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Effectiveness of Mindfulness-based interventions delivered via technology versus therapist among patients on peritoneal dialysis

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Introduction

Mindfulness-based interventions (MBIs) have been recommended to mediate stressful events, albeit inconsistently. It is also unknown which is the most effective method to teach MBI.

Study Aims

1. To evaluate the effectiveness of MBI in improving self-efficacy, reducing stress and anxiety among peritoneal dialysis (PD) patients over time

2. To compare the most effective method to teach MBI

Methodology

Study design : Single-site, parallel randomized 3-arms controlled trial.

Setting : Peritoneal Dialysis Clinic in Singapore General Hospital

Study period : Between October 2020 to June 2021

Inclusion criteria:
- End-stage kidney disease patients requiring lifelong PD therapy.
- Patients learning PD for the first time.
- Patients performing the PD or Automatic PD independently.
- Patients who have access to either a smartphone, tablet or computer

Exclusion criteria:
- Patients under 21 years old for informed consent purposes.
- Patients who relied on their caregiver to manage their PD

- Eligible participants were randomly allocated to receive either the video-assisted mindfulness training (VAMT) or therapist-assisted mindfulness training (TAMT) or treatment as usual with no mindfulness training (TAU).

- All groups received **4.5 days of structured PD training** at the PD centre, whilst VAMT and TAMT groups were taught additional MBI techniques.

Outcome data collected (measured at baseline, 4 and 12 weeks post-randomization)
- Perceived stress scale (PSS),
- self-efficacy and
- anxiety (State and Trait Anxiety Inventory)

Results

A total of 39 participants were recruited (13 in each group). Figure 1 shows the CONSORT flowchart of the study.

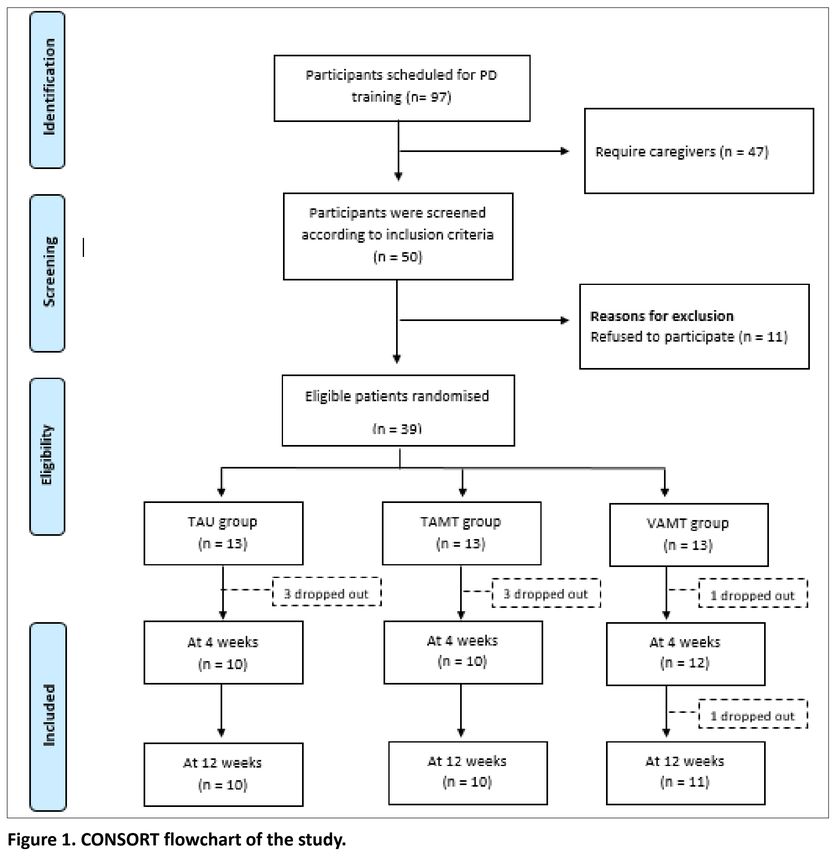

Figure 1. CONSORT flowchart of the study.

