre vous au cours de mon mandat.

À l'heure actuelle, dans mon nouveau rôle, j'apprends tout ce que je peux afin de mieux pouvoir servir nos membres. J'anticipe avec grand plaisir de travailler avec notre merveilleux Conseil d'administration de l'ACITN. Je suis certaine que la transition sera harmonieuse, grâce aux conseils et à la vaste expérience qu'ils me transmettront.

J'espère aussi que vous, nos membres, me donnerez des nouvelles. Veuillez communiquer avec moi sur n'importe quel sujet. J'apprécie les expériences et les points de vue uniques qu'apporte chacun de vous. Nos membres sont la raison pour laquelle nous, membres du Conseil, faisons ce que nous faisons. La vision de l'ACITN est de « montrer la voie et promouvoir les meilleurs soins et pratiques en néphrologie grâce à la formation, à la recherche et à la communication. » Nous n'y arriverons pas sans vous.

ADHÉSION

Notre association compte actuellement 337 professionnels en néphrologie en date de décembre 2018. Le Conseil d'administration évolue continuellement pour offrir des avantages durables à tous nos membres. Je sollicite les commentaires de nos précieux membres et j'aimerais avoir votre opinion sur la manière d'augmenter le nombre de nos adhérents. Veuillez nous faire part de vos idées en communiquant avec l'équipe administrative de l'ACITN : **cannt@cannt.ca** ou au 613 507-6053.

Les membres sont la force vive de l'ACITN, puisque ce sont eux qui administrent l'Association. Il y a une foule d'avantages à devenir membre de l'ACITN :

- Accès au journal électronique de l'ACITN;
- Accès à la section réservée aux membres du site www.cannt.ca;
- Tarifs réduits au symposium annuel de néphrologie;
- Accès aux publications Nephrology Nursing Standards and Practice Recommendations et Standards of Nephrology Technical Practice de l'ACITN;
- Promotion et soutien en vue de l'obtention du certificat de spécialisation;
- Possibilités de formation continue

 par le journal en ligne et des webinaires;
- Occasions de saluer l'excellence professionnelle par la remise de prix annuels;
- Accès à des bourses d'études et à des subventions de recherche;
- Promotion de la pratique fondée sur des données probantes;
- Collaboration au sein de la communauté de la néphrologie;
- Le renouvellement de votre adhésion annuelle à l'ACITN contribue à la viabilité de notre association à long terme.

JOURNAL

Vous trouverez la marche à suivre pour soumettre un article pour publication dans notre revue sous la section réservée au « Journal de l'AC-ITN » du site Web de l'ACITN. Nous privilégions les articles qui portent sur de nouvelles données cliniques ou qui traitent de sujets présentant un intérêt particulier pour les infirmières et infirmiers et les technologues en néphrologie.

Envoyez votre article par courriel à Jovina Bachynski au **cannt.journal1@gmail.com**.

Joignez une lettre de présentation contenant les coordonnées de l'auteur principal et une présentation biographique d'une phrase (titres, emploi actuel et lieu de travail) pour chaque auteur.

Le Journal de l'ACITN est publié quatre fois par année sous forme électronique. La revue est une publication soumise à l'examen d'un comité de lecture, et seuls les articles originaux, révisés par des pairs, sont acceptés. Des occasions de publicités et des possibilités de formation parrainées par des entreprises sont offertes.

COMMUNICATIONS

Nous continuons d'élaborer de nouvelles stratégies pour mobiliser nos membres et leur transmettre des renseignements pertinents en temps opportun. Your CANNT Connection est un bulletin d'information bimensuel transmis par courrier électronique qui vise à offrir à nos membres des renseignements ciblés, personnalisés et correctement segmentés. Nous tâchons également de faire en sorte que le contenu soit simple, direct, concis et utile, de facon à fidéliser les lecteurs. Si vous avez une question, une idée ou un événement à promouvoir, veuillez contacter notre directrice des communications, Ethan Holzer.



Site Web de l'ACITN (www.CANNT.ca/fr) Twitter : @CANNT1

CONGRÈS ANNUEL

Le congrès CANNT 2018, « Notre passé guidera notre avenir », a eu lieu dans la ville de Québec du 25 au 27 octobre 2018. Échanger avec les fournisseurs de soins de santé et les patients qui ont vécu et passé à travers les stades variés de la prestation de soins en néphrologie a été inspirant. Il était tout à fait incroyable de voir d'où nous venions, la manière dont nous continuons d'avancer et où nous sommes aujourd'hui. La créativité, l'innovation et le courage démontrés par nos collègues, au cours de l'histoire des soins en néphrologie, étaient stimulants, encourageants et tout simplement extraordinaires! Nos collègues continuent d'innover et de créer, et nous démontrent qu'il faut remettre en question le statu quo, penser de façon innovante et ne pas craindre l'échec. Sans échec, il n'y a pas de progrès! Le comité organisateur s'est vraiment surpassé! Un gros merci au comité organisateur pour leur travail acharné et leur dévouement à nous offrir un congrès extrêmement dynamique.

FINANCES

En tant qu'association professionnelle « sans but lucratif », notre objectif est de créer de la valeur pour nos membres conformément à notre mission et à notre vision. Nous continuons d'explorer des occasions de développement, de collaboration et de financement pour maintenir la viabilité de notre association. Comme la transparence améliore la cohérence et la cohésion de notre association, nos membres sont invités à consulter le rapport annuel 2018 de l'association sur le site Web de l'ACITN

(https://www.cannt.ca/en/about/ major-activities, en anglais).

Krista Smith Présidente élue et trésorière de l'ACITN 2018-2020

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A cross-sectional study measuring cobalt levels in pediatric CKD patients

By Lisa Wolfs, Liju Yang, Vladimir Belostotsky, Shih-Han S. Huang, Chris McIntyre, Guido Filler

ABSTRACT

Objectives: Cardiomyopathy is a leading cause of death of pediatric patients with chronic kidney disease (CKD) when they reach adulthood (Filler, 2011). Although many secondary effects of high levels of cobalt (Co) may cause cardiac dysfunction seen in pediatric patients with CKD, their plasma Co levels are understudied (Filler, 2011).

Design: Ancillary cross-sectional study to a prospective longitudinal randomized controlled trial.

Participants: 36 children and adolescents four to 18 years of age with CKD.

Interventions: One to six trace element measurements per patient. Cystatin C (CysC) estimated glomerular filtration rate (eGFR) was calculated using the Filler formula. Plasma

ABOUT THE AUTHORS

Lisa Wolfs, MPH, BSc, RN, Children's Hospital, London Health Sciences Centre, London, ON

Liju Yang, PhD, Pathology and Laboratory Medicine, Schulich School of Medicine and Dentistry, University of Western Ontario, London, Ontario

Vladimir Belostotsky, MD, PhD, FRCPCH (UK), Department of Paediatrics, Division of Paediatric Nephrology, McMaster Children's Hospital, Hamilton, Ontario

Shih-Han S. Huang, MD, PhD, FRCPC, Department of Paediatrics, Division of Paediatric Nephrology, Children's Hospital

Chris McIntyre, MD, PhD, Department of Paediatrics, Division of Paediatric Nephrology, Children's Hospital, Lilibeth Caberto Kidney Clinical Research Unit, London Health Sciences Centre, Department of Medicine, Division of Nephrology, Schulich School of Medicine and Dentistry, University of Western Ontario, London, Ontario

Guido Filler, MD, PhD, FRCPC, Department of Paediatrics, Division of Paediatric Nephrology, Children's Hospital, Lilibeth Caberto Kidney Clinical Research Unit, London Health Sciences Centre, Department of Medicine, Division of Nephrology, Department of Pathology and Laboratory Medicine, Schulich School of Medicine and Dentistry, University of Western Ontario, London, Ontario

Address for correspondence: Lisa Wolfs, London Health Sciences Centre, 800 Commissioners Road East, Room B1-138A, London, Ontario, Canada N6A 529. Email: **lisa.wolfs@lhsc.on.ca** Co levels were measured using High Resolution Sector Field Inductively Coupled Mass Spectrometry (HR-SF-ICP-MS). Anthropomorphic data and blood parameters were collected from our electronic chart program. Water Co data were obtained from the Ontario Water (Stream) Quality Monitoring Network.

Primary and secondary outcome measures: Primary outcomes: plasma Co levels; secondary outcomes: age, season, CysC, CysC eGFR, and Co levels in environmental water.

Results: Median interquartile range (IQR) eGFR was 51 mL/min/1.73 m² (35 to 75 mL/min/1.73m²). The median Co level was 0.39 μ g/L (0.29 to 0.52 μ g/L), which was significantly greater than the mean of the reference interval of 0.31 μ g/L (0.14 to 0.49 μ g/L, p<0.0035, Wilcoxon signed rank test). Eighteen patients had at least one set of Co levels above the published reference interval. Although the highest values (up to 5.31 μ g/L) were found in patients with the lowest eGFR, Co levels did not correlate with CysC eGFR.

Conclusions: This study suggests that pediatric patients with CKD have elevated plasma levels of Co. This may be the result of environmental exposure and low eGFR. As Co is known to induce cardiomyopathy (i.e., leading cause of death in children with CKD), it may be necessary to monitor Co levels in patients with an eGFR<30 mL/min/1.73m².

INTRODUCTION

Cobalt (*Co*, atomic number 27), the 33rd most abundant element, has one stable isotope, 26 known radioactive isotopes, and occurs naturally in rock, soil, water, plants and animals (Leyssens, Vinck, Van Der Straeten, Wuyts, & Maes, 2017). Natural sources include dust, seawater spray, volcanoes, forest fires, and biogenic emissions. Man-made sources include the burning of fossil fuels, sewage sludge, phosphate fertilizers, mining and smelting of cobalt ores, processing of cobalt alloys, and industries that use or process cobalt compounds. Surface water and groundwater concentrations of cobalt are low, below 1 μ g/l in pristine areas and 1 to 10 μ g/l in populated areas. Surface water and groundwater concentrations can be much higher in mining and agricultural areas (Kim, Gibb, & Howe, 2006).

Cobalt has a necessary biological role as metal constituent of vitamin B12. Excessive exposure, however, has been shown to induce various adverse health effects (Leyssens et al., 2017). Oral exposure can result in unfavourable effects on the respiratory, cardiovascular, hematological, hepatic, renal, endocrine, and neurological systems (Paustenbach, Tvermoes, Unice, Finley, & Kerger, 2013; Agency for Toxic Substances and Disease Registry [ATSDR], 2004). The renal manifestations of *Co* exposure are somewhat inconsistent, ranging from renal impairment in humans (Barborik & Dusek, 1972), increase of relative weight of the kidneys in a rodent model (Bucher et al., 1990), to no observed effects with exposure in a swine model (Kerfoot, Fredrick, & Domeier, 1975).

Cobalt leaves the body slowly through renal excretion (ATSDR, 2004; Tvermoes et al., 2014). The impact of chronic kidney disease (CKD) on *Co* levels is understudied, and the scant literature is limited to patients undergoing hemodialysis (HD) (Curtis, Goode, Herrington, & Urdaneta, 1976; Prodanchuk, Makarov, Pisarev, Sheiman, & Kulyzkiy, 2014). In a recent study of adult patients on hemodialysis, high *Co* levels (about twice normal) remained unimpacted with ongoing HD over time (Tonelli et al., 2018). The reason for the elevated *Co* level in adult HD is not understood, and anephric patients have particularly elevated *Co* levels (Curtis et al., 1976). It is hypothesized, therefore, that *Co* level should already accumulate in CKD prior to the initiation of renal replacement therapy. The authors are unaware of any studies on *Co* levels in children with CKD.

