In the present study, we identified patients who had difficulties learning the minimum knowledge and skills required to carry out peritoneal dialysis (PD), and we compared the outcomes in this subgroup of patients with outcomes in the general PD population.

We calculated the mean learning sessions needed by our total PD population during the training period. We then assigned patients to one of two groups according to the number of learning sessions they needed. Patients who required a number of sessions equal to or less than the mean were placed in the “standard learning” group; patients who required more sessions but who reached the minimum knowledge and skills were placed in the “learning difficulties” group. We compared these two groups in terms of age, sex, diabetes status, autonomy to perform PD, family support, education level, residual renal function, and Charlson comorbidity index. Outcomes on PD included time to first peritonitis episode, peritonitis rate, percentage of patients free of peritonitis during follow-up, survival time on PD, and transfer to hemodialysis.

Patients with learning difficulties were older and had more comorbidities. Outcomes on PD in the learning difficulties group were similar to those in the standard learning group, except for time to first peritonitis.

Key words
Training, learning difficulties

Introduction
The overall success of a peritoneal dialysis (PD) program is strongly mediated by the efficacy of its education program. In the recent past, an increasing number of elderly patients have been initiated onto PD treatment, and these patients often have an increased number of comorbid conditions that limit performance. Teaching practices and protocols have therefore been adapted to this new situation. Flip charts and posters are now included in the training routine to make it more interactive, and the length and frequency of training periods have also been adjusted so that patients can learn at their own pace. However, no data are available regarding the profile of patients with learning difficulties, and how such patients do on PD with this modified teaching approach.

The first aim of the present study was to identify patients with learning difficulties—that is, patients that needed more time to achieve the minimum knowledge and skill required to carry out the PD technique. The second aim was to compare the outcomes on PD of this subgroup of patients with outcomes in the general PD population.

Patients and methods
The PD training program is given within our unit and includes an illustrated guide, flip charts, and posters that patients can then follow at home. Exchanges are simulated during the training period. A minimum of knowledge and skills is required to initiate the PD technique, but the training is adapted to accommodate each patient’s condition.

For the purposes of the present study, nurses delivering the training kept quantitative records of the process, expressed as the number of training sessions (2 – 3 hours per session). The record included the general process and each type of intervention: theory, the connection and disconnection process, management of PD material, care of the exit site, problem identification, and so on.

We included in the study all the patients trained in our unit using this approach. We calculated the mean of the sessions needed by our total PD population during the training period. Patients were then assigned to one of two groups according to the number of sessions that they had required. Patients who required a number of sessions equal to or less than the mean were assigned to the “standard learning” group, and
patients who required more sessions, but who reached the minimum knowledge and skills were assigned to the “learning difficulties” group.

We then compared the two groups in terms of age, sex, diabetes status, autonomy to perform PD (yes or no), family support (living alone, alone with support, accompanied) educational level (illiterate or elementary, high-school, or university education), residual renal function (RRF, as mean of urea and creatinine clearance), and Charlson comorbidity index (CCI) to evaluate comorbid conditions (1).

Outcomes on PD included time to first peritonitis episode (months), peritonitis rate (patient–years), percentage of patients free of peritonitis during the follow-up, survival time on PD, and transfer to hemodialysis (HD). All data are expressed as mean ± standard deviation for normally distributed data and median or range for skewed data. Statistical comparisons were performed using the Student t-test; comparisons of percentages between groups were made using the chi-square test or Fisher exact test, as appropriate. Actuarial survival curves were determined according to the Kaplan–Meier life-table method. Data were censored at death, transplantation, and transfer to HD. The level of significance was set at \( p = 0.05 \).

Results
A total of 77 incident continuous ambulatory peritoneal dialysis patients were trained during the study. Mean age of the patients was 57.9 ± 18 years. The group included 79.2% men and 36% patients with diabetes. Among the patients, 56% were completely autonomous, 88% lived with a family member or companion, and 82% had elementary or high-school education. The mean number of training sessions was 7.4 ± 2.8 (range: 3 – 15). Mean time of PD follow-up was 23.3 ± 15 months.

Table I shows the baseline characteristics of the two groups and comparisons between them. In our study, age and CCI were the factors that significantly determined the number of training sessions. That is, older patients and those with more comorbidities needed more training time.

Table II compares the two groups of patients. Patients that needed more training time had a significantly shorter time to first peritonitis (38 months vs. 54 months, \( p = 0.04 \); Figure 1). However, no significant differences were found in the peritonitis rate or in the percentage of patients free of peritonitis during the follow-up period.

We observed no differences in survival time on PD or in the percentage of patients transferred to HD.

Discussion
Increasing age and comorbidity imply a prolonged training time. These parameters are interrelated, because age is included as a variable in calculating the CCI. The remaining parameters that we analyzed—
for example, education level and family support—did not affect the number of training sessions.

However, it is important to note that our population was very homogenous in terms of education level and that 88% of patients lived with a family member or companion. These factors may have precluded the lack of significant results in our study. For this reason, our results should be confirmed in more diverse populations.

The time and the techniques used for training in our unit were similar to those reported for other European units (2). Studies that compare standard learning techniques with a more modern approach find that patients with learning difficulties do better with the latter type of training (3). For this reason, we were not surprised by our results. Despite a nonsignificant increase in the number of peritonitis episodes in the learning difficulties group, their peritonitis rate is lower than the accepted international standard (4).

Patients with learning difficulties have a survival time on PD that is similar to that of their standard-learning peers, and a similar percentage of transfer to HD. Our results accord with other studies in which older patients adapted and performed well on PD (5).

The only significant difference observed in our study was in time to first peritonitis. Patients with learning difficulties had a significantly shorter time to first peritonitis. This result suggests that we should consider this subgroup of patient to be candidates for refreshing training sessions. An annual refresher session conducted simultaneously with the peritoneal equilibration test has become a regular practice in our unit. The number of patients is still not large enough as to determine if this practice delays the time to first peritonitis.

**Conclusions**

Patients with learning difficulties are older and have more comorbidities. Outcomes of patients with learning difficulties on PD were similar to those in a standard learning group, except for time to first peritonitis.

**References**


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