Results

The descriptive demographic and the outcome measures are presented in Table 1 and Table 2, respectively.

Characteristics	TAU (n = 13)	TAMT (n = 13)	VAMT (n = 13)
	Mean (SD)	Mean (SD)	Mean (SD)
Age, years	55.31 (10.21)	57.23 (10.71)	54.38 (13.14)
Characteristics	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**
Gender			
Female	6 (46.2)	5 (38.5)	6 (46.2)
Ethnicity			
Chinese	9 (69.2)	11 (84.6)	10 (76.9)
Malay	1 (7.7)	2 (15.4)	1 (7.7)
Indian	1 (7.7)	0 (0.0)	2 (15.4)
Others	2 (15.4)	0 (0.0)	0 (0.0)
Religion			
Christianity	1 (7.7)	2 (15.4)	2 (15.4)
Buddhism/Taoism	6 (46.2)	8 (61.5)	4 (30.8)
Islam	2 (15.4)	2 (15.4)	2 (15.4)
Hinduism	1 (7.7)	0 (0.0)	1 (7.7)
Others	3 (23.1)	1 (7.7)	4 (30.8)
Highest education level			
No education/primary	1 (7.7)	0 (0.0)	0 (0.0)
Secondary	7 (53.8)	5 (38.5)	4 (30.8)
Trade school*/diploma	2 (15.4)	6 (46.2)	4 (30.8)
University	3 (23.1)	2 (15.4)	5 (38.5)
Number of underlying comorbidities			
0	0 (0.0)	0 (0.0)	0 (0.0)
1-2	12 (92.3)	12 (92.3)	12 (92.3)
>2	1 (7.7)	1 (7.7)	1 (7.7)
Type of PD			
CAPD	3 (23.1)	1 (7.7)	0 (0.0)
APD	10 (76.9)	12 (92.3)	13 (100.0)

Table 1. Demographics characteristics of patients

Characteristics			
Baseline	**TAU (n = 13)**	**TAMT (n = 13)**	**VAMT (n = 13)**
SE score	41.00 (5.86)	34.77 (14.06)	37.62 (13.78)
PSS score	16.08 (5.78)	19.46 (9.60)	17.38 (6.68)
S-STAI score	38.62 (7.59)	39.62 (16.16)	39.92 (13.10)
T-STAI score	40.31 (6.99)	41.00 (14.55)	40.38 (12.63)
Week 4	**TAU (n = 10)**	**TAMT (n = 10)**	**VAMT (n = 12)**
SE score	42.90 (4.73)	38.30 (8.35)	41.33 (8.96)
PSS score	13.90 (5.02)	16.10 (2.73)	15.25 (4.14)
S-STAI score	34.00 (5.42)	33.20 (4.96)	32.67 (4.10)
T-STAI score	33.80 (4.29)	33.80 (4.87)	33.83 (5.37)
Week 12	**TAU (n = 10)**	**TAMT (n = 10)**	**VAMT (n = 11)**
SE score	44.00 (5.58)	39.70 (7.62)	43.73 (9.02)
PSS score	15.20 (4.42)	14.20 (1.93)	12.45 (3.98)
S-STAI score	32.40 (4.01)	32.50 (3.24)	31.00 (4.29)
T-STAI score	33.40 (4.22)	32.20 (3.71)	32.18 (3.97)

Table 2. Baseline, Week 4 & Week 12 of Measurement Scores

All the therapies showed a significant time trend in anxiety (State and Trait Anxiety Inventory). There were a significant trend in PSS only for participants in TAMT/VAMT groups, but no significant trends in self-efficacy. Participants in TAMT and VAMT groups had reduced PSS compared to TAU at week12 (figure 2- figure 5).