Co accumulation in CKD is of particular interest as elevated *Co* levels (in serum and hair) are associated with cardiomyopathy (Alusik, Cernohorsky, & Barborik, 1982; Barborik & Dusek, 1972; Manifold, Platts, & Kennedy, 1978; Paustenbach et al., 2013). The association between *Co* and cardiomyopathy was first described when multiple patients succumbed to cardiomyopathy after drinking beer that had *Co* added as a foam control substance (Morin, Foley, Martineau, & Roussel, 1967; Olsen, 1972); subse-

quently, adding *Co* as a foam control agent was discontinued. Cobalt cardiomyopathy, however, is re-emerging (Packer, 2016).

Unfortunately, cardiorenal syndrome type IV (CRS-IV) is the leading cause of death in pediatric patients with CKD when they reach adulthood (Filler, 2011). CRS-IV is characterized by decreased cardiac function, and/or cardiac hypertrophy, and/or increased risk of cardiovascular events, as a consequence of CKD (Clementi et al., 2013). Although CRS-IV can have many facets, cardiomyopathy is definitely a major component (Matteucci et al., 2006). Several pediatric studies have shown that trace elements are altered in CKD in children (Filler, Belostotsky, Kobrzynski, Huang, & Yang, 2017; Filler & Felder, 2014; Filler, Kobrzynski, et al., 2017). Although Co data in pediatric patients with CKD are elusive, the authors hypothesized that, similar to patients on dialysis, there would be elevated *Co* levels in pediatric patients with CKD who were not yet receiving dialysis treatments. The authors also hypothesized that levels would increase with worsening glomerular filtration rate (GFR).

METHOD

Study Design

The study adhered to the Declaration of Helsinki. The Research Ethics Board of the University of Western Ontario approved the study as part of an intervention study on zinc supplementation in patients with CKD centred at McMaster University (NCT02126293; HC #172241; REB #104976). Patients were recruited from April 2014 to April 2016. Given that almost all patients enrolled within the first three months had elevated *Co* levels, the authors created this ancillary cross-sectional study to specifically analyze the elevated trace elements in this population. The initial study focused on patient plasma zinc level, whereas the secondary outcome was the patient plasma trace element level.

Study Population

See Figure 1 for inclusion and exclusion criteria. Thirtyeight patients were approached. One patient declined to participate after enrolment and one patient had a sample collection error. The authors performed an interim analysis on 36 study patients (16 females [44%], 20 males [56%]; average age 11.85 ± 4.5 years, age range 4.42-18.98 years) with various renal pathologies and diagnosed



Multiple measurements: measurements taken over multiple clinic visits *Repeat measurements: measurements analyzed on the same day and from the same blood sample

, *Figure 1*. Patient Flow Chart. Of the 38 subjects assessed for eligibility in the study, we included 36 in our analysis. These 36 patients had 94 trace element panel measurements.

with CKD (as per the KDIGO guidelines [KDIGO, 2009]) using the modified Schwartz formula (Schwartz et al., 2009) at the London Health Sciences Centre, a tertiary pediatric nephrology centre (Table 1). Patients with CKD stage 1 (eGFR> 90 mL/min/1.73 m²) to stage 5 (<15 mL/min/1.73 m²) were included in the study. Patients receiving hemodialysis treatments were excluded from the study because the dialysis water could further affect the patients' *Co* levels. Furthermore, dialysis patients routinely receive supplementation with a water-soluble vitamin (Replavite[®]), which contains cyanocobalamin as a potential

Table 1. Patient Characteristics

Variable	n (%)
Gender	
Male	20 (56%)
Female	16 (44%)
Age group (years)	
4 to 10	18 (50%)
11 to 15	7 (19%)
16 to 18	11 (31%)
Primary Diagnosis	
Hereditary	
Renal dysplasia	11 (31%)
Metabolic disorders	5 (14%)
Nephronophthisis	2 (6%)
Autosomal recessive polycystic kidney disease	2 (6%)
Autosomal dominant polycystic kidney disease	1 (3%)
Congenital nephrotic syndrome	1 (3%)
Alport syndrome	1 (3%)
Acquired	
Reflux nephropathy	4 (11%)
Hemolytic Uremic Syndrome	3 (8%)
Glomerulonephritis/ Focal segmental glomerulosclerosis	3 (8%)
Tubulopathy	2 (6%)
Ischemic renal injury	1 (3%)
Kidney Transplant	
Yes	13 (36%)
No	23 (64%)

source of *Co.* Since this was an ancillary study, it did not specifically select for the stage of CKD, the patient's age, or the location of the patient's residence, which could introduce potential bias. Patients also had different numbers of repeated samples, depending on their clinic visits. Patients did not record their fluid or food intake, which could influence the results. To address potential bias due to contaminated drinking water, the authors matched the postal code of the patient's home with provincial 2014 water quality data.

Experimental Methods

Estimated GFR was calculated using the Filler formula (Filler & Lepage, 2003) using the new international reference materials (Grubb et al., 2010). Plasma samples were collected in BD K2-EDTA Royal Blue Vacutainer tubes (Reference #368381). Co levels were measured using High Resolution Sector Field Inductively Coupled Mass Spectrometry (HR-SF-ICP-MS). Total Imprecision (CV) of the Co measurements were 1.8% at low concentration, (1.20 μ g/L), 1.5% at medium concentration (1.70 μ g/L), and 1.6% at high concentration (3.72 μ g/L). Age-specific reference ranges are between 0.14 and 0.49 µg/L (Pathology and Laboratory Medicine [PaLM], 2017). However, this reference range was derived from mostly older adults. The authors, therefore, used a published reference interval derived from healthy subjects aged three to 79 years, which was up to 0.23 μ g/L (Haines, Saravanabhavan, Werry, & Khoury, 2017). Anthropomorphic data (patient height measured by a "stadiometer" required to calculate the Schwartz eGFR), the first three digits of patients' postal codes, and creatinine and cystatin C levels were collected from the hospital's electronic chart program, PowerChart. Data were entered into Excel for Mac 2011, version 14.4.4.

Data analysis was performed using GraphPad Prism 5 for Mac OS X, version 5.0f, and HLM 7.01, Scientific Software International, Inc., Skokie, IL, USA. Data were analyzed for normal distribution using the D'Agostino & Pearson omnibus normality test. As most data were normally distributed, parametric methods were used for all statistical tests, with the exception of the Co levels and estimated glomerular filtration rate (eGFR), which were expressed as median and interquartile range (25th and 75th percentiles). Spearman's rank correlation analysis was used to analyze the correlation analysis of *Co* levels that were not normally distributed. The Wilcoxon signed rank test was used to compare the *Co* levels with the 50th and 97.5th percentiles, as Co levels were normally distributed. A repeated measures analysis was conducted to determine whether the results of repeated measurements (from the same day) affected the original results.

Heat maps depicting *Co* levels in drinking water were generated using data collected by the Government of Ontario for their Provincial (Stream) Water Quality Monitoring Network, and only the most recent data were used (Ontario Ministry of the Environment and Climate Change, 2014). The station coordinate data (found at https://files.ontario.ca/moe_mapping/downloads/2Wa-ter/PWQMN1.xlsx) were used to determine the longitude and latitude of each testing station in order to generate the map. Since each station had a varying number of results, only the most recent measurement was used, unless that measurement was a negative number, in which case the second most recent measurement was used. Measurements used in the maps were taken between spring and winter of 2014. The *Co* measurement at each station, and the longitude and latitude of each station were then uploaded in two separate files to open source mapping software (www. openheatmap.com). Patients' locations in Southern Ontario were mapped using the first three digits of their postal codes (data available on request).

RESULTS

Thirty-six children and adolescents with CKD, and at least one set of Co data were included in the study (Figure 1). Median eGFR was 51 mL/min/1.73 m² (35 to 75 mL/min/1.73 m²). Among these 36 patients, there were 94 Co levels measured. Co levels were not normally distributed (D'Agostino & Pearson omnibus test p-value <0.0001). The median *Co* level was 0.39 μ g/L (0.29 to 0.52 μ g/L), which was significantly greater than the mean of the reference interval of 0.31 μ g/L in our laboratory (0.14 to 0.49 µg/L, p<0.0035, Wilcoxon signed rank test). Eighteen patients had at least one set of *Co* levels above the published reference interval. When using the 95th percentile of the published reference interval by Haines et al. (2017), only three patients had normal values. The Co measurements ranged from 0.20 to 5.31 μ g/L. The results of 27 of the 94 total tests (28%) were above 0.49 µg/L. However, the Co levels were not significantly greater than the 97.5th percentile of the reference interval of 0.49 μ g/L using older adults in our laboratory (Wilcoxon signed rank test). By contrast, the Co levels were highly significantly greater than the 95th percentile published by Haines et al. (2017) (p<0.0001). There was no correlation between the Co levels and the eGFR (Spearman r=-0.1209) (Figure 2). Figure 2 shows the



Cobalt vs. CysC eGFR

Figure 2. Relationship between Cystatin C (CysC) estimated glomerular filtration rate (eGFR) and cobalt levels.

relationship between Cystatin C (CysC) eGFR and *Co* levels. Although the correlation analysis did not reach statistical significance (Spearman r = 0.1148, p = 0.142), the highest levels were observed at the lowest eGFR. The equation for the non-linear fit was a one-phase decay formula using the format Y=(Y0 - Plateau)*exp(-K*X) + Plateau, where Y0 was 11.97, Plateau was 0.3928, K was 0.2851, Half Life was 2.431, Tau was 3.508 and Span was 11.58. In patients with repeated *Co* levels, there was no statistically significant change between the first and last measured levels, and the changes were not significant on repeated measures tests (data not shown).

Although food may contribute more to cobalt levels than water, drinking water cobalt concentrations were at levels exceeding 1.0 ug/L at almost 100 water stations in Ontario (Ontario Ministry of the Environment and Climate Change, 2014), which is the safe limit for livestock (Agriculture and Agri-Food Canada, 2009). The concentrations of the drinking water cobalt content are provided in Figure 3. Importantly, no recommendations for humans have been published by the World Health Organization or Ontario government. The *Co* levels measured in water ranged from undetectable to 67.4 µg/L with a median level of 0.355 (0.184 to 0.581 µg/L). A significant proportion of measurements were greater than 1 µg/L (Figure 3).



Lookup Concentration -0.0787 0.237 0.552



Comparing the two maps to a map of the patients' locations from the study, the authors found that, although some groupings of patients corresponded to the areas of high *Co* (such as Windsor, St. Thomas, and Owen Sound, n=7), others were located in areas of low concentrations (Figure 4). The patient with the highest *Co* level was from a low *Co* drinking water location that had the lowest GFR. Another patient from an area with high drinking water exposure had a high level despite having relatively stable GFR of 43 mL/min/1.73 m². The mapped *Co* data show higher concentrations grouped along the Detroit and Saint Clair Rivers, as well along as the shores around Lake Erie (Ontario Ministry of the Environment and Climate Change, 2014).

