

## AN INTERVENTION DESIGN: SUPPORTING SKILLS DEVELOPMENT FOR PERITONEAL DIALYSIS TRAINERS

Josephine S.F. Chow,<sup>1,2,3</sup> Yeoungjee Cho,<sup>4,13,14</sup> Keri-Lu Equinox,<sup>5</sup> Ana Figueiredo,<sup>6</sup> Serena Frasca,<sup>7</sup> Carmel Hawley,<sup>4,13,14</sup> Kirsten Howard,<sup>8</sup> David W. Johnson,<sup>4,13,14</sup> Matthew Jose,<sup>9</sup> Anna Lee,<sup>10</sup> Moira Maley,<sup>11</sup> Jo-Anne Moodie,<sup>12</sup> Peta-Anne Brent,<sup>13</sup> Elaine Pascoe,<sup>13</sup> Donna Reidinger,<sup>13</sup> Genevieve Z. Steiner,<sup>15</sup> Melinda Tomlins,<sup>16</sup> David Voss,<sup>17</sup> Paula Woodward,<sup>18</sup> and Neil Boudville<sup>11</sup>

*Clinical Innovation & Business Unit,<sup>1</sup> South Western Sydney Local Health District, Sydney, Australia; Faculty of Nursing,<sup>2</sup> University of Sydney, Sydney, Australia; School of Health Science,<sup>3</sup> University of Tasmania, Tasmania, Australia; Department of Nephrology,<sup>4</sup> Princess Alexandra Hospital, Brisbane, Australia; Department of Renal Medicine,<sup>5</sup> Cairns Hospital, Sydney, Australia; School of Health Sciences,<sup>6</sup> Pontificia Universidade Catolica do Rio Grande do Sul, Porto Alegre, Brazil; Central Northern Adelaide Renal and Transplantation Service,<sup>7</sup> Adelaide, Australia; Sydney School of Public Health,<sup>8</sup> Faculty of Medicine and Health, University of Sydney, Sydney, Australia; School of Medicine,<sup>9</sup> University of Tasmania, Tasmania, Australia; Department of Renal Medicine,<sup>10</sup> Illawarra Shoalhaven Local Health District, NSW, Australia; Medical School,<sup>11</sup> University of Western Australia, Perth, Australia; Department of Nephrology,<sup>12</sup> The Royal Melbourne Hospital, Parkville, Australia; Australasian Kidney Trials Network,<sup>13</sup> University of Queensland, Brisbane, Australia; Translational Research Institute,<sup>14</sup> Brisbane, Australia; NICM Health Research Institute and Translational Health Research Institute (THRI),<sup>15</sup> Western Sydney University, Penrith, Australia; Department of Renal Medicine,<sup>16</sup> Hunter New England Local Health District, New Lambton, Australia; Renal Medicine,<sup>17</sup> Middlemore Hospital, Auckland, New Zealand; The Med Collective (Medical Education and Communications),<sup>18</sup> Sydney, Australia*

◆ **Background:** Peritoneal dialysis (PD) is a home-based therapy where nurses train patients in its use. There has been no published randomized controlled trial (RCT) evaluating any specific protocol for nurses delivering PD training. A standardized education package based upon the best available evidence and utilizing modern educational practices may lead to improved patient outcomes. The aim is to develop a standardized, evidence-based curriculum for PD trainers and patients aligned with guidelines from the International Society for Peritoneal Dialysis (ISPD), using best practice pedagogy.

◆ **Methods:** A literature search and clinical audit were conducted to identify current practice patterns and best practice. Results were reviewed by a focus group of practitioners comprising PD nurses, nephrologists, consumers, a medical education expert, and an eLearning expert. From this, a training curriculum and modules were developed.

◆ **Results:** A comprehensive PD training curriculum has been developed, which includes modules for training PD nurses (trainers) and patient training manuals. The package comprises 2 introductory modules and 2 clinical case modules. The curriculum is designed for both interactive digital media (trainers) and traditional paper-based teaching with practical demonstrations (patients). Assessment is also addressed.

Correspondence to: Josephine Chow, Clinical Innovation & Business Unit, Liverpool Hospital, Locked Bag 7103, BC 1871, Liverpool NSW 2170.

Josephine.Chow@health.nsw.gov.au

Received 21 July 2018; accepted 11 September 2018.

◆ **Conclusion:** The need for the development of a comprehensive and standardized curriculum for PD nurse trainers and their patients was confirmed. This paper outlines the process of the development of this curriculum. Pilot testing of the modules was launched in late 2017 to examine feasibility, and planning has commenced for a RCT in 2019 to investigate the effect of the modules on clinical outcomes, and their wider application across Australia and New Zealand.

*Perit Dial Int* 2019; 39(2):134–141 epub ahead of print: 18 Jan 2019  
<https://doi.org/10.3747/pdi.2018.00159>

KEY WORDS: eLearning; end-stage kidney disease; patient training; adult learning principles.

