

We don't need no education . . . (Pink Floyd, *The Wall*) Multidisciplinary predialysis education programmes: pass or fail?

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In the famous Pink Floyd song, education fails as it reduces every pupil in a totalitarian way to 'another brick in the wall'. Recently, much attention has been paid to timely referral and multidisciplinary predialysis education (MPE) programmes (for review see [1]). In this issue of *Nephrology Dialysis Transplantation* (NDT), Wu *et al.* [2] report the results of a non-randomized observational trial on the impact of an established MPE programme on the outcome of patients with chronic kidney disease (CKD) stage 3 or higher. The authors conclude that such an MPE programme decreases the number of patients ending up on dialysis, and reduces mortality. In what follows, we try to discuss why some methodological aspects of studying the effect of MPE make that the question whether all centres should have MPE programmes cannot be answered by a definite 'yes'; as such, we also try to offer some explanations why MPE programmes seem to work in some but not in all studies.

How does the positive outcome in the Wu study compare to other studies?

Outcome of MPE seems to be different between different studies. We discuss here two randomized controlled trials (RCT) (one negative [3] and one positive [4]). In the RCTs, Harris *et al.* [3] did not observe improvement in mortality nor in evolution of renal function, whereas Devins *et al.* [4] found that the MPE programme delayed the start of dialysis with an average of 3 months (17 versus 20 months), a significant but probably clinically irrelevant difference. More importantly, in the Devins study, 10-year survival was clearly superior in the MPE versus non-MPE group, but was not different between early and late referrals, irrespective of MPE. In the Harris study [3], the mean renal function at inclusion was higher than that in the Devins [4] and in the Wu [2] studies, where a substantial part of patients were already in CKD stage 5 on inclusion. Of note, in the Wu study, the number of CKD stage 5 patients at start was higher in the non-MPE versus the MPE group (162 versus 131, respectively). It would have been nice to see whether in

the Wu study there was also a difference in time to the start of epuration in patients who had an estimated glomerular filtration rate (eGFR) between 20 and 30 ml/min at inclusion. The follow-up in the study by Harris [3] was >3 years, as compared to only 12 months in the study by Wu *et al.* [2]. This difference in time frame is important, as the mean time to dialysis in the MPE versus non-MPE group was 9.2 versus 11.3 months in the Wu study. As the Wu [2] study covered only 12 months of observation, and the Devins [4] study suggested that the gain of MPE in this patient group is on average 3 months, it seems likely that in the months after the observation was censored, more patients in the MPE group will have started dialysis. It would be nice to see, e.g. whether after 15 months, there still was a difference in percentage of patients who did start dialysis. Taken together, these data seem to suggest that MPE in patients with already advanced CKD can be effective (1) in delaying need for dialysis, but for a limited period of time; (2) to prolong survival. The impact in patients with CKD3 seems less well established.

It is tempting to speculate on the nature of the underlying mechanisms of the delay of the start of dialysis. An in-depth analysis of the data in the Wu paper [2] reveals that half of the patients in the non-MPE group start dialysis for a potentially avoidable reason: fluid overload and/or hyperkalaemia. As these patients have a more or less comparable renal function at the time of the start of dialysis as the MPE group, the most likely reason for this difference is lack of dietary compliance. The reason for the observed (short term) benefit might thus well be a better dietary compliance enforced by the MPE programme. Di Micco *et al.* [5] recently demonstrated that in well-motivated, stable CKD 5 patients, dietary intervention is able to successfully delay the need to start renal replacement therapy with on average 11.8 months. This study was done in a highly selected and motivated patient group, so the effect in real life conditions might be less impressive.

This touches upon a second potential explanation for the better survival in MPE patients: patients included in the MPE or in the non-MPE arm may differ in baseline characteristics. This difference may relate to clinical differences: in the study by Devins *et al.* [4], despite being randomized, patients in the MPE group had a better non-renal health compared to the non-MPE group. Even more