Cobalt Concentration at All Drinking Water Stations



2014 Data all Ontario Drinking Water Stations

Figure 4. Cobalt levels in water stations across Southwestern Ontario (Ontario Ministry of the Environment and Climate Change, 2014).

DISCUSSION

This study demonstrates a high prevalence of elevated *Co* levels in pediatric patients with CKD stages 1 to 4, and may be even higher in patients on dialysis. The authors did not find a clear correlation between drinking water concentration and *Co* levels.

Homeostasis of *Co* depends on uptake and elimination. Uptake occurs through different types of environmental exposures, namely through air, water, food, and soil. Although this study did not show a clear relationship between *Co* drinking water levels and *Co* measurements, almost 100 drinking water stations in Ontario had *Co* levels greater than 1.0 μ g/L, exceeding the recommended levels for livestock (Agriculture and Agri-Food Canada, 2009).

Although previous studies have shown elevated Co levels in dialysis patients (Curtis et al., 1976; Tonelli et al., 2018; Tonelli et al., 2009), the authors are unaware of any published work showing high Co levels in pediatric patients with CKD. Since many pediatric patients with CKD have high output renal failure and develop polydipsia, their exposure to Co in drinking water is several-fold greater than the general population. Combined with the fact that *Co* is mainly eliminated through the kidneys (Tvermoes et al., 2014), this vulnerable population's environmental exposure to Co in drinking water may pose a danger, especially if they have polyuria and polydipsia, and drink contaminated water. The authors suspect that, in addition to the patients' low Co clearance, their significantly greater exposure to Co in drinking water is one possible reason for their high Co levels. Many of the patients were not from the highly-polluted areas. However, the highest Co level was observed in a patient with a very low GFR, despite living in an area with low *Co* exposure. The authors believe that the high-water intake with CKD and low GFR are two additional factors that result in the high prevalence of elevated Co in these patients.

STRENGTHS AND LIMITATIONS

Strengths of the study include a reasonable number of patients for a pediatric pilot study, as well as its cross-sectional design in combination with longitudinal data. An additional strength is the high precision of the instruments used to measure the Co levels. There are a number of limitations. More subjects would have led to more precise data, and the patient cohort had a bias towards milder CKD stages, which could have potentially minimized the *Co* levels seen in this population. Additionally, although the reference intervals that were used were specific to the authors' catchment area and to the equipment used to measure plasma trace elements at this site, they were based on small patient numbers and have not been published. The authors did not assess for the type of water that was consumed or sources of Co in food. None of the patients was prescribed vitamin supplements with vitamin B12. However, the authors cannot completely rule out that parents were not supplementing vitamins. The data may also not be generalizable, as water quality may vary in other parts of the world. Furthermore, the authors did not compare echocardiography findings with Co levels. This is subject to a future study, which will also assess dietary Co intake. If markers of left ventricular function such as ejection fraction were correlated with Co levels, this would become very important.

Despite these limitations, the data robustly demonstrate a high prevalence of elevated *Co* levels in children with CKD. There was a trend toward higher *Co* levels with worsening kidney function. Our data would favour monitoring *Co* in pediatric patients with CKD, especially when they progress to CKD stage 4 or start dialysis.

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CONTRIBUTORS' STATEMENT

Contributors GF and VB articulated the conceptual framework for both the original RCT study and this ancillary study. GF developed the analytical approach, and LW and GF analyzed the data. LW and GF drafted and edited the manuscript. CM, VB, SHSH and LY contributed to the interpretation of data, added intellectual content during manuscript preparation, and provided valuable feedback on various aspects of the manuscript. All authors read and approved the final manuscript.

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Predicting factors of spiritual well-being in patients receiving hemodialysis

By Rajkumari Jugjali, Kantaporn Yodchai, and Ploenpit Thaniwattananon

ABSTRACT

Purpose: The purpose of the study was to identify the predicting factors of spiritual well-being of patients receiving hemodialysis (HD).

Methods: This was a cross-sectional study of 100 patients who were receiving HD. Inclusion criteria used to select participants were: (1) age 18 years or older; (2) able to communicate in or read and write the Nepali language; (3) receiving HD for three months or more; (4) able to provide informed consent; and (5) no acute symptoms such as dyspnea and vomiting. Tools used to collect data included the demographic data form, Fatigue Assessment Scale (FAS), Medical Outcomes Study Social Support Survey (MOS-SS), Religiosity Assessment Scale (RAS), and Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (FACIT-Sp-12). Data were analyzed using descriptive and inferential statistics (standard multiple regression).

Results: The participants were between the ages of 18–78 years (M= 40.64; SD = 13.72), and 63% were males. Multiple regression analysis demonstrated that fatigue (β = -.22, p < .05), social support (β = .23, p < .05), and religiosity (β = .22, p < .05) could statistically predict the spiritual well-being in patients receiving HD. These independent variables (fatigue, social support, and religiosity) comprised the total variance of 19.8% in spiritual well-being.

Conclusion: Fatigue, social support, and religiosity were identified as the predictors of spiritual well-being. This result can aid healthcare providers in planning appropriate strategies to enhance spiritual well-being while receiving HD.

Key words: hemodialysis, predicting factors, spiritual well-being

End-stage renal disease (ESRD) is a chronic and irreversible disease that is managed with hemodialysis (HD), peritoneal dialysis (PD), kidney transplant, or conservative

ABOUT THE AUTHORS

Rajkumari Jugjali, MSN, RN, Faculty of Nursing, Prince of Songkla University, Thailand

Kantaporn Yodchai, PhD, RN, Assistant Professor, Faculty of Nursing, Prince of Songkla University, Thailand

Ploenpit Thaniwattananon, PhD, RN, Assistant Professor, Faculty of Nursing, Prince of Songkla University, Thailand

Address for correspondence: RajkumariJugjali, Faculty of Nursing, Prince of Songkla University, Hat Yai, Thailand.

Email: rjugjali@gmail.com

care. In the United States, 63.1% of patients with ESRD were managed with HD (USRDS, 2016). Similarly, the practice of managing ESRD cases with HD is also increasing and evolving in Asia (Prasad & Jha, 2015). HD is a widely used renal replacement therapy in Nepal (Sharma et al., 2009). Patients who depend on HD treatment as a life-sustaining therapy face various personal stressors and develop feelings of dependency on medical staff, fluid and food restriction, and the inability to continue employment (Shinde & Mane, 2014). Due to continued stress, they may experience feelings of hopelessness, helplessness, and despair, and contemplate existential questions about the meaning and purpose of their lives (Alshraifeen, 2015). The difficulty in finding meaning and purpose in life may result in a deficit in spiritual well-being (Bulkley et al., 2013; Promkaewngam, Pothiban, Srisuphan, & Sucamvang, 2014).

The patient should be considered as a whole person, and healthcare providers must address physical, psychological, social, and spiritual aspects (Sulmasy, 2002). Spiritual well-being is vital for human life and is defined as individuals being at peace with themselves, having a sense of meaning and purpose in life, and finding comfort from their beliefs (Canada, Murphy, Fitchett, Peterman, & Schover, 2008). Previous studies reported decreased levels of spiritual well-being in patients receiving HD (Reig-Ferrer et al., 2012; Ebrahimi, Ashrafi, Eslampanah, & Noruzpur, 2014; Eslami, Rabiei, Khayri, Nooshabadi, & Masoudi, 2014).

A low level of spiritual well-being was associated with various negative consequences in different groups of patients living with chronic disease, such as hopelessness, desire to hasten death, and suicidal ideation (McClain, Rosenfeld, & Breitbart, 2003), anxiety (Rawdin, Evans, & Rabow, 2013), and depression (Dalmida, Holstad, Diiorio, & Laderman, 2009; Rawdin et al., 2013). Poor mental health was also reported by patients receiving HD who had low spiritual well-being (Martinez & Custodio, 2014).

Factors associated with spiritual well-being have been explored in studies with cancer survivors using structural equation modelling (SEM) (Lo, Zimmermann, Gagliese, Li, and Rodin, 2011). The investigators confirmed a positive relationship between religiosity, social support, and spiritual well-being, and a negative relationship between physical suffering and spiritual well-being. Religiosity refers to religious affiliation, religious activities, and religious beliefs that are expressed in intrinsic and extrinsic ways (Koenig, King, & Carson, 2012). Social support is the emotional/ informational, tangible, affectionate, and positive social interaction support received (Sherbourne & Stewart, 1991). Fatigue refers to the mental and physical weakness experienced (Michielsen, De Vries, & Van Heck, 2003). Studies conducted on the spiritual aspect in patients receiving HD are still evolving (Eslami et al., 2014). The paucity of studies conducted in patients receiving HD revealed an association between spiritual well-being with fatigue (Ebrahimi et al., 2014), social functioning (Ebrahimi et al., 2014; Kharame, Zamanian, Foroozanfar, & Afsahi, 2014), and religiosity (Reig-Ferrer et al., 2012). In view of the gaps in literature, the researchers in the present study sought to explore whether fatigue, social support, and religiosity predict the spiritual well-being in patients receiving HD.

METHOD

Design

This was a cross-sectional study conducted among 100 patients who were receiving HD.

Participants

The participants were selected purposively based on the following inclusion criteria: (1) 18 years or older; (2) able to communicate, or read and write the Nepali language; (3) receiving HD for three months or more; (4) able to provide informed consent; and (5) no acute physical symptoms such as dyspnea and vomiting.

Setting

The study was conducted in the National Kidney Center, located in Kathmandu, the capital city of Nepal. This referral centre has the largest capacity to provide HD service to Nepalese patients living with ESRD.

Measurement

Data collection was performed using the demographic data form, Fatigue Assessment Scale (FAS), Medical Outcomes Study Social Support Survey (MOS-SS), Religiosity Assessment Scale (RAS), and Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (FACIT-Sp-12).

The FAS questionnaire developed by Michielsen, De Vries, and Van Heck (2003) was used to assess perceived fatigue. The FAS is composed of 10 items, and measures the mental and physical dimension of fatigue. It is a five-point Likert scale (1 = "Never"; 2 = "Sometimes"; 3 = "Regularly"; 4 = "Often"; and 5 = "Always") and has good internal reliability with Cronbach's alpha of .90 (Michielsen et al., 2003).

The MOS-SS was developed by Sherbourne and Steward (1991). It is a 19-item scale that measures four different dimensions of social support: emotional/informational, tangible, affectionate, and positive social interaction. This is also a five-point Likert scale, and the items are scored from 1 (*None of the time*) to 5 (*All of the time*). The scale has internal consistency with Cronbach's alpha of .97 (Sherbourne & Stewart, 1991). Religiosity of the participants was examined by the RAS developed by the researchers of the present study on the basis of questionnaires of religious constructs. Two dimensions (religious practice and religious beliefs) were measured. This scale consists of six items, with response selection ranging from 1 to 4 (1 = "Strongly disagree"; 2 = "Disagree"; 3 = "Agree"; and 4 = "Strongly agree").

The FACIT-Sp-12, developed by Peterman, Fitchett, Brady, Hernandez, and Cella, (2002), was used to measure the level of spiritual well-being of the participants. The scale is composed of 12 items with four items in each of the three subscales (meaning, peace, and faith). This is a five-point Likert scale, and the items are scored from 0 (*Not at all*) to 4 (*Very much*) (Bredle, Salsman, Debb, Arnold, & Cella, 2011). This scale also has good internal consistency with Cronbach's alpha of .87 (Peterman et al., 2002).