An increasing number of people are developing end-stage kidney disease (ESKD) in Australia every year (1). Compared with hemodialysis patients (HD), peritoneal dialysis (PD) patients experience enhanced opportunities for rehabilitation and return to work, flexibility in dialysis schedules, time and cost savings from reduced travel to dialysis centres, improved quality of life (1,2), and greater patient satisfaction (3). Although the survival rates are comparable, PD has been found to be more cost-effective than HD in most developed countries (4). In Australia, the estimated annual patient cost for PD (AUD \$53,112) was substantially lower than that for HD (AUD \$79,000) (5). In spite of these favorable features, the

uptake of PD has diminished worldwide (6) with utilization steadily decreased from 32% in 1995 to 24% in 2003, 22% in 2007, and 19% in 2016 (7).

One of the reasons for low utilization of PD is the potential for complications, such as peritonitis, which directly contributed to 65% of PD technique failures and 7% of deaths in 2016 (7). Peritonitis has been associated with an increased risk of mortality up to 6 months after an episode of peritonitis (8). In Australia, the PD peritonitis rate has been found to be unacceptably higher than in many other countries (9). There has been some improvement over the past few years, although rates have now plateaued (10), and a tenfold variation in rates of peritonitis across PD units remains (11). A plausible explanation for such variance may include differences in clinical practices and training.

In light of this, the Nursing Liaison Committee of the International Society for Peritoneal Dialysis (ISPD) has recommended standardization of teaching practices for PD patients and their caregivers (12). Training guidelines, a PD patient training curriculum (13), a review reference, and an online education portal (14) were produced. The syllabus was published in 2016, but is yet to be evaluated (15). A review of 14 PD courses in 10 countries demonstrated large variability between units in training practices and duration of training. In Australia, a survey of PD units on their training practices revealed a large variation in delivery of PD training and competency assessments to meet educational standards recommended by the ISPD (16).

There is a need to develop a curriculum that ensures key learning outcomes in PD are achieved. A formalized PD education program has been shown to significantly reduce peritonitis rates in a retrospective single-arm intervention study involving 31 PD patients at a single center in Uruguay (17). However, an optimal education package has yet to be produced. It is likely that there are unrealized gains to be made for clinical outcomes in PD (18,19). The aim of this paper is to describe the development of the intervention, a standardized, evidence-based educational curriculum for PD nurse trainers and PD patients consistent with ISPD guidelines that will be used as part of a randomized controlled trial (RCT) to test its effectiveness and cost-effectiveness. Use of best practice to reduce the rate of PD-related infections and technique failure, was the underlying goal to keep patients safe, preventing complications, especially PD-related infections and technique failure, and supporting self-management.

## METHODS

In 2014, a learning needs analysis was undertaken by members of the HOME Network (THN) as part of the annual task-force prioritization. The development of a "Train the Trainer" program for PD nurses to support nurses to gain knowledge, skills, and experience as competent PD trainers was subsequently endorsed. The HOME Network (20) was established in 2010 as an Australian initiative to bring together healthcare professionals in the field of home dialysis with the aims of identifying and addressing the barriers to optimal utilization of

home dialysis in Australia. The members include senior dialysis nurses, dietitians, and social workers. The Delphi technique (21) was used in the development of the "Train the Trainer" curriculum and its supporting material. The Delphi technique is an iterative process to collate and refine expert opinions, thus to obtain group consensus. It has been used widely in nursing research and has been useful in educational curriculum development (21,22).

A purposive sample of senior dialysis nurses (subject matter expert) and allied health staff from THN ( $n = 18$ ) participated in the development of the content of the curriculum. The first face-to-face workshop with the 18 subject matter experts was conducted. The aims and objectives for the study and the activities for the workshop were explained prior to the brainstorming sessions. The 18 healthcare professionals were randomly subdivided into 3 groups of 6 members each. The idea of smaller groups maximized the contribution from each participant in a non-threatening and informal manner. The first task each group was requested to complete was to list headings or categories of a successful training curriculum for PD trainers. After the first exercise, each group was required to identify elements for each category. They were given 45 minutes to complete the brainstorming session and score the elements of importance. They were then invited to a plenary session for the final half hour to incorporate all information into a single list. The entire meeting lasted 2 1/2 hours and defined the elements for the potential curriculum. The same methodology was used for the development of the patient training manual. At the end of the first workshop, the group identified and developed the first draft set composition for the curriculum (Table 1).

A series of face-to-face workshops complemented by weekly teleconference calls over 18 months were conducted to develop and review the content of the curriculum and the modules. The investigator facilitated the workshops and teleconference calls. Revised versions of the curriculum and modules were provided to the participants prior to each engagement. The participants were required to identify any deficits and recommendations for improvement. Questions and/or items were discussed among the group. Debate and justification for certain items, with evidence and rationales, were included. The investigator recorded all information and discussion.

Based on the results of the analysis, consultation with the addition of 10 nursing staff from 4 PD units, 2 clinical service leads, and 2 renal consultants established further structured content development. A literature search supported by a clinical audit of Australian PD units (16) was conducted to identify practices and teaching content currently in use.