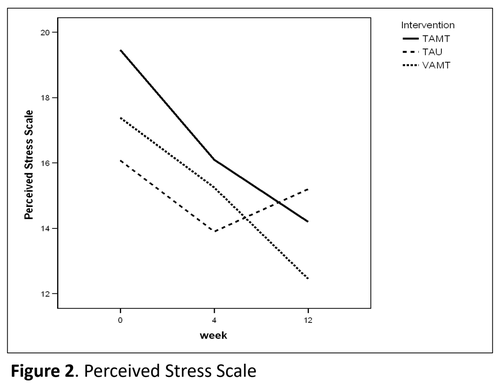

Figure 2. Perceived Stress Scale

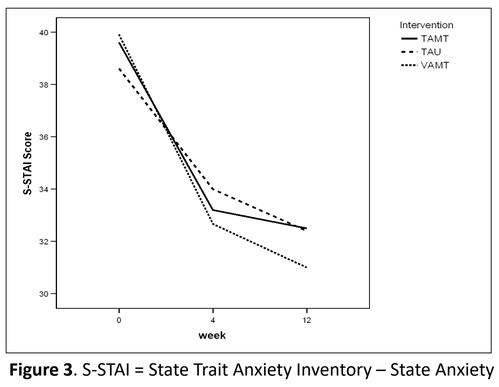

Figure 3. S-STAI = State Trait Anxiety Inventory – State Anxiety

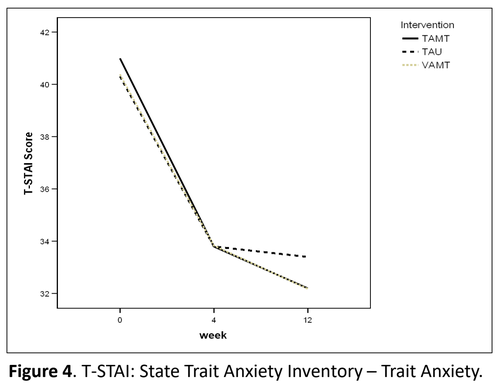

Figure 4. T-STAI: State Trait Anxiety Inventory – Trait Anxiety.

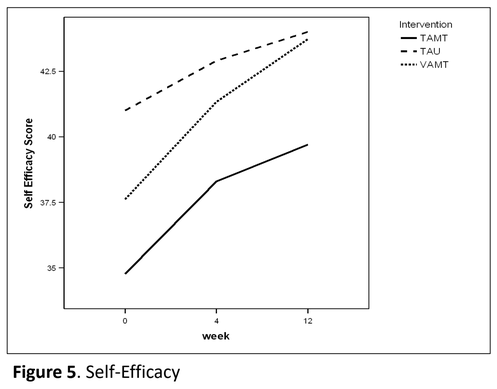

Figure 5. Self-Efficacy

Discussion

This study evaluated the effect of MBI in improving PD patient outcomes, specifically in reducing anxiety, perceived stress and enhancing self-efficacy among first time PD patients. Overall, the significant reduction in the anxiety trend denotes the possibility of PD patients being less anxious over time as they gain confidence in managing PD at home. TAMT and VAMT also seem to be equally effective methods to conduct MBI, as evident from the reduced PSS at 12 weeks.

PD is the only well-established home-based dialysis therapy in Singapore. During the COVID-19 pandemic, modification and optimization to the PD training were essential in response to the limited capabilities for commuting to and fro the hospital. As a result, VAMT was the ideal option to deliver MBI during the pandemic, as well as to accommodate the therapists who had to work remotely. Moreover, using a video-assisted guide to teach mindfulness practices to patients during their PD training sessions is hypothesized to aid the limited supply of mindfulness trained therapists.

Conclusion

This study demonstrated the potential of MBI in improving stress and anxiety among first time PD patients, and VAMT is just as effective as TAMT.

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