In the present study, Cronbach's alpha for FAS, MOS-SS, RAS, and FACIT-Sp-12 were .72, .97, .84, and .79, respectively when pretested with 20 patients receiving HD who met the inclusion criteria of this study.

Data Collection Procedure and Ethical Consideration

Data collection was performed after obtaining ethical approval from Prince of Songkla University, Nepal Health Research Council and the National Kidney Center. Eligible participants were identified with the help of a registered nurse. The participants were aware of the objectives, importance of the study, and procedures of data collection. The researcher obtained informed consent from the participants.

DATA ANALYSIS

Descriptive statistics were used to analyze the demographic characteristics of the participants. Predicting factors of spiritual well-being were assessed using standard multiple regression. Assumptions of normality, linearity, homoscedasticity, multicollinearity, and non-autocorrelation were examined before performing the analysis. An alpha level of less than .05 was regarded as statistically significant.

Results

Demographic characteristics of the patients receiving hemodialysis. One hundred patients receiving HD participated in the study. The demographic characteristics of the study participants are presented in Table 1. Fortyfour percent of the participants were between the ages of 18 to 35 years old, and approximately two-thirds (63%) were male. Seventy-two percent of the participants were married and followed the Hindu religion. Regarding employment status, 76% were unemployed and 67% of the participants reported that their monthly family income was inadequate. Regarding the duration on HD, 76% of participants had been receiving HD for less than three years.

Predictors of spiritual well-being among patients receiving hemodialysis. After assumptions were met, standard multiple regression was applied to identify the predicting factors of spiritual well-being. The variables (fatigue, social support, and religiosity) accounted for the total of 19.8% variance in the spiritual well-being of participants. Fatigue ($\beta = -.22$, p < .05), social support ($\beta = .23$, p < .05), and religiosity ($\beta = .22$, p < .05) were the predictors of spiritual well-being in patients receiving HD (Table 2).

Table 1. Demographic Characteristics of Patients Receiving	g
Hemodialysis (n=100)	

Variable	Percentage
Age (years)	
18 to 35	44
36 to 55	42
> 55	14
Gender	
Male	63
Female	37
Marital Status	
Married	72
Single	28
Religion	
Hindu	72
Buddhist	20
Christian	8
Employment status	
Unemployed	76
Housewife	8
Business	5
Agriculture	2
Student	1
Other	8
Monthly family income adequate	
Yes	33
No	67
Duration diagnosed with renal disease	
3 months – 3 years	61
4 years – 6 years	23
≥7 years	16
Duration receiving hemodialysis	
3 months – 3 years	76
4 years – 6 years	18
≥7 years	6

DISCUSSION

This study aimed to identify the predictors of spiritual well-being in patients receiving HD. Our findings demonstrated that the variables of fatigue, social support, and religiosity could statistically predict spiritual well-being in patients receiving HD.

Fatigue is a multidimensional and multifactorial problem (Artom, Moss-Morris, Caskey, & Chilcot, 2014) common in patients receiving HD. In the present study, all of the participants experienced fatigue. Fatigue affects daily functioning, quality of life, and survival (Bossola, Vulpio, & Tazza, 2011); it can lead to difficulty in performing simple daily activities such as walking upstairs and carrying out household chores (Horigan, Schneider, Docherty, & Barroso, 2013). These restrictions in physical activities due to fatigue can affect an individual's self-care abilities, employment activities, and social performance (Biniaz, Tayybi, Nemati, Shermeh, & Ebadi, 2013). Being unable to earn income and perform activities of daily living will contribute to feelings of low self-esteem and demoralization (Gerogianni & Babatsikou, 2013) that may decrease one's sense of meaning and purpose in life. In the present study, 76% of participants were unemployed. The findings in this study are validated by a previous study undertaken by Lewis, Salins, Rao, and Kadam (2014) in cancer patients that reported fatigue as a negative predictor of spiritual well-being.

Increased social support results in the following effects: decreased level of depression, increased perception of quality of life, increased access to healthcare services, increased patient compliance with treatment regimen, and enhanced immune system in patients (Cohen et al., 2007). In addition, a higher level of social support is also correlated with increased survival in patients receiving HD (Spinale et al., 2008). Social support helps an individual to cope with problems that occur due to disease, thus enabling them to adapt to treatment that leads to satisfaction in their life (Silva et al., 2016). In the present study, 72% of patients were married, which may help them to retain their meaning and purpose in life. Support obtained from their spouses and children may help to reduce the burden of the disease for patients and increase their quality of life; in turn, this may assist the patients to realize the importance of their life. Social support, as a predicting factor of spiritual well-being, was demonstrated in previous studies undertaken in patients living with AIDS (Pace & Stables, 1997) and HIV (Sittipran, 2007). Similarly, a significant relationship was

Table 2. Standard Multiple Regression Ang	lvsis Predictina Spiritual Well-Being	a in Patients Receivina	Hemodialvsis Treatment

Variables	В	SE	β	t	Sig
Fatigue	37	.15	22	-2.36	.02*
Social support	.11	.04	.23	2.37	.01*
Religiosity	.52	.21	.22	2.22	.01*
<i>R</i> = .44	<i>R</i> ² = .198		<i>F</i> = 7.90	*(<i>p</i> < .05)	
<i>SE</i> = 9.6	$R^{2}_{adj} = .173$		a = 16.14		

observed between the spiritual well-being and the social performance of patients receiving HD (Ebrahimi et al., 2014; Kharame, Zamanian, Foroozanfar, & Afsahi, 2014).

Religious belief is used as a coping strategy to relieve suffering and as a source of strength, and is related to decreased depressive symptoms and better quality of life (Lucchetti, Almeida, & Lucchetti, 2012). Religiosity can be considered as one way through which an individual can make sense of their life (Chokkanathan, 2013). In the present study, 72% of participants followed the Hindu religion. The central tenet of Hinduism is acceptance (Whitman, 2007); therefore, the participants in the present study might have accepted their disease condition and HD treatment. This acceptance of their condition may help them to have meaning and purpose in life. Religiosity, as a predictor of spiritual well-being, was supported by a study conducted among undergraduate students (Cecero, Bedrosian, Fuentes, & Bornstein, 2006). A significant positive relationship between the religiosity and spiritual well-being was also demonstrated in a study conducted by Reig-Ferrer et al. (2012) among HD patients.

LIMITATIONS

This study was conducted in only one centre in Nepal; therefore, the generalizability of the results is limited. Fatigue was the factor predicting the spiritual well-being of participants. Psychological stressors such as depression, anxiety, and sleep disorder were not included in the present study.

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IMPLICATIONS AND RECOMMENDATIONS

The key to successful management of patients receiving HD is considering the patient as a whole rather than the sum of biological, psychological, social, and spiritual aspects. The spiritual aspect of patients is usually neglected due to the lack of guidelines on spiritual care, lack of education and training, and lack of time. This present study was conducted with an aim to identify the predicting factors of spiritual well-being. The study revealed social support and religiosity as positive factors, and fatigue as a negative predicting factor of spiritual well-being of patients receiving HD. Hence, nurses can prepare and implement interventions that enhance religiosity and social support. In addition, nurses can assess the level and contributing factors of fatigue, and facilitate management interventions. Future studies are needed to identify which interventions would positively enhance these aspects of spiritual well-being.

CONCLUSION

The present study revealed a significant negative relationship between spiritual well-being and fatigue, and a significant positive relationship between spiritual well-being, religiosity, and social support. In order to improve spiritual well-being in patients receiving hemodialysis, healthcare personnel should consider implementing strategies that improve social support and religiosity, and decrease fatigue.

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Prophylactic management of contrast-induced acute kidney injury in high-risk patients

By Diya Nahar

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ABSTRACT

Contrast-induced acute kidney injury (CI-AKI) has been linked to morbidity and mortality, especially in high-risk patients whose kidney function is compromised. Recently, many studies have been conducted to search for more novel, preventative methods of decreasing CI-AKI. Through a detailed analysis of recent studies, this article discusses recommendations for hydration, N-acetylcysteine, and statin therapy in relation to the prophylactic management of CI-AKI in high-risk patients.

Key words: contrast-induced acute kidney injury, N-acetylcysteine, statin

ABOUT THE AUTHOR

Diya Nahar, ACNP-BC, BSN, RN, is a member of the CANP (California Association for Nurse Practitioners). At the time of original publication in the Nephrology Nursing Journal, the author worked as a hospitalist with PlatinumCare LA, a private Internal Medicine group.

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The administration of iodinated contrast has been documented to be one of the most common iatrogenic causes of acute kidney injury (AKI). The reported worldwide incidence is estimated to be 21.6% in adults, with AKIassociated mortality rates to be 23.9% in adults, though these rates vary across different nations (Susantitaphong et al., 2013). The variance in the reported incidence occurs because contrast-induced AKI (CI-AKI) depends on the type of contrast and definition of CI-AKI used. Despite the variance, it is known that the incidence of CI-AKI is greater in both high-risk patients as well as with the amount of contrast media given (Morabito et al., 2012). High-risk patients are patients who have chronic or acute conditions that may compromise their kidneys, such as chronic kidney disease (CKD), diabetes mellitus, congestive heart failure (CHF), acute hypotension or conditions that cause volume depletion, and ST-elevation myocardial infarctions. These medical conditions cause the filtration function of the kidneys to be diminished. When the body's compensatory mechanisms are not working to maintain kidney function, it increases the risk for AKI from iodinated contrast. Iodinated contrast is filtered through the kidneys, and when compensatory mechanisms are not working to maintain filtration function, the contrast dye accumulates in the filtration system of the kidneys, thereby causing CI-AKI (Solomon & Dauerman, 2010). Another contributor to CI-AKI is when large amounts of contrast media are injected into a patient's blood vessel. Large amounts of contrast media are especially used in angiograms because it requires the healthcare provider to inject several dyes to see the blood vessels to perform an efficient coronary intervention (James et al., 2013). Hence, patients who are at the highest risk for developing CI-AKI are those with compromised kidney function who need to undergo a coronary interventional procedure.

While AKI used to be seen as quick, generally reversible damage to the kidneys, studies have shown that there are short- and long-term deleterious effects that may increase patient morbidity and mortality, especially in patients at high-risk for developing AKI. Some short-term prospective studies have shown that high-risk patients carry the risk of undergoing problems related to worsening comorbidities if renal function is compromised, such as worsening heart failure (Meinel, De Cecco, Schoepf, & Katzberg, 2014). Long-term prospective studies have also found deleterious effects. One study showed that CI-AKI resulted in an increased risk for dialysis, death, and permanent renal insufficiency (Meinel et al., 2014). Because of the short- and long-term effects, the high incidence of CI-AKI in high-risk patients, and no specific treatment for CI-AKI, it is crucial in identifying and adopting a standardized procedure to prevent CI-AKI.