The training curriculum and modules developed were then further refined by THN, senior medical clinicians from the Australasian Kidney Trials Network (AKTN; an international collaborative research group with extensive experience in investigator-initiated clinical trials), medical educators and eLearning experts. Consumer engagement and input was sought extensively through consultation with PD patients by members of THN. Curriculum content was consistent with ISPD guidelines (15), with teaching based on adult learning

principles (13–15), and best practice eLearning techniques. Competency-based assessment was also required to evaluate learning and confirm trainers’ skills. This study was approved by the Human Research Ethics Committee prior to the commencement of the study procedures and activities.

**RESULTS**

A comprehensive PD nurse training curriculum, the “Train the Trainer” program, was developed in an interactive electronic format which included 2 introductory modules and 2 clinical case modules. It is designed for use in the PD unit setting to ensure adequate supervision. The document catered for a continuum of PD training experience and was a complete framework across a range of PD training expertise from beginner through to proficient. It is assumed that the trainers would be registered nurses with varying levels of expertise (Table 2), but also that these trainers may not have had any formal education on how best to teach patients.

**THE CURRICULUM**

The goal as a trainer is to enable patients to competently manage their own dialysis needs safely at home, preventing complications, especially PD-related infections and technique

failure, and supporting self-management. The “Train the Trainer” curriculum included 2 introductory modules and 2 clinical case modules (Figure 1) available in electronic format. They are designed to be used by registered nurses only, while understanding that some countries, such as the United Kingdom, employ non-registered nurses to teach patients on PD. The first 2 modules considered the principles of home PD training, including an overview of clinical practice and the learning process, as it applies to personalized home training. The remaining 2 modules comprised clinical case studies with scenarios and issues that may be encountered during PD training. The program was supported by 2 patient training manuals. The training modules will address PD training for patients whose primary language is not English, and an assessment tool is incorporated for the trainers to assess the patient’s level of health literacy before starting PD training, along with dexterity, vision, and other potential barriers to learning.

All electronic modules in the program applied a conversational approach, modelling the patient-to-trainer (or learner-to-teacher) feedback cycle consistent with optimal learning processes (23). In the modules, trainers were asked to answer a question or predict an outcome on the basis of their existing experience or knowledge before seeing the solution and its rationale. This encouraged them to reflect upon their own life and clinical experiences and build on prior knowledge, given

TABLE 1  
First Draft Set Composition for the Curriculum

Module	Heading	Elements	Participants selected (n=18)
1	Adult learning principles	How different people learn	16/18
		Being respectful to adult learners	18/18
		How to change teaching style for different learners	18/18
2	General	Defining training	15/18
		How to use written instructions during training sessions with patients	18/18
		Recognizing cultural properties	18/18
		Discussing management of fluid with patient	18/18
		Teaching how to use math (UF calculations)	8/18
		Recognizing uremia before teaching	18/18
3	PD-specific	Giving feedback on success and failure to the patient	18/18
		Discussing the peritoneum anatomy	15/18
		Tips for opening packaging/managing dexterity issues	18/18
		Discussing infection	18/18
		Problem-solving	18/18
4	Resource and competency	Simulation case studies	17/18
		Competency (watch in own unit)	18/18
		Competency tools	18/18
		Assessment/quiz	18/18
		What would give confidence to a nurse	18/18
		Training tools (links to resources)	18/18
Helpful hints	18/18		
		Frequently asked questions	18/18

UF = ultrafiltration; PD = peritoneal dialysis.

TABLE 2  
Categories of Trainers According to Their Expertise

Category of trainer	Description
Beginner	The novice/beginner was considered to have no experience in training patients in PD, limited ability to demonstrate safe practice, required continual verbal and physical cues from a local trainer and was unable to use discretionary judgement. The beginner assisted in training the patient for all basic PD procedures under the supervision of a local trainer (who should be at a competent level). They assisted the competent trainer, observed vital signs, and monitored complications. This registered nurse was someone who might just commence working in the PD unit.
Advanced beginner	The advanced beginner demonstrated marginally acceptable performance due to prior experience in real-life training situations. They were efficient and skilful in parts of the practice areas, but had limited experience and required occasional supportive cues from a local trainer. When they were able to train a patient unsupervised, they were considered competent.
Competent	The competent trainers were able to demonstrate skills in PD patient training and had confidence in their actions. They were able to learn new training techniques via job training.
Proficient	The proficient trainer perceived situations as a whole and had learned from reflection on experiences in the PD unit what events to expect and how to modify strategies in response. They demonstrated skills in patient preparation, patient training, and care for patients without supervision. They were aware of complications that may occur and had the knowledge to assist and intervene when necessary. They were often the team leader and ensured compliance by all staff members with the guidelines. A local trainer should have achieved this competency level.

PD = peritoneal dialysis.