important are presumable differences in motivation between patients taking part and those refusing to take part in an MPE programme. In the RCT by Devins *et al.* [4], only motivated patients were included as 30% refused participation, so despite randomization, there was a selection bias versus the real life situation. Curtis *et al.* [6,7] observed that MPE results in a survival benefit of patients starting dialysis, but inclusion in the MPE arm was voluntary, thus also most likely biased. Quite remarkably, in this study by Curtis *et al.* [6], the survival advantage was mainly concentrated in the period between the first and the second year after the start of dialysis. An indirect effect of MPE, such as the bias introduced by the fact that MPE patients are more motivated and compliant, might quite well fit with this observation. Also the Wu study [2] suffers from this problem. The authors explicitly excluded patients not providing consent to participate. While this seems evident, and ethically correct, it poses some questions on the generalizability of this study, specifically as we do not know how many patients refused the MPE, nor how these patients differed from those who did participate. It is quite conceivable that in the centres providing MPE, only the most motivated patients consented to take part, whereas in the non-MPE providing centre, the selection was less rigid, as there was no additional 'effort' asked from the patient. All teachers know that interest is the prerogative to successful learning, and as such the motivated MPE patients probably have an intrinsic advantage over the less motivated, non-MPE patients. Overall, these data underline that MPE can be efficacious (i.e. it works in well-defined conditions) in motivated patients, especially for prolonging survival. Questions remain about its effectiveness (i.e. whether it works in everyday life) as it will be very hard to convince 'non-compliant' patients.

How and why do MPE programmes work?

The Wu study is not a RCT, as patients are randomized to two different centres rather than to two different treatments. While this is a clear drawback, and it might be that centre effects do play an important role in the observed outcome differences, it highlights a very important point: the observed benefits are not attributable to differences in the nephrological/medical care, as the nephrologists were the same in both hospitals. Hence, the difference must be attributed to non-nephrological, or practice-related factors. The sobering observation that 'multidisciplinarity' [8] has an additional benefit and that 'early referral' [1] in itself is not enough to improve outcome has been made before. In a non-randomized trial comparing patients followed in the same centre and by the same nephrology team, but one group with and one without MPE, Levin *et al.* [8] found a reduction of urgent dialysis start (13% versus 35%), and less hospitalization days after the start of dialysis in the MPE patients. In a comparable setting, Goldstein *et al.* [9] demonstrated better survival after the start of dialysis in patients having received MPE. Polkinghorne *et al.* [10] recently demonstrated that a nurse-driven algorithm resulted in an increase of percentage of patients starting dialysis with a functioning arteriovenous fistula. Of note, in this study, there was a substantial reduction in waiting

time to be scheduled for surgery with the implementation of this programme, suggesting that practice patterns indeed do have an important role in the preparation for epuration of the CKD patient. In the Wu study, the impact of the MPE on functioning native vascular access at start was less impressive (62 out of 101 versus 10 out of 26 patients in the MPE versus non-MPE groups, respectively), but different authors have previously reported that a structured approach enlarges the number of patients starting dialysis with permanent access, adding to a survival benefit after the start of RRT [11,12]. It is clear that, besides nephrological skills, a multidisciplinary and well-structured approach is essential to take care of CKD patients in an efficacious way. There are several reasons why MPE should be more efficacious than a 'solo nephrologist approach'. It might be that 'skilled non-medical educators' are better in transferring information than physicians, as they have a more solid pedagogic and methodological background. Non-medical educators achieve higher patient satisfaction in terms of received and acquired information on kidney disease and dialysis than nephrologists [13]. It might be that nephrologists focus too much on 'esoteric' aspects, rather than on the basics, like diet, or compliance with medication. Dietary compliance presumes that patients have both the skills and the motivation to adhere to the diet. The presence of a skilled dietician is probably quintessential to translate the instructions of the nephrologist to a diet sustainable in everyday life.

Buck *et al.* [14] observed that MPE lowered the need to start dialysis acutely, an effect mainly attributable to avoidance of potential nephrotoxic insults. As patients with advanced CKD mostly have multiple comorbidities, they are prone to exposure to nephrotoxic medications and interventions. McClellan *et al.* [15] reported that of patients with a serum creatinine >2 mg/dl and admitted to hospital for observation of difficult to control hypertension, 12.5% still were prescribed NSAID's at the time of discharge. Blix *et al.* [16] confirmed that in hospitalized patients with renal impairment, nephrotoxic drugs were frequently administered, resulting in a substantial incidence of drug-related comorbidities. Also for the avoidance of nephrotoxicity, the multidisciplinary and educational character of the predialysis programme can thus be of importance [13]. In an elderly population, Quartarolo *et al.* [17] observed that reporting eGFR to the treating physician did increase awareness of the diagnosis of CKD, but did not result in the reduction of prescription of NSAID's or adaptation of drug dosing. This indicates that better structured interventions than just alerting the physician are warranted, which pleads for MPE. Careful instruction of all actors involved, and in the first place the patient, to scrutinize every intervention or change in medication might be a key factor to avoid such 'unlucky' events.