DEFINITION

The definition that is widely used in institutions or prior literature for any type of AKI is an increase of serum creatinine greater than or equal to 0.5 mg/dL from the baseline serum creatinine within a short time span, such as 24 to 72 hours (McDonald et al., 2013). Similarly, CI-AKI is defined as an injury to the kidneys in a narrow timeframe shortly after the administration of iodinated contrast. CI-AKI is commonly defined as a "rise in blood urea nitrogen (BUN), serum creatinine, or a decline in estimated glomerular filtration rate (eGFR) occurring in a narrow time window typically 24 to 72 hours – after administration of iodinated contrast material" (Meinel et al., 2014, p. 2). The American College of Radiology (2013) has defined CI-AKI with the Acute Kidney Injury Network (AKIN) criteria along with AKI occurring within 48 hours after the injection of the iodinated contrast material. AKIN criteria require at least one of three conditions to be met for the condition to be considered an AKI event: a) an absolute increase in serum creatinine levels by greater than or equal to 0.3 mg/dL from baseline, b) a relative increase in serum creatinine by greater than or equal to 50% from baseline, or c) a urine output decreased to less than or equal to 0.5 mL/kg/hour for at least six hours (Lakhal et al., 2011). Because many facilities do not measure urine output in non-critically ill adults, many studies often used the first two AKIN criteria. Other definitions of CI-AKI exist and are used in various studies. This demonstrates the need for a standardized definition of CI-AKI for the results of studies to be comparable.

PATHOPHYSIOLOGY

The pathophysiology that contributes to CI-AKI is complex. When the filtration system of the kidneys is compromised, the contrast material builds up. This not only causes direct tubular toxicity and intraluminal obstruction, but also renal hypoxia and subsequent release of reactive oxygen species (ROS) (Susantitaphong & Eiam-Ong, 2014). Renal hypoxia occurs when oxygen supply does not meet oxygen demand, which results from the reduction of effective blood flow to the kidneys. To further complicate this, when the contrast dye is not readily filtered, the body increases reabsorption of it, which may increase metabolism, and therefore, result in increased oxygen consumption in the kidneys (Susantitaphong & Eiam-Ong, 2014). The process leads to further microvascular damage and renal hypoxia. When intrarenal hypoxia occurs, the imbalance of oxygen supply and demand to the kidneys produces ROS by polymorphonuclear neutrophils at the site of the inflammation (Mittal, Siddiqui, Tran, Reddy, & Malik, 2014). Under the inflammatory pathway, ROS opens the inter-endothelial junctions, which allow the inflammatory cells to cross the endothelial barrier. These inflammatory cells not only clear out foreign particles, but may also cause tissue injury at the site of inflammation (Mittal et al., 2014). Therefore, many aspects of the pathophysiological process can cause CI-AKI, which suggests that more than one pharmacological agent may be helpful in preventing CI-AKI from occurring.

PHARMACOLOGICAL MANAGEMENT

The pharmacological management of CI-AKI is based on the pathophysiological principles of this condition. Though there are multiple preventative modalities currently being researched for CI-AKI, only the most promising or historical therapies will be presented in this article, including intravenous normal saline, N-acetylcysteine, and statins. An analysis of the current research on these therapies will be included to assess its safety and efficacy.

Intravenous Normal Saline

Intravenous hydration with 0.9% sodium chloride (NaCl) is the most proven method in preventing CI-AKI (Weisbord & Palevsky, 2008). There are two mechanisms in which hydration plays a role in preventing CI-AKI. One mechanism involves the expansion of the intravascular space in the kidneys, which suppresses vasopressin secretion, inhibits the renin-angiotensin pathway, and increases the production of renal prostaglandins (Susantitaphong & Eiam-Ong, 2014). All cause vasodilatory effects, which blunt the vasoconstrictive effect of the contrast media on the renal medulla. The second mechanism of intravenous hydration is hypothesized to be involved in attenuating the direct toxic effect of contrast media on tubular cells. This happens by decreasing the concentration of the contrast in the tubular lumen as the increased volume decreases reabsorption of the contrast medium (Susantitaphong & Eiam-Ong, 2014).

It is recommended to administer intravenous normal saline in patients at a rate of 1 mL/kg/hour 12 hours pre-procedure and 12 hours post-procedure (Mueller et al., 2002). In a classical study, a large number of participants (1,620) undergoing coronary angioplasty participated in a randomized controlled trial that assessed whether isotonic or hypotonic fluids would be better in preventing CI-AKI (Mueller et al., 2002). Baseline characteristics, such as age, sex, diabetes mellitus, hypertension, and chronic renal insufficiency, were well-matched between the two groups. The primary endpoint was to measure CI-AKI based on an increase in serum creatinine of at least 0.5 mg/dL within 48 hours. Overall, the normal saline group had a significantly reduced occurrence of CI-AKI at 0.7% compared to 2.0% in the 0.45% NaCl group (Mueller et al., 2002). Therefore, it is apparent that normal saline is a better alternative for preventative therapy with CI-AKI development in high-risk patients than 0.45% NaCl. However, patients with severe left-ventricular dysfunction have an increased risk for fluid overload, and caution should be used with hydration therapy with 0.45% NaCl (Brar et al., 2014). This would reduce the risk of secondary problems, such as pulmonary edema.

Recently, research has focused on finding cost-effective methods for the prevention of CI-AKI. Researchers are trying to determine whether oral hydration or intravenous hydration is superior in preventing CI-AKI in high-risk patients undergoing a coronary intervention. A small study of 102 patients with diabetes who were undergoing a coronary angiography or angioplasty were either hydrated with intravenous normal saline of 1 mL/kg/h or oral mineral water of 1 mL/kg/h (Wróbel, Sinkiewicz, Gordon, & Woźniak-Wiśniewska, 2010). The creatinine clearance was very similar in both groups after 72 hours of the procedure, with 65.3 +/- 23.39 mL/minute in the oral therapy and 73.5 +/- 21.94 mL/minute in the intravenous group (Wróbel et al., 2010). The intravenous group had a larger mean volume of contrast medium injected into the patients, thereby possibly affecting the serum creatinine clearance, yet it was still lower than the creatinine clearance for the oral therapy group. The difference between the two groups was minimal, and the power of the study was limited by its small sample size. Another randomized controlled trial with 225 high-risk patients undergoing coronary angiography and/or percutaneous coronary intervention compared the effectiveness of oral hydration and intravenous hydration for prevention of CI-AKI (Akyuz et al., 2014). The study found that the incidence of CI-AKI was 6.9% with the oral therapy versus 7.3% with the intravenous therapy, indicating that oral hydration is as effective as intravenous hydration in preventing CI-AKI in high-risk patients. However, the study had several shortcomings, including a small sample size along with a statistically insignificant outcome (p = 0.89).

Other studies have been conducted that have been included in meta-analyses. One meta-analysis assessed the results of six prospective randomized controlled trials (Cheungpasitporn et al., 2014). The sample size was large, with 513 patients whose kidney function ranged from normal to CKD Stage 3. Within the intravenous fluid regimen group, 8.1% developed CI-AKI. Of the oral hydration group, 9.5% developed CI-AKI. Because it was a meta-analysis, the two groups could have had heterogeneities due to differences in the study population, which could have affected the results. Despite this, there was no significant difference between the two groups, and it was concluded that oral hydration therapy does not pose more risk in patients with normal to moderately reduced kidney function, with a suggestion of possibly considering it as an outpatient treatment option when giving contrast. While oral hydration may be a more cost-effective option in an outpatient setting with lowrisk patients, the safety and efficacy of oral hydration over intravenous hydration for high-risk patients in preventing CI-AKI are inconclusive and should not be used as a current therapy in acute care settings until further research shows more supporting evidence for the use of oral hydration.

N-acetylcysteine

N-acetylcysteine (NAC) is an antioxidant that has vasodilatory effects. Its mechanism is not fully understood, but it is thought to be involved in minimizing ROS and vasoconstriction after contrast injection, thereby preventing CI-AKI. In healthy patients with a normal renal function or any comorbidities that may compromise renal function, NAC has not shown to have a preventative benefit (Kshirsagar et al., 2004). Previous research by Tepel et al. (2000) was an eye-catching study because it showed a significant difference in the incidence of CI-AKI with NAC. The study had 83 patients with chronic renal insufficiency who had to undergo a computed tomography (CT) with an iodinated contrast agent. The intervention group took a 600 mg antioxidant acetylcysteine (NAC) twice daily with 0.45% NaCl before and after administration of the contrast agent, while the control group received a placebo with 0.45% NaCl. In the intervention group, 2% of the patients had an increase in the serum creatinine concentration 48 hours after administration, compared to 21% in the control group. Though there was a difference between the two groups, the study had shortcomings, including a small sample size and a non-significant *p*-value. However, this study fuelled further research on NAC.

Current research shows a wide array of conflicting results for the use of NAC in high-risk patients to prevent CI-AKI. A study intervention involving 2,308 high-risk patients undergoing angiography received either NAC 1,200 mg orally twice a day or a placebo before and after the angiogram (Berwanger et al., 2011). The high-risk patients were included in the study if they had at least one risk factor for CI-AKI, including age of greater than 70 years old, chronic renal failure, diabetes mellitus, hypotension, or heart failure. There was no significant difference between the intervention and the control groups in the development of CI-AKI within the 48 to 96 hours after angiography (Berwanger et al., 2011). This was a strong, double-blinded, randomized controlled trial with a large sample size, a very similar baseline characteristics among the two groups, and an adequate statistical power of 84%, with a strong methodological quality. One limitation of this study was that providers were able to use other interventions besides hydration to prevent CI-AKI based on their discretion. However, these interventions were minimal and well-balanced between the groups.

In another study, 487 patients with renal dysfunction undergoing cardiac catheterization were randomly assigned to intravenous NAC 500 mg immediately before the procedure or to another group that received 200 mL of normal saline (Webb et al., 2004). Though the study was terminated early because the Data Safety Monitoring Committee deemed it to be futile, it found that the primary endpoint of CI-AKI occurred at 23.3% for the NAC group and 20.7% for the placebo group, with a *p*-value of 0.57 indicating no statistical difference (Webb et al., 2004). This large, randomized controlled trial found that intravenous NAC is ineffective in preventing CI-AKI for high-risk patients. Though some small studies have shown the efficacy of NAC in preventing CI-AKI in high-risk patients, many others with large-scale studies have not (Berwanger et al., 2011; Webb et al., 2004). Therefore, NAC is not a recommended standardized prophylaxis treatment for high-risk patients undergoing a coronary intervention.

Statins

Statin therapy is a newly investigated topic regarding CI-AKI prevention. Statins are known to have an inhibitory effect on hydroxymethylglutaryl coenzyme A reductase, which lowers serum low-density lipoprotein cholesterol concentrations, and therefore, the risk for heart disease (Han et al., 2014). Patients undergoing angiography are normally those who have coronary artery disease and who have been placed on statin therapy already or will be placed on it after the angiography (Han et al., 2014). Some researchers are currently investigating the effect of statin therapy prior to the injection of contrast material with high-risk patients undergoing coronary interventional procedures as a prophylactic management for CI-AKI (Han et al., 2014). While the mechanism may not be fully understood, it is known that statins have a pleiotropic effect (Han et al., 2014). This effect is an anti-inflammatory, antioxidant, and antithrombotic action because it reduces high-sensitivity C-reactive protein levels and oxidative stress, which prevents direct contrast toxicity, such as nephron cell death (Han et al., 2014).