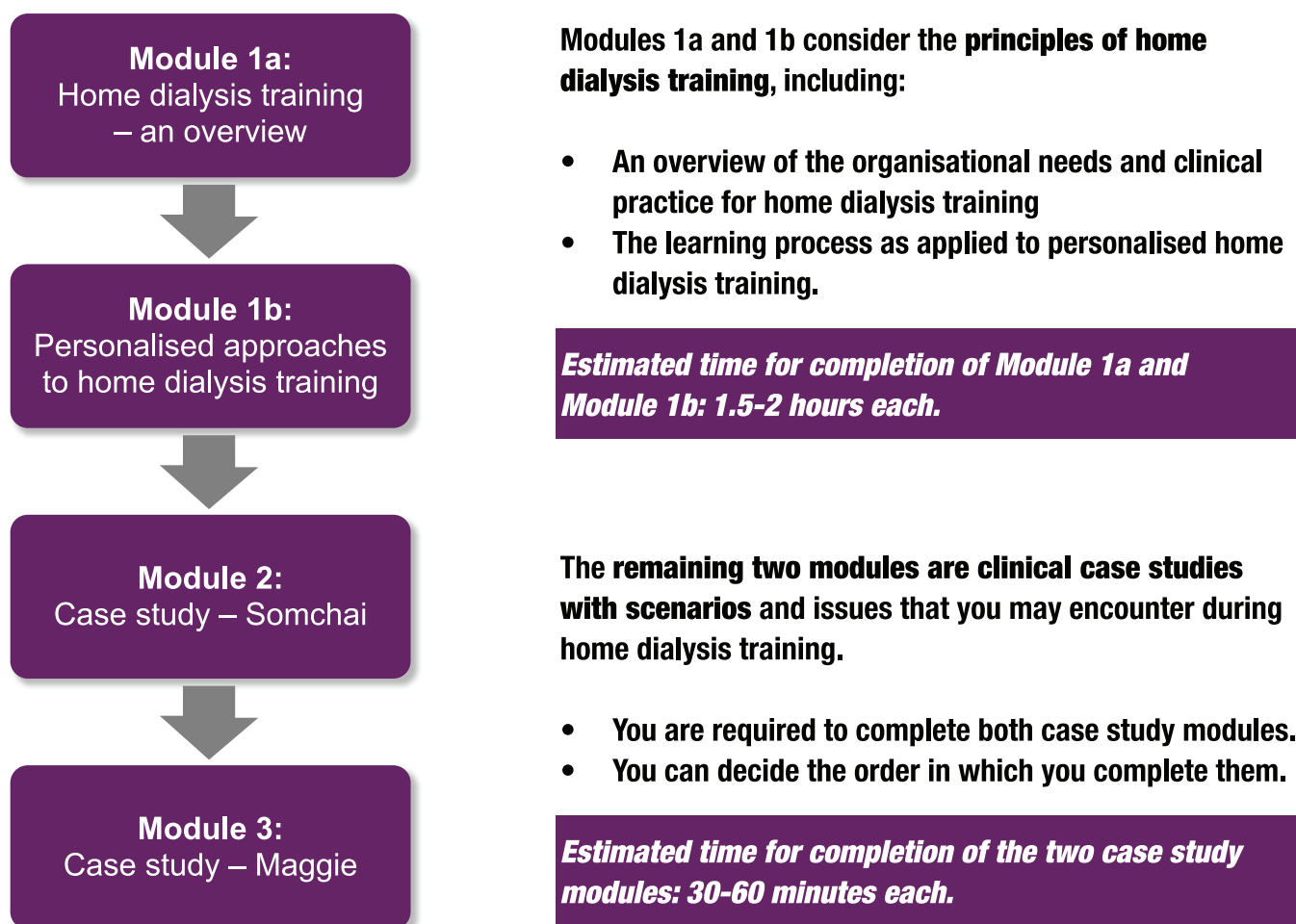


Figure 1 – Outline of the trainer modules.



additional information. Answers were used for feedback on learning but were not assessable.

Audio insights were embedded throughout each module to operationalize the conversational approach. Insights sharing real-world experience were presented by experts in the field and helped to extend on-screen information. Finally, the trainers were encouraged to keep a learning journal to document and reflect on their learning experiences (23) as they progressed through the modules. This may have been hard copy or electronic and included notes of any particular points or resources of interest, reflections on experiences, responses to activities, and questions for their mentor/accredited assessor.

**ASSESSMENT METHODS**

Competency assessment focused on performance in caring for and teaching a PD patient. It included assessing learning about how to teach patients, adequacy of documentation, and integration of knowledge through skills, using established standards of care, policies, and procedures. Trainers needed to identify a mentor/accredited assessor from their PD unit to

assess their competencies as part of the requirement for the program. In addition, an understanding of all clinical content areas (i.e., theory-based and practical knowledge), covered by the PD Patient Training Manual had to be demonstrated.

Assessments included multiple-choice quizzes covering progressive knowledge and learning processes; written reflection, for example, on complications, and what could be done differently to prevent them; analysis of clinical case studies; and practice competency.

The Training Framework for the trainers (Figure 2) and patients (Figure 3) was thus developed. These frameworks were designed to outline the guiding principles and key structural elements of the curriculum. For the trainers, they were required to complete a prerequisite clinical knowledge online multiple-choice assessment in addition to a practical assessment prior to the commencement of the modules. There were online multiple-choice assessments at the end of each module with digital certificates of completion. The trainers were required to complete case study assessments and assess which patient factors and barriers impacted on PD training. Finally, the trainers prepared a personalized lesson plan for a specific PD training step.