In conclusion, the Wu study [2] confirms that early nephrology referral in itself is not sufficient to improve outcomes [1], and that a multidisciplinary educational programme seems to be a prerequisite for success. As such, and in line with other studies, the implementation of MPE's in all CKD programmes should be encouraged. Unfortunately, we cannot be sure of the impact of MPE's in the overall CKD population, as in all studies there is selection bias for more

motivated patients. Besides this, MPE is labour intensive, the CKD population is large and cost-effectiveness evaluation of MPE is lacking. A 'basic awareness' programme, focussing on avoidance of nephrotoxicity, importance of blood pressure control and diet for the majority of CKD patients (and for the physicians treating them) and a 'full menu' for motivated CKD 4 patients might be the best way to go. An education programme treating and respecting every patient as an individual, with education on his/her level, is what we want, because patients are not just another brick in the wall.

Conflict of interest statement. None declared.

(See related article by I.-W. Wu *et al.* Multidisciplinary predialysis education decreases the incidence of dialysis and reduces mortality—a controlled cohort study based on the NKF/DOQI guidelines. *Nephrol Dial Transplant* 2009; 24: 3426–3433.)

References

1. Baer G, Van Biesen W, Lameire N. Late referral of patients with end stage renal disease: an in depth review and suggestions for further actions. *Nephrol Dial Transplant Plus* 2009
2. Wu IW, Wang SY, Hsu KH *et al.* Multidisciplinary predialysis education decreases the incidence of dialysis and reduces mortality—a controlled cohort study based on the NKF/DOQI guidelines. *Nephrol Dial Transplant* 2009; 24: 3426–3433
3. Harris LE, Luft FC, Rudy DW *et al.* Effects of multidisciplinary case management in patients with chronic renal insufficiency. *Am J Med* 1998; 105: 464–471
4. Devins GM, Mendelssohn DC, Barre PE *et al.* Predialysis psychoeducational intervention extends survival in CKD: a 20-year follow-up. *Am J Kidney Dis* 2005; 46: 1088–1098
5. Di Micco L, Torraca S, Pota A *et al.* Setting dialysis start at 6.0 ml/min/1.73 m² eGFR—a study on safety, quality of life and economic impact. *Nephrol Dial Transplant* 2009; 24: 3434–3440
6. Curtis BM, Barret BJ, Jindal K *et al.* Canadian survey of clinical status at dialysis initiation 1998–1999: a multicenter prospective survey. *Clin Nephrol* 2002; 58: 282–288
7. Curtis BM, Barrett BJ, Djurdjev O *et al.* Evaluation and treatment of CKD patients before and at their first nephrologist encounter in Canada. *Am J Kidney Dis* 2007; 50: 733–742
8. Levin A, Lewis M, Mortiboy P *et al.* Multidisciplinary predialysis programs: quantification and limitations of their impact on patient outcomes in two Canadian settings. *Am J Kidney Dis* 1997; 29: 533–540
9. Goldstein M, Yassa T, Dacouris N *et al.* Multidisciplinary predialysis care and morbidity and mortality of patients on dialysis. *Am J Kidney Dis* 2004; 44: 706–714
10. Polkinghorne KR, Seneviratne M, Kerr PG. Effect of a vascular access nurse coordinator to reduce central venous catheter use in incident hemodialysis patients: a quality improvement report. *Am J Kidney Dis* 2009; 53: 99–106
11. Lee T, Barker J, Allon M. Associations with predialysis vascular access management. *Am J Kidney Dis* 2004; 43: 1008–1013
12. Lorenzo V, Martin M, Rufino M *et al.* Predialysis nephrologic care and a functioning arteriovenous fistula at entry are associated with better survival in incident hemodialysis patients: an observational cohort study. *Am J Kidney Dis* 2004; 43: 999–1007
13. Plantinga LC, Pham HH, Fink NE *et al.* Use of dialysis educators beyond nurses and physicians and outcomes in patients with kidney failure. *Adv Chronic Kidney Dis* 2005; 12: 424–432
14. Buck J, Baker R, Cannaby AM *et al.* Why do patients known to renal services still undergo urgent dialysis initiation? A cross-sectional survey. *Nephrol Dial Transplant* 2007; 22: 3240–3245
15. McClellan WM, Knight DF, Karp H *et al.* Early detection and treatment of renal disease in hospitalized diabetic and hypertensive patients: important differences between practice and published guidelines. *Am J Kidney Dis* 1997; 29: 368–375
16. Blix HS, Viktil KK, Moger TA *et al.* Use of renal risk drugs in hospitalized patients with impaired renal function—an underestimated problem? *Nephrol Dial Transplant* 2006; 21: 3164–3171
17. Quartarolo JM, Thoele M, Schafers SJ. Reporting of estimated glomerular filtration rate: effect on physician recognition of chronic kidney disease and prescribing practices for elderly hospitalized patients. *J Hosp Med* 2007; 2: 74–78

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