A randomized controlled trial was conducted with 504 statin-naïve patients who were assigned to either 40 mg of rosuvastatin therapy followed by 20 mg/day until discharge versus no therapy until the day of discharge (Leoncini et al., 2014). CI-AKI, defined in this study as an increase in serum creatinine of 0.5 or more within 72 hours after contrast administration, was the primary endpoint analyzed. CI-AKI occurred in 6.7% of the patients in the statin therapy group and 15.1% in the control group with a statistically significant difference (*p* = 0.003) (Leoncini et al., 2014). The study also used intravenous normal saline and oral NAC therapy as a standardized prophylactic regimen for both groups. Though a strong study, NAC and statin therapy may have had a synergistic effect in reducing CI-AKI incidence, therefore contributing to the significantly decreased incidence in the statin therapy group. Another randomized control trial was performed with 410 patients who were either assigned to the atorvastatin group (80 mg within 24 hours before contrast administration and 40 mg right before the procedure) or the control group (no intervention or had standard therapy) (Patti et al., 2011). Patients who had moderate to severe renal dysfunction were hydrated with normal saline, while the others were not. The primary endpoint assessed for CI-AKI within 72 hours post-procedure. Of the patients in the atorvastatin group, 5% developed CI-AKI versus 13.2% in the placebo group (Patti et al., 2011). In addition, secondary endpoints showed that creatinine clearance, C-reactive protein peak levels, and serum creatinine were all significantly lower in the atorvastatin group versus the control group (Patti et al., 2011). These results further lend support to the early use of high-dose statin therapy as an adjunctive pharmacological prophylaxis for CI-AKI in highrisk patients.

A meta-analysis of nine randomized-controlled trials was conducted by Singh et al. (2014). This meta-analysis assessed the role of statin pretreatment in the prevention of CI-AKI. Data from 5,143 patients were analyzed, of whom approximately half received statins while the other half was in the placebo group. The risk of CI-AKI was significantly reduced in the statin therapy group versus the control group of no therapy or NAC therapy, with a risk ratio of 0.47. In patients with renal impairment or diabetes mellitus, there was no significant difference in the degree of beneficial effect of statin therapy on CI-AKI between the intervention and the control groups, but it did show a 45% to 55% risk reduction of CI-AKI with the use of statins. Additionally, the meta-analysis accounted for the co-treatment of NAC in some studies. It found that the beneficial effect of statin reducing the risk of CI-AKI was independent of NAC, with a 54% risk reduction in those who also received NAC and 49% risk reduction in those who did not. The type of statins used was also statistically analyzed. The study found there was a benefit with both atorvastatin and rosuvastatin, but with a risk reduction of 0.38 with atorvastatin and 0.53 with rosuvastatin. Irrespective of the type of statin, pretreatment with a statin had a beneficial role in preventing CI-AKI.

The advent of statin pretreatment in preventing the development or reducing the risk of CI-AKI is promising. Further large-scale studies with the same baseline prophylaxis therapy, such as intravenous normal saline in combination with the same dose and type of statin among homogenous groups, need to be performed. These studies should then be compared to conclude the logistics of statin therapy and implement it as a standardized prophylactic management for CI-AKI.

CONCLUSION

CI-AKI has been receiving more attention over the last several years. While CI-AKI may be an acute episodic event, some studies have shown that an injury to the kidneys may cause devastating effects, especially in high-risk patients. Because CI-AKI may be a potentially preventable condition, it is important to understand some of the effective pharmacological methods. Hydration has always been at the forefront of pharmacological management in preventing CI-AKI. Normal saline has consistently been shown to be more effective and safer than 0.45% NaCl for all patients except for patients with severe heart failure who are at risk of fluid overload. Oral hydration is now being researched as a more cost-effective and less invasive means to reduce the incidence of CI-AKI in high-risk patients, but it has not been shown to be more efficacious in acute care settings with high-risk patients.

NAC is another well-studied prophylactic therapy. Smallscale studies that have been performed with NAC have shown its benefits to be questionable. However, more recent largescale studies have found NAC to be futile, and therefore, it should not be recommended as a standardized prophylaxis regimen until more large-scale studies with strong methodological quality are done to prove NAC is beneficial. At this time, the joint American College of Cardiology/American Heart Association (ACC/AHA) guidelines do not recommend NAC (Anderson et al., 2013).

Statin therapy is a novel prophylaxis therapy for CI-AKI in high-risk patients and has been shown to have beneficial results when used in combination with hydration. While promising, statin therapy is still relatively new and needs to be further researched with the same type and dosage of statin to make the results of the various studies comparable. However, recommendations for and the use of statin pretreatment should be initiated in hospitals because of its safety, benefit, and cost-effective nature. In addition to pharmacological management, it is important to adopt a universal definition of CI-AKI and a baseline risk for AKI before continuing to perform research studies.

Nursing Considerations

It is important to understand that nurses play a crucial role in preventing CI-AKI as well. When a nurse cares for a patient who is to undergo a procedure involving

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iodinated contrast medium, certain precautions should be taken. Recognizing high-risk patients who are more prone to CI-AKI is the most important assessment a nurse can make because it will direct a patient's course of treatment. Another important step in preventing or monitoring CI-AKI is to obtain the patient's baseline kidney function, including serum creatinine, creatinine clearance, estimated glomerular filtration rate, and blood urea nitrogen (BUN). Understanding the pathophysiological process of how CI-AKI can develop should inform nurses of the importance of hydrating their patients before contrast injection. At this time, some of the major methods of preventing CI-AKI are with intravenous hydration using normal saline and the conservative use of contrast dye. In addition to intravenous normal saline, other pharmacological treatments are being researched in the prevention of CI-AKI. Nurses should continue to act as advocates and keep informed of recent studies on the pharmacological prevention of CI-AKI to prevent harm to or withhold beneficial treatment from patients.

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CONTINUING EDUCATION STUDY QUESTIONS

CONTACT HOUR: 2.0 HRS

Prophylactic management of contrast-induced acute kidney injury in high-risk patients

By Diya Nahar, ACNP-BC, BSN, RN

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- 1. The variance in the reported incidence of contrast-induced acute kidney injury (CI-AKI) depends on which two of the factors listed below:
 - a) Amount of contrast media given
 - b) Type of contrast media used
 - c) Stratification of high-risk patients
 - d) Definition of CI-AKI used
 - i.a,b
 - ii. b, d
 - iii. c, d
 - iv. a, c
- 2. The incidence of CI-AKI is greater in high-risk patients. Which patient population is <u>not</u> deemed high risk for CI-AKI?
 - a) Volume depletion
 - b) ST-elevation myocardial infarction
 - c) Volume overload
 - d) Acute hypotension
 - e) None of the above
- 3. There is no standardized definition of acute kidney injury (AKI). One definition of AKI has been developed by the Acute Kidney Injury Network (AKIN). Which of the following conditions is <u>not</u> included in the AKIN criteria for AKI?
 - a) Absolute increase in serum creatinine levels by greater than or equal to 0.3 mg/dL from baseline
 - b) Relative increase in serum creatinine by greater than or equal to 50% from baseline
 - c) Urine output decreased to less than or equal to 0.5 mL/kg/hour for at least six hours
 - d) Decrease in glomerular filtration rate greater than 75% from baseline
- 4. CI-AKI is de3fined as an injury to the kidneys that occurs in a narrow timeframe after administration of a contrast medium. When does this phenomenon typically occur?
 - a) Within 12–24 hours
 - b) Within 24–72 hours
 - c) Within 72–96 hours
 - d) Within one week

- The complex pathophysiology of CI-AKI occurs with diminished kidney function that leads to the accumulation of the contrast material. Which of the following is a direct effect of this build-up?
 - a) Direct tubular toxicity
 - b) Intraluminal obstruction
 - c) Renal hypoxia
 - d) Release of reactive oxygen species (ROS)
 - e) All of the above
- When the contrast material is not readily filtered in the kidneys, certain effects occur, which are outlined below. Place this chain of effects in sequence of occurrence:
 - a) Metabolism is increased.
 - b) Microvascular damage and renal hypoxia occur.
 - c) Reabsorption of the contrast material in the body is increased.
 - d) Oxygen consumption in the kidneys is increased.
 - i. a-c-d-b
 - ii. b-d-a-c
 - iii. c-a-d-b
 - iv. d-c-a-b
- 7. Of the following, which is <u>not</u> a preventative therapy in the pharmacological management of CI-AKI?
 - a) Antibiotics
 - b) Normal saline
 - c) N-acetylcysteine
 - d) Statins
 - e) None of the above
- 8. Intravenous hydration with 0.9% NaCl is effective in preventing CI-AKI. One mechanism by which this occurs involves the expansion of the intravascular space in the kidneys leading to vasodilatory effects that blunt the vasoconstrictive effect of the contrast material.

Which of the following is <u>not</u> an effect of this mechanism?

- a) Suppression of vasopressin secretion
- b) Inhibition of the renalangiotensin pathway
- c) Increased production of renal prostaglandins
- d) Decreased concentration of the contrast material
- e) None of the above
- 9. Statins are known to have a pleiotropic effect that prevents direct contrast toxicity. Which of the following is <u>not</u> considered to be part of the pleiotropic action of statin therapy?
 - a) Anti-inflammatory
 - b) Antioxidant
 - c) Anticholinergic
 - d) Antithrombotic
 - e) None of the above
- 10. Which of the following statements about the pharmacological management of CI-AKI is <u>not</u> true?
 - a) Research supporting the safety and efficacy of oral hydration over intravenous hydration for high-risk patients in preventing CI-AKI is inconclusive and thus should not be used as current therapy in acute care settings.
 - b) Pretreatment with statin therapy has a beneficial role in preventing or reducing the risk of CI-AKI.
 - c) N-acetylecysteine is a recommended standardized prophylactic therapy for highrisk patients undergoing coronary interventional procedures.
 - d) Hydration has been the mainstay of pharmacological management in the prevention of CI-AKI.

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 HRS CONTINUING EDUCATION

Prophylactic management of contrast-induced acute kidney injury in high-risk patients

Volume 28, Number 4

By Diya Nahar, ACNP-BC, BSN, RN

Post-test instructions:

- Select the best answer and circle the appropriate letter on the answer grid below.
- Complete the evaluation.
 Send only this answer form (or a photocopy) to: CANNT National Office

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- or submit online to www.cannt.ca
- Enclose a cheque or money order payable to CANNT.
- Post-tests must be postmarked by December 31, 2019.
- If you receive a passing score of 80% or better, a certificate for 2.0 contact hours will be awarded by CANNT.
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1.	i	ii	iii	iv		1. The offering met the stated objectives.	1	2	3	4	5
						2. The content was related to the objectives.	1	2	3	4	5
2.	а	b	С	d	e	3. This study format was effective for the content	. 1	2	3	4	5
3.	а	b	с	d		4. Minutes required to read and complete:	50	75	100	125	150
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6.	i	ii	iii	iv							
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Meet the 2018 CANNT bursary, award, and research grant winners

SPONSORED BY FRESENIUS MEDICAL CARE Franca Tantalo Bursary Award (Graduate Level) Recipient: Danielle Fox



Danielle Fox is a Clinical Nurse Educator for the Peritoneal Dialysis and Kidney Care Clinics for Alberta Kidney Care-South. Danielle is passionate about delivering

high quality care to people living with and affected by renal disease, and feels honored to have received the Franca Tantalo Bursary. She holds a Bachelor of Nursing Degree from the University of Lethbridge and is currently enrolled in the Master of Nursing Program at the University of Calgary. The research that Danielle is conducting for her master's thesis pertains directly to the challenges encountered by patients and families who have opted to undertake peritoneal dialysis at home. In particular, she is exploring the reasons why patients transfer out of peritoneal dialysis, and how patients and their families can be better supported while on peritoneal dialysis.