# Training framework: nurse trainers

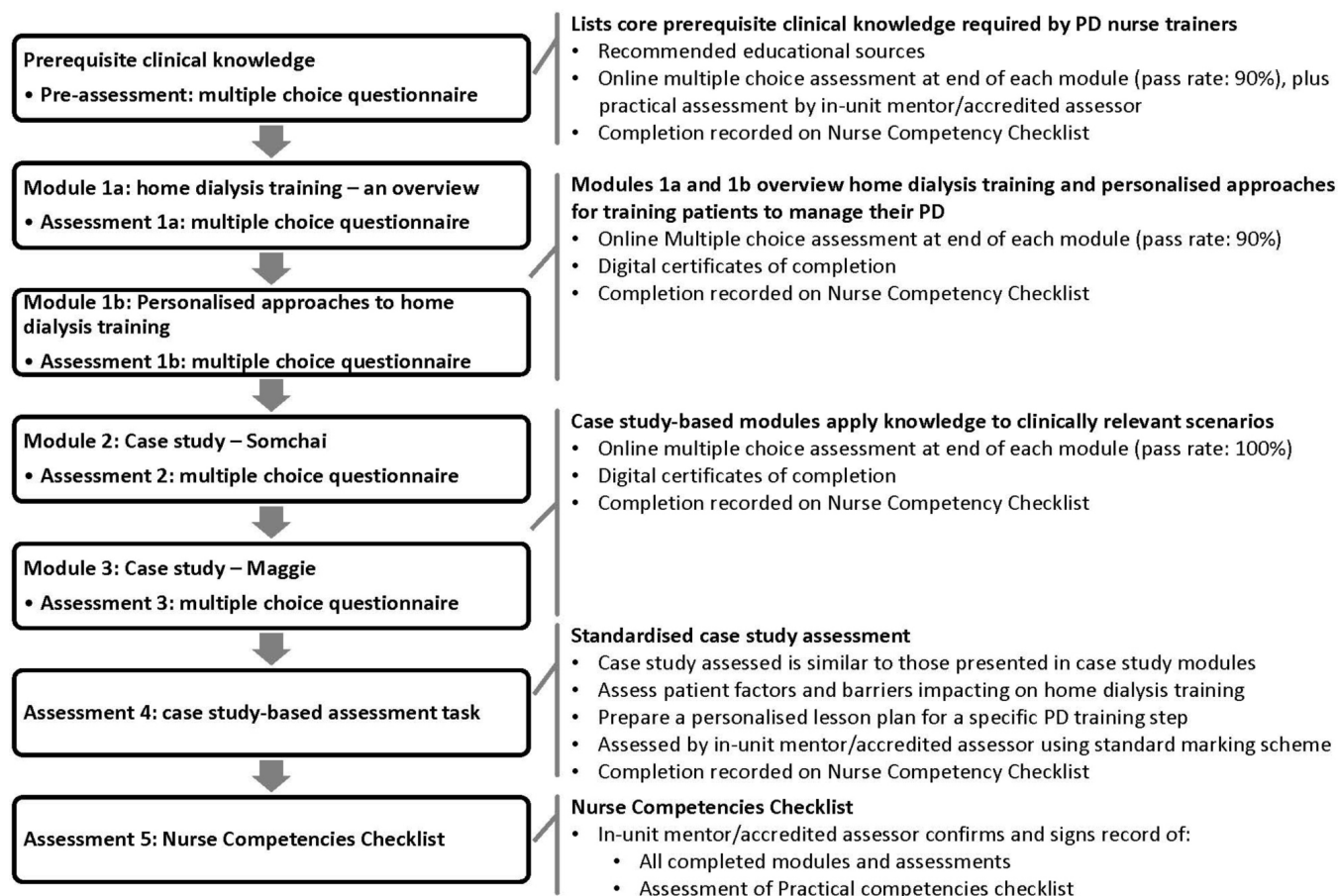


Figure 2 — Training framework for PD nurse trainers. PD = peritoneal dialysis.