CANNT CERTIFICATION/ RECERTIFICATION IN NEPHROLOGY AWARD RECIPIENTS CANNT Research Grant: Franz Marie Gumabay, HBSc, BScN(c)



HBSc, BScN(c) Franz Marie Gumabay graduated from the University of Toronto with an Honours Bachelor of Science degree with High Distinction. Franz Marie is part of the Multi-Or-

gan Transplant Student Research Training Program at Toronto General

Hospital. She worked as a Clinical Research Assistant for the Kidney Transplant Program for four years, and was involved with data management and clinical research studies. Her research interests include equitable access to healthcare, post-operative complications, and psychosocial research. In the past year, Franz Marie worked as a Clinical Research Coordinator and Research Analyst. She managed clinical trials, research studies, and research databases for the Kidney Transplant Program. Currently, Franz Marie is a first-year nursing student at the University of Toronto.

CANNT Recertification Bursary (Ontario Region): Billie Hilborn, MHSc, RN, CNeph(C)



Billie Hilborn is the Clinical Educator in the Hemodialysis Unit, Nephrology Department, Sunnybrook Health Sciences Centre in Toronto, where she has been on staff for 25

years. The Hemodialysis Unit includes 48 outpatient stations and provides hemodialysis across all acute care units.

CANNT Recertification Bursary (Atlantic Region): Karen MacDonald, RN, CNeph(C)



I am currently employed in the role of Optimal Care Coordinator in the renal program at the Cape Breton Regional Hospital with my main focus being vascular access and

case management. I exhibit strong organizational skills, and the ability to work both independently and as a team member. I have more than 30 years of experience in nephrology nursing including the Canadian nursing certification in nephrology since its inception in 1993. I have extensive knowledge of hemodialysis, peritoneal dialysis, and transplantation as treatment options for patients with endstage renal disease. I have also worked in the settings of pre-dialysis, inpatient nephrology, and satellite dialysis. I am a longstanding member (25 years plus) of the Canadian Association of Nephrology Nurses and Technologists (CANNT), and have served on the Board of Directors as Vice-President for Atlantic Region. I have done various presentations at the CANNT national conferences and just recently collaborated on a poster for CANNT 2017. I was co-chair for the CANNT Atlantic 2014 regional symposium held at Membertou Trade and Convention centre in Cape Breton. I have been a member in nephrology journal clubs and have attended many educational sessions on various aspects of renal disease. I have attended several leadership presentations and have acted as preceptor to nephrology nurses on numerous occasions. I have also worked as the head nurse on different occasions in our in-centre hemodialysis centre. I am currently enrolled with Athabasca University in the post RN Bachelor Degree in Nursing Program (all mandatory courses completed). I work full-time in a demanding career and am raising two teenagers, which adds to the challenge of obtaining a distance education.

CANNT Recertification Bursary (Western Region): Lonnie Baldwin, RN, CNeph(C)



I graduated from nursing in 1992, with my first job in a rural community where you were "Jack of all trades, master at none!" My love for the ER grew from this, and I went on to spend the next few years in Manitoba's busiest ER/ trauma centre. From there, I shifted gears into nephrology, where I have been in some shape or form for the last 12-plus years. I started in hemodialysis, and then transferred into the CKD clinic. My path took an unexpected but very rewarding turn into Renal Transplant clinic for a couple of years, before returning to the CKD clinic in my current position as nurse clinician. This position has given me a more involved role in patient education in both teaching and developing patient education material, staff education, community education, streamlining documentation tools for nursing in the clinic, as well as providing direct patient care for progressing/transitioning CKD patients.

CANNT Recertification Bursary (Western Region): Nicola Hamilton, RN, CNeph(C)



I have worked as a renal nurse for almost 20 years. It is an area of nursing I enjoy because of the continuity and the positive impact we can have on the patients we

care for. I moved to Canada in 2013 from the U.K., and have worked for Providence Health and now for Fraser Health in a community dialysis unit. The majority of my career has been in the U.K. working in the National Health Service (NHS). I have worked with many fantastic people over the years and have made some lifelong friends during my career in renal care. I am delighted to receive this funding from CANNT towards my CNeph certification.

CANNT Excellence in Practice Award (Clinical): Cheryl Kalupar, RN, CNeph(C)



I would like to thank the CANNT Board of Directors for granting me the award for Excellence in Clinical Practice. I graduated from the Health Science Centre School of Nursing in Winnipeg in 1991. As a new grad, I worked in several different areas developing new skills and expertise. I mentored many new grads along the way and became a Clinical Resource Nurse on an acute medical ward. In 2002, I found my passion in nephrology nursing, and I have been employed in the Renal Transplant Clinic for the past 16 years. I used my knowledge and expertise in writing and passing my initial CNeph(C) certification exam in 2013 and recertification in 2018. Every day brings a new experience and great challenges in nephrology nursing. I hope to continue along this pathway for many years to come.

CANNT Excellence in Practice Award (Mentorship): Marilyn Muir, BN, RN, CNeph(C)



I would like to express my appreciation to the CANNT Board of Directors for granting me the Award for Excellence in Mentorship. I graduated from the Health Sciences

School of Nursing diploma program in Winnipeg in 1991 and completed my BN from Athabasca University in 2016. I have worked with the Manitoba Renal Program since 1995 and have been a Clinical Resource Nurse for the Manitoba Local Renal Health Centre Program at the Health Sciences Centre since 2009. This program enables patients to return to their home communities in Manitoba for hemodialysis, and we currently have 16 satellite units across Manitoba. I have been a CANNT member for many years and I have been involved with the CANNT Board of Directors since 2008; I had the honor of serving as our CANNT President from 2011–2013. I was also a CANNT liaison from 2005-2014 and co-chair of CANNT 2007 held in Winnipeg. Mentorship is more than just sharing our knowledge and expertise; it is an opportunity to build a stronger team with more engaged and empowered team members. My time on the CANNT Board of Directors was an excellent opportunity to see the importance of mentorship – both as a mentee by previous Board of Directors members and by acting as a mentor to the new incoming Board members. I obtained my initial CNA certification in nephrology in 2001. I am a huge advocate for CNA certification and believe all nephrology nurses should not only become CANNT members, but should also obtain their CNA certification in nephrology.

CANNT Journal Award: Burnout and empowerment in hemodialysis nurses working in Quebec: A provincial survey by Christina Doré, PhD, RN (primary author), Linda Duffett-Leger, PhD, RN, Mary McKenna, PhD, Myriam Breau, MScN, RN, PhD(student), and Marc Dorais, MSc



Christina Doré, inf., Ph. D., est professeure à la faculté des sciences infirmières de l'Université du Québec en Abitibi-Témiscamingue, campus Mont Laurier, QC. Elle

a à son actif quatre articles publiés et un article soumis pour publication et des communications scientifiques au Canada et à l'international en lien avec son projet doctoral qui porte sur l'évaluation de l'épuisement professionnel et l'empowerment des infirmières en hémodialyse et le développement d'un futur site Web professionnel visant à favoriser leur empowerment et leur bien-être au travail afin de réduire leur risque d'épuisement professionnel. Elle compte 28 ans de pratique, soit à titre d'infirmière clinicienne en hémodialyse, prédialyse, soins critiques, médecine, chirurgie, oncologie, gériatrie et en santé communautaire puis, à titre de cadre-conseil afin d'optimiser les pratiques infirmières et interdisciplinaires. Elle fait aussi partie de comités professionnels pour le développement de la pratique infirmière ainsi que de la recherche.

Christina Doré, RN, PhD, is a professor at the Faculty of Nursing, Université du Québec in Abitibi-Témiscamingue, Mont Laurier Campus, QC. She has four articles published and one article submitted for publication, and scientific papers in Canada and internationally in connection with her doctoral project on the assessment of burnout and the empowerment of nurses in hemodialysis, and the development of a future professional website to foster their empowerment and well-being at work to reduce their risk of burnout. She has 28 years of practice as a clinical nurse in hemodialysis, predialysis, critical care, medicine, surgery, oncology, geriatrics and community health, and as a consultant to optimize nursing and interdisciplinary practices. She is also a member of professional committees for the development of nursing practice, as well as research.

SPONSORED BY AMGEN CANADA

Amgen Canada Nephrology Healthcare Professional Preceptorship/Mentorship Grant - Outreach Experience: Theresa McKnight, MN, RN(EC) NP-PHC



Theresa McKnight has been a practising primary nurse practitioner for almost 10 years. She works as a kidney transplant coordinator within the Multi-

Organ Transplant Program at Toronto General Hospital. She also serves concurrently as a primary nurse practitioner at Credit Valley Hospital in Mississauga, Ontario. Theresa completed her nursing diploma at George Brown College and her Bachelor of Science in Nursing at Ryerson University, Toronto. She proceeded to obtain her Masters in Nursing at the University of Toronto with a focus on primary care. She is a member of numerous professional organizations and has been a collaborator on many published projects in kidney transplantation.

CANNT POSTER AWARDS

First Place: Clinical Effectiveness and Safety of 4% Tetrasodium EDTA as a Routine Non-antibiotic Antimicrobial Lock Solution in Central Venous Access Devices of Hemodialysis Patients Against the TripleThreat[™]: A 15-month Canadian Experience

Dr. Chantal Lainesse, DVM, PhD, DACVCP, Karen Kelln, RN

Dr. Chantal Lainesse



Dr. Lainesse has several years of experience in life sciences. She is a veterinarian with a PhD in pharmacology, and is a board-certified clinical pharmacologist. She gained experience and cru-

cial insight into the regulatory process of drug development while working for Health Canada and in drug discovery while working for one of the largest global pharmaceutical companies. Dr. Lainesse is currently a member of several national and international scientific societies, and holder of various recognized achievement awards. She is also the author of several peer-reviewed scientific journal articles, and has appeared as a guest speaker in Canadian universities and conferences around the world.

Karen Kelln



Karen Kelln spent her career in life sciences initially as a registered nurse then in various roles in the medical device industry. She started her career

as a registered nurse gaining experience in several frontline patient care settings. After nursing, she moved into medical sales to learn the business side of healthcare.

She is currently an executive leader responsible for the success of a new and innovative life science company that owns Canadian patents for a non-antibiotic antimicrobial solution that directly impacts the clinical outcomes of our Canadian healthcare system. She is responsible for developing and executing a detailed business model to ensure successful product commercialization. Karen represents the organization to the financial community, healthcare clinicians, government agencies, shareholders, and the public.

From 2014–2016, she served on the Canadian Vascular Access Association Board of Directors. She is currently a steering committee member for the development of the Canadian National Vascular Access and Infusion Guidelines. With experience from bedside to finances, she has deep understanding of patients' and healthcare providers' respective clinical needs and expectations, while understanding the Canadian healthcare system as a whole.

Second Place: Evaluating Expanded Hemodialysis (HDx) therapy in comparison to conventional HD therapy in clinical and patient outcomes aspects

Sandra Lagacé, Resource Nurse, CNeph(C)



I basically started my nursing career in hemodialysis. I have been a hemodialysis nurse from 1999 to 2004. In 2004, I was offered a new

role as the Resource Nurse. It was a new challenge that quickly turned into a passion that I still have to this day. In 2006, I decided to take the CNA Nephrology certification exam and have been certified since then. I am also on the exam committee, and making sure I take every opportunity to mention that the certification program is very important and that we have to continue promoting it to our staff.