# Training framework: patients

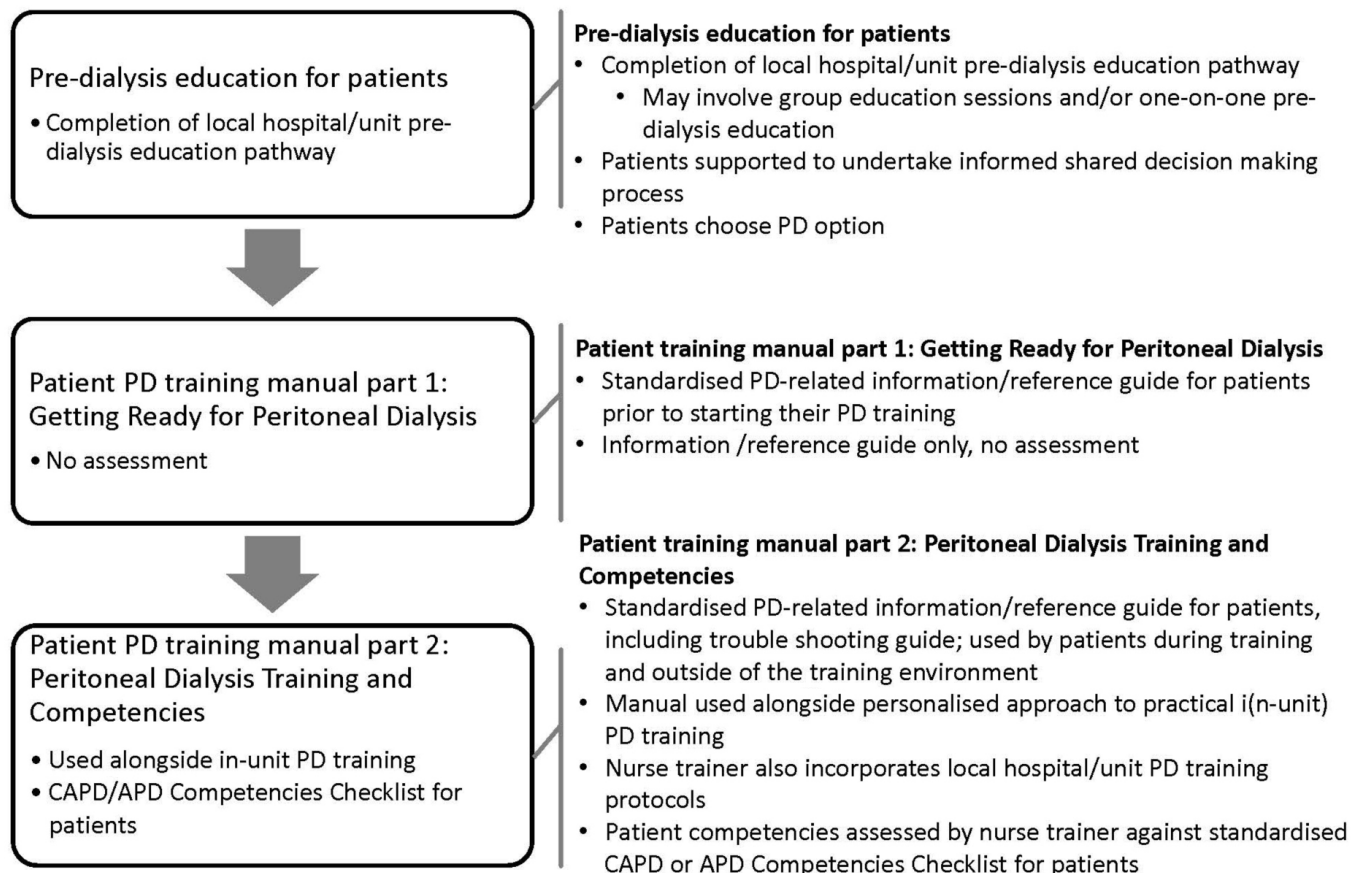


Figure 3 – Training Framework for PD Patients. PD = peritoneal dialysis; CAPD = continuous ambulatory PD; APD = automated PD.

## PATIENT TRAINING MANUALS

A traditional paper-based version of the Patient Training Manuals with practical demonstrations was available. Assessment was also addressed. Patients were required to follow their hospital’s predialysis education pathway, which may have involved group education sessions and/or one-on-one predialysis education. Once the decision to transition into PD was made by the patient, they were provided with “Patient Training Manual 1: Getting Ready for Peritoneal Dialysis,” which had been designed to provide the patient with information that facilitated this transition. On commencing PD training, the patients were provided with “PD Training Manual 2: Peritoneal Dialysis Training and Competencies,” which had been designed to provide the patient with information and knowledge that allowed the patient to move into PD training and prepared them to go home safely on PD. It included an overview of PD, how to perform a PD exchange safely, and how to troubleshoot. The trainers assessed the patients’ competencies against a standardized PD Competencies Checklist for patients. The readability of the Patient Training Manuals was determined by the use of the Flesch Reading Ease score and the Flesch-Kincaid Grade Level (FKGL) (24,25). The Flesch

Reading Ease score and the FKGL were selected because both are commonly used and are suitable to assess the readability of patient educational material and health information. These readability tools have been previously validated. The recommended reading grade level of health information for patients is 8 on the FKGL (26). The Flesch Reading Ease Score for the Patient Training Manual was 63.6 and the FKGL was 8. This paper is the first step toward the implementation of the designed intervention.

## DISCUSSION

The development of a standardized, evidence-based curriculum for PD trainers and patients aligned with ISPD guidelines used best practice pedagogy and included a large number of multidisciplinary stakeholders from different backgrounds. This provided fundamental and critical elements to ensure the quality and relevance of the curriculum, online modules, and training manuals. The patient training manuals were also reviewed by a number of PD patients periodically throughout the development. This active involvement of consumers in the development of the TEACH-PD curriculum was integral to its success.

In order to cater to a range of learning styles and settings as recommended by the ISPD (15), the patient training manuals need to be converted to digital format and evaluated. This will provide patients with flexibility in terms of their approach to learning, and bring the patient modules in line with the train-the-trainer (nurse) modules. It will improve the understanding/treatment of the dialysis disease burden and also provide an opportunity for PD patients to be engaged in the development and evaluation of the digital format of the patient training manual.