Every day, as a team, we work to make hemodialysis easier, better, and smoother for the patient and their family. Innovation is always a work in progress, and we are always ready to try a new product if it will somehow help out our patients and/ or our staff. Now in 2018, I am still

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the hemodialysis Resource Nurse in my hospital. I have done lots of documents, presentations, projects, trials, and research, but this was my first attempt at presenting a poster.

Third Place: Creating an Opportunity to Improve Outcomes through a Joint Initiative to Develop a Standardized Preceptor/ Mentor Workshop for Hemodialysis (HD) Nurses

Peggy Kajah, MScN, RN, CNeph(C)

Lezlie Lambert-Burd, B.Ad.Ed, BScN, RN, CNeph(C)

Lisa Robertson, BScN, RN, CNeph(C)

Peggy Kajah

Peggy's current role is the Nurse Educator for the Hemodialysis Program at St. Joseph's Healthcare Hamilton. Prior to this, she was the Clinical Nurse Specialist in the Predialysis Kidney Function Program, and has gained valuable experience in varied positions across the renal program at SJHH over the last 18 years. She obtained her Master of Science in Nursing at D'Youville University in community health nursing with a focus on education. She currently holds her Canadian certification in nephrology, and is an active CANNT member.



Peggy Kajah

Lezlie Lambert-Burd

Lezlie has worked in kidney care for the past 22 years, and at present is a Nurse Educator in the Kidney Care Program at Niagara Health. She is currently completing her Master of Adult Education. She has a passion for learning with specific interests in curriculum design, complexity, and workplace learning and its application to technology and human factors.

Lisa Robertson

Lisa is currently the Nurse Educator for the Nephrology Unit, Renal Transplant Unit, Peritoneal Dialysis, Multi-Care Kidney Clinic, Transplant Clinic, and the Transplant Coordinators at St. Joseph's Healthcare Hamilton. She has had experience in renal care in the hospital setting, as well as the community setting for close to 25 years. She is co-author of an online course in peritoneal dialysis offered through Mohawk College and holds her certification in nephrology through the Canadian Nurses' Association.

PROFILING ...

New CANNT Board Members

KRISTA SMITH, MN, RN President-Elect/Treasurer 2018-2020



Krista Smith lives and works on the beautiful island of Cape Breton with her husband (Wil) and their two children (Gracey and Cameron). Krista is a registered nurse currently working as the Program Manager for Renal Services in the Eastern Zone of the Nova Scotia Health Authority. Krista received her Master in Nursing in 2016 from

Dalhousie University and previously graduated from Cape Breton University with a Bachelor of Science in Nursing in 2011. Aside from her management experience, she has worked in a variety of healthcare settings, including intermediate care, critical care, and in-centre hemodialysis as a direct care health provider. She is also a Nursing Practice Instructor with Cape Breton University and a Distance Course Instructor with the Nursing Program at St. Francis Xavier University. Aside from her professional life, Krista is actively involved with the Cape Breton Down Syndrome Society as the current Treasurer and the Chair of Emerging Health Leaders Nova Scotia. Krista is extremely excited to work with the CANNT Board of Directors for her upcoming term as President-Elect/Treasurer and looks forward to connecting and networking with CANNT members!

ETHAN HOLZER, MHSC, CHE Director of Communications



Since 2010, I have had the pleasure of working in the rewarding field of nephrology. My journey began in a technical role and shortly thereafter transitioned to administration. In 2016, I took on the role of Director of Operations and Quality within our organization, a leadership role that coincided with completing a Master of Health Sciences

in Health Administration at the University of Toronto's Institute of Health Policy Management and Evaluation, as well as the Certified Health Executive designation through the Canadian College of Health Leaders.

As the Director at Dialysis Management Clinics, I support an eclectic team of professionals who care for 130 hemodialysis patients across three greater Toronto area locations. Our community dialysis clinics are independently regulated by the College of Physicians and Surgeons of Ontario and, as such, we can provide care for patients associated with numerous hospital programs. These partnerships provide the unique opportunity to engage with and learn from a wide range of nephrology teams and stakeholders within the system. To support this collaboration, I sit on a number of local and regional committees, including the executive committee for the Renal Administrative Leaders Network of Ontario. As Director of Communications, I hope to leverage existing and build new networks to help further the goals and exposure of our association.

Thank you to the CANNT Board and all its members for the opportunity to represent a community I am so proud to be a part of.

CANNT Membership



First Name				
Last Name	□ I have attained CNeph(C)/cdt designation			
Home Address	□ I am a member of CNA			
City	Ontario applicants only			
Province Postal Code	Do you belong to RNAO? 🖵 Yes 🛛 🖬 No			
Telephone (H) ()	Professional Status			
(W) ()	Registered Nurse			
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Employer Address	Other (Specify)			
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Do you consent to the use of your name and address on mailing lists that CANNT has considered pertinent and appropriate?	Direct Patient Care		eaching	
□ Yes □ No	Technical		Other (Specify)	
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New Member or Renewal	Self-Care Unit		Private Sector	
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*Proof of full-time enrolment must accompany application	Doctorate		Doctorate	
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Guidelines for Authors

The Canadian Association of Nephrology Nurses and Technologists (CANNT) Journal invites letters to the editor and original manuscripts for publication in its quarterly journal. We are pleased to accept submissions in either official language—English or French.

Which topics are appropriate for letters to the editor?

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.

What types of manuscripts are suitable for publication?

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
- Relevant clinical articles
- Innovative quality improvement reports
- Narratives that describe the nursing experience
- Interdisciplinary practice questions and answers
- · Reviews of current articles, books and videotapes
- Continuing education articles

How should the manuscript be prepared?

Form: The manuscript should be typed double-spaced, one-inch margins should be used throughout, and the pages should be numbered consecutively in the upper right-hand corner. More formal research or clinical articles should be between five and 15 pages. Less formal narratives, question and answer columns, or reviews should be fewer than five pages.

Style: The style of the manuscript should be based on the *Publication Manual of the American Psychological Association (APA)*, Sixth Edition (2009), available from most college bookstores.

Title page: The title page should contain the manuscript title, each author's name (including full first name), professional qualifications [e.g., RN, BScN, CNeph(*C*)], position, place of employment, address, telephone, fax numbers, and email address. The preferred address for correspondence should be indicated.

Abstract: On a separate page, formal research or clinical articles should have an abstract of 100 to 150 words. The abstract should summarize the main points in the manuscript.

Text/Reference List: Proper names should be spelled out the first time they are used with the abbreviation following in brackets, for example, the Canadian Association of Nephrology Nurses and Technologists (CANNT). Generic drug names should be used. Measurements are to be in Standards International (SI) units. References should be cited in the text using APA format. A reference list containing the full citation of all references used in the manuscript must follow the text.

Tables/Figures: Manuscripts should only include those tables or figures that serve to clarify details. Authors using previously published tables and figures must include written permission from the original publisher. Such permission must be attached to the submitted manuscript. Table/figure formatting should comply with APA style.

How should the manuscript be submitted?

Email your manuscript to: **cannt.journal1@gmail.com**. Include a covering letter with contact information for the primary author and a one-sentence biographical sketch (credentials, current job title and location) for each author.

How are manuscripts selected for the CANNT Journal?

Each manuscript will be acknowledged following receipt. Research and clinical articles are sent out to two members of the *CANNT Journal* manuscript review panel to be reviewed in a double-blind review process. All manuscripts may be returned for revision and resubmission. Those manuscripts accepted for publication are subject to copy editing; however, the author will have an opportunity to approve editorial changes to the manuscript. The editor reserves the right to accept or reject manuscripts. The criteria for acceptance for all articles include originality of ideas, timeliness of the topic, quality of the material, and appeal to the readership. Manuscripts that do not comply with APA formatting and style will be returned to the author(s).

What are the implications for copyright ownership?

Authors should note that manuscripts will be considered for publication on the condition that they are submitted solely to the *CANNT Journal*. Upon acceptance of submitted material, the author(s) transfer(s) copyright ownership to CANNT. Statements and opinions contained within the work remain the responsibility of the author(s). Authors retain the right to include their respective published work in a thesis or dissertation provided that it is not published commercially. Although no permission is required in this instance, it is expected that you reference *CANNT Journal* as the original source. All other material may not be reproduced without the written permission of CANNT.

Checklist for authors

- ✓ Cover letter
- 🗸 Article
 - Title page to include the following:
 - Title of article
 - Each author's name (including full first name)
 - Professional qualifications
 - Position
 - Place of employment
 - Author to whom correspondence is to be sent, including address, phone, fax number, and email address
 - Text of article, with abstract if applicable, **doublespaced**, **pages numbered**
 - References (on a separate sheet)
 - Tables (one per page)
 - Illustrations (one per page)
 - Letters of permission to reproduce previously published material

Revised March 2018

Lignes directrices à l'intention des auteurs

Le Journal de l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN) vous invite à faire parvenir articles, textes et manuscrits originaux pour publication dans son journal trimestriel. Nous sommes heureux d'accepter vos documents soumis dans l'une ou l'autre des langues officielles, anglais ou français.

Quels sont les sujets d'article appropriés?

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.

Quels types de manuscrits conviennent à la publication?

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 :

- Exposés de recherche originaux
- Articles cliniques pertinents
- Rapports sur des approches innovatrices en matière d'amélioration de la qualité
- Textes narratifs relatant une expérience de pratique infirmière ou technologique
- Textes sous forme de questions et de réponses sur la pratique interdisciplinaire
- Revues d'articles courants, de livres et films
- Articles en éducation continue.

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/Liste de références : 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. La mise en forme des tableaux et des figures doit être conforme au style de l'AAP.

De quelle manière doit-on soumettre les manuscrits?

Veuillez envoyer par courriel votre manuscrit à : **cannt.journal1@** gmail.com

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. La rédactrice en chef se réserve le droit d'accepter ou de refuser tout manuscrit. 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. Les manuscrits qui ne sont pas conformes à la mise en forme et au style de l'AAP seront renvoyés à l'auteur ou aux auteurs.

Quelles sont les conséquences du transfert des droits d'auteur?

Les auteurs doivent prendre note que les manuscrits seront considérés pour publication à la condition qu'ils ne soient soumis qu'au *Journal de l'ACITN*. Sur acceptation du matériel soumis, les auteurs transfèrent leur droit d'auteur à l'ACITN. Les déclarations et opinions émises par les auteurs dans leurs articles, textes ou manuscrits demeurent leur responsabilité. Les auteurs conservent le droit d'insérer leurs travaux publiés respectifs dans une thèse ou un mémoire, pour autant que ces derniers ne soient pas publiés à des fins commerciales. Bien qu'aucune permission ne soit requise en pareil cas, il est attendu que les auteurs indiquent en référence le *Journal de l'ACITN* comme source originale. Tous les autres documents ne peuvent être reproduits sans l'autorisation écrite de l'ACITN.

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
 - Nom de l'auteur à qui la correspondance doit être envoyée (incluant adresse, numéros de téléphone et de télécopieur et adresse courriel)
 - 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