A number of anticipated barriers to completion of the training modules, such as competing workloads, can affect commitment to training (27). It is therefore important that PD units provide trainers with time release from their usual work activities in order to complete the program. However, even when time is allocated, there is a need to identify ways of addressing departmental cultures. This program requires trainees to be supported by a departmental mentor (28) to help overcome any resistance to change. Development of communities of practice should also be promoted so that newly trained staff are not isolated (29). Bringing trainers from different PD units together to identify effective practices (30) has also been found to change departmental cultures.

The developed curriculum and modules will undergo an interventional study titled: "A Targeted Education Approach to improve Peritoneal Dialysis Outcomes (TEACH-PD Trial)" and this paper is the first step to developing the intervention. A TEACH-PD pilot study is underway to support the development of the TEACH-PD curriculum. The primary objective of this pilot study is to evaluate and further refine the TEACH-PD training tools and collect data that will assist in the planning of the larger implementation trial. The TEACH-PD pilot study will identify the gaps and barriers to the curriculum and its implementation. This is vital for the integrity, feasibility, and applicability of the curriculum.

After completion of the pilot study and review, planning will commence for a RCT to begin in 2019 across all PD units in Australia and New Zealand to investigate the effect of the comprehensive training curriculum on clinical outcomes. The program can then be used to develop standard operating procedures for training modules, which will provide opportunities for building an evidence base for future research and improve external validity.

## CONCLUSION

There have been no published RCT data evaluating any specific protocol for training PD nurse trainers. It is highly likely that there are unrealized gains to be made for PD clinical outcomes with the adoption of best practice guidelines. A comprehensive PD training curriculum has been developed by experts, utilizing adult learning principles and eLearning techniques, following the guidelines outlined by the ISPD. This curriculum includes an interactive electronic format for training PD staff and paper-based training manuals for patients. The long-term plan for the pilot study and subsequent RCT is

to introduce the program to all PD units in Australia and New Zealand, translating current evidence into clinical practice.

## ACKNOWLEDGMENTS

Funding was received from the following organizations to support the Train the Trainer modules development: Baxter Healthcare Competitor Educational Grant; Kidney Health Australia Enabling Grant: BEAT-CKD Program Grant; Western Australia Health; and New South Wales Health. DJ is supported by an Australian National Health and Medical Research Council Practitioner Fellowship. GZS's contribution was supported by funding from a National Health and Medical Research Council (NHMRC) – Australian Research Council (ARC) Dementia Research Development Fellowship (#1102532). YC is supported by an Australian National Health and Medical Research Council Early Career Fellowship.

## DISCLOSURES

JC has previously received speaker's honoraria and research funds from Baxter Healthcare, Fresenius Medical Care, Roche Pharmaceuticals and Amgen. DJ has previously received consultancy fees, research funds, travel sponsorships and speakers' honoraria from Baxter Healthcare and Fresenius Medical Care. YC has previously received research funds from Baxter Healthcare and Fresenius Medical Care. As a medical research institute, NICM receives research grants and donations from foundations, universities, government agencies, individuals, and industry. Sponsors and donors provide untied funding for work to advance the vision and mission of the Institute. The project that is the subject of this article was not undertaken as part of a contractual relationship with any organization other than the funding declared. NB has received speaker's honoraria, advisory board honoraria, travel grants, and unrestricted educational grants from Roche Pharmaceuticals, Astra Zenaca, and Amgen. AF has received speaker's honoraria and research funds from Baxter Healthcare.

## REFERENCES

1. Agar JW, Hawley CM, George CR, Mathew TH, McDonald SP, Kerr PG. Home haemodialysis in Australia—is the wheel turning full circle? *Med J Aust* 2010; 192(7):403–6.
2. Pipkin M, Eggers PW, Larive B, Rocco MV, Stokes JB, Suri RS, *et al.* Recruitment and training for home hemodialysis: experience and lessons from the Nocturnal Dialysis Trial. *Clin J Am Soc Nephrol* 2010; 5(9):1614–20.
3. Juergensen E, Wuerth D, Finkelstein SH, Juergensen PH, Bekui A, Finkelstein FO. Hemodialysis and peritoneal dialysis: patients' assessment of their satisfaction with therapy and the impact of the therapy on their lives. *Clin J Am Soc Nephrol* 2006; 1(6):1191–6.
4. Karopadi AN, Mason G, Rettore E, Ronco C. Cost of peritoneal dialysis and haemodialysis across the world. *Nephrol Dial Transplant* 2013; 28(10):2553–69.
5. Li PK, Chow KM, Van de Luijngaarden MW, Johnson DW, Jager KJ, Mehrotra R, *et al.* Changes in the worldwide epidemiology of peritoneal dialysis. *Nat Rev Nephrol* 2017; 13(2):90–103.
6. Cass A, Chadban S, Gallagher MP, Howard K, Jones A, McDonald SP, *et al.* *The economic impact of end-stage kidney disease in Australia: projections to 2020.* Melbourne: Kidney Health Australia; 2010.
7. Australian and New Zealand Dialysis and Transplant Registry. 39<sup>th</sup> Report. [Online.] Available at: [www.anzdata.org.au/v1/report\\_2017.html](http://www.anzdata.org.au/v1/report_2017.html)
8. Boudville N, Kemp A, Clayton P, Lim W, Badve SV, Hawley CM, *et al.* Recent peritonitis associates with mortality among patients treated with peritoneal dialysis. *J Am Soc Nephrol* 2012; 23(8):1398–405.
9. Jose MD, Johnson DW, Mudge DW, Tranaeus A, Voss D, Walker R, *et al.*

- Peritoneal dialysis practice in Australia and New Zealand: a call to action. *Nephrol (Carlton)* 2011; 16(1):19–29.
10. Mudge DW, Boudville N, Brown F, Clayton P, Duddington M, Holt S, *et al.* Peritoneal dialysis practice in Australia and New Zealand: a call to sustain the action. *Nephrol* 2016; 21(7):535–46.
  11. Nadeau-Fredette AC, Johnson DW, Hawley CM. Centre-specific factors associated with peritonitis risk—a multi-centre registry analysis. *Perit Dial Int* 2016; 36:509–18.
  12. Bernardini J, Price V, Figueiredo A. Peritoneal dialysis patient training. *Perit Dial Int* 2006; 26(6):625–32.
  13. Piraino B, Bernardini J, Brown E, Figueiredo A, Johnson DW, Lye WC, *et al.* ISPD position statement on reducing the risks of peritoneal dialysis-related infections. *Perit Dial Int* 2011; 31(6):614–30.
  14. ISPD, University of Pittsburgh. Teaching nurses to teach: peritoneal Dialysis training 2006. [Online.] Available at: [https://ispd.org/PD\\_Video/](https://ispd.org/PD_Video/)
  15. Figueiredo A, Bernardini J, Bowes E, Hiramatsu M, Price V, Su Chunyan, *et al.* ISPD guidelines/recommendations: a syllabus for teaching peritoneal dialysis to patients and caregivers. *Perit Dial Int* 2016; 36:592–605.
  16. Boudville N, Choy Y, Equinox KL, Figueiredo AE, Hawley C, Howard K, *et al.* Teaching peritoneal dialysis in Australia: an opportunity for improvement. *Nephrol* 2018; 23(3):259–63.
  17. Gadola L, Poggi C, Poggio M, Saez L, Ferrari A, Romero J, *et al.* Using a multidisciplinary training program to reduce peritonitis in peritoneal dialysis patients. *Perit Dial Int* 2013; 33(1):38–45.
  18. Campbell DJ, Johnson DW, Mudge DW, Gallagher MP, Craig JC. Prevention of peritoneal dialysis-related infections. *Nephrol Dial Transplant* 2015; 30(9):1461–72.
  19. Zhang L, Hawley CM, Johnson DW. Focus on peritoneal dialysis training: working to decrease peritonitis rates. *Nephrol Dial Transplant* 2016; 31(2):215–22.
  20. Chow J, Fortnum D, Moodie JA, Simmonds R, Tomlins M. The HOME network: an Australian national initiative for home therapies. *J Ren Care* 2013; 39(Suppl 1):56–61.
  21. Green RA. The Delphi technique in education research. SAGE 2014. [Online.] Available at: <http://journals.sagepub.com/doi/full/10.1177/2158244014529773>
  22. Jiang XP, Yan L, Zheng XL, Liu X, Wei XQ. Development and evaluation of a new curriculum based on the Delphi method for master of nursing programs in China. *Chinese Nurs Res* 2016; 3:162–7.
  23. Laurillard D. Motivating and enabling the learning cycle. In: *Teaching as a design science: Building pedagogical patterns for learning and technology*. London: Routledge; 2012:82–104.
  24. Cline C. Flesch reading ease: understanding it, calculating it, improving it. [Online.] Available at: <https://www.verablo.com/blog/flesch-reading-ease>. Accessed 2017.
  25. Flesch R. How to write plain English. [Online.] Available at: <https://apps.carleton.edu/campus/webgroup/assets/flesch.pdf>. Accessed 2017.
  26. Centers for Disease Control and Prevention. Develop and Test Materials [Online.] Available at: [www.cdc.gov/healthliteracy/developmaterials](http://www.cdc.gov/healthliteracy/developmaterials). Accessed 2017.
  27. Dearn J, Fraser K, Ryan Y. Investigation into the provision of professional development for university teaching in Australia: a discussion paper. A DEST commissioned project funded through the HEIP program 2002. [Online.] Available at: <https://researchprofiles.canberra.edu.au/en/publications/preparing-academics-for-teaching-in-australian-universities>
  28. Mathias H. Mentoring on a programme for new university teachers: a partnership in revitalizing and empowering collegiality. *Int J Acad Dev* 2005; 10(2):95–106.
  29. Viskovic A. Becoming a tertiary teacher: learning in communities of practice. *Higher Ed Research & Dev* 2006; 25(4):323–39.
  30. Barlow J, Antoniou M. Room for improvement: the experiences of new lecturers in higher education. *Innov Educ Teach Int* 2007; 44(1):67–78.