

Exercise Intervention to Normalize Blood Pressure and Nocturnal Dipping in Hypertensive Patients: a Randomized Controlled Trial

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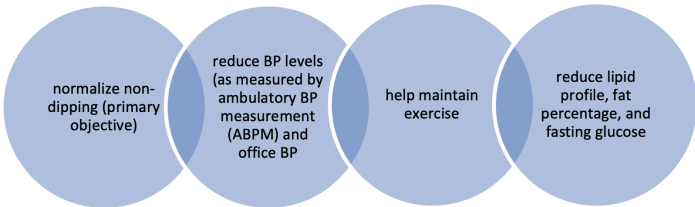
Background

- Non-dipping refers to a lack of normal systolic blood pressure (BP) reduction of 10% during sleep, which is an independent predictor of cardiovascular events and mortality
- There is a lack of evidence-based treatment for non-dipper
- It is unclear whether exercise can normalize non-dipping in hypertensive patients

Objectives

Major objectives:

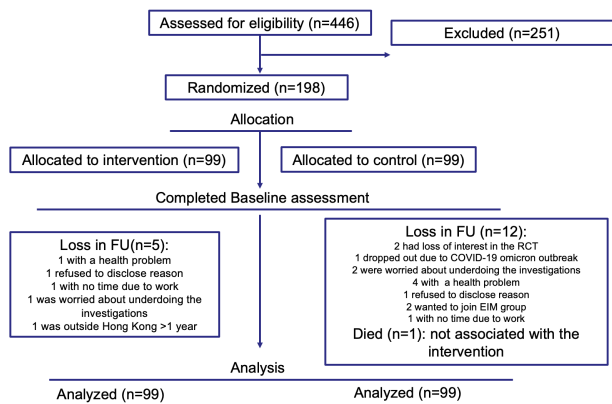
- When compared with usual care control, examine whether Exercise is Medicine (EIM) program on top of usual care:



Methods

Recruitment:

- During medical follow-up in 2 local Government-funded out-patient clinics (Lek Yuen Clinic & Yuen Chau Kok Clinic)
- ABPM: 4 weeks before EIM classes to identify non-dippers

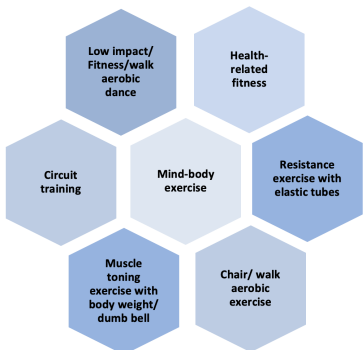


Major outcomes:

- Proportion of non-dippers at 3 months
- BP levels at 3 months, 6 months, and 12 months

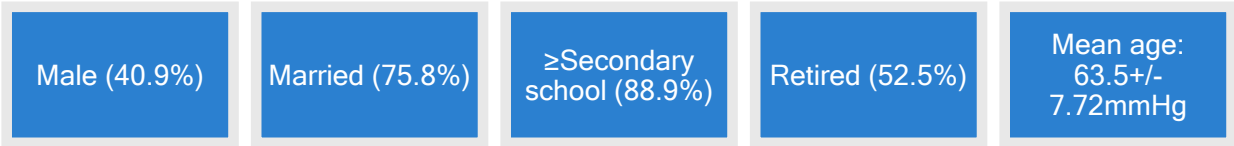
Analysis:

- The data were analysed on an intention-to-treat basis
- Logistic regression & ANCOVA



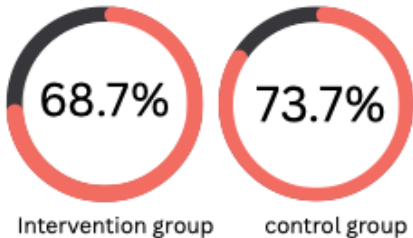
Results

At baseline, most participants:



Primary findings :

- At 3 months (immediately after the intervention), EIM program did not significantly reduce the proportion of non-dippers (EIM:68.7% [95% CI:59.39%-77.98%] vs. control:73.7% [95% CI:64.92%-82.56%]; p=0.43) Similar results were observed at 12 months



Other major findings:

- Blood pressure levels also showed non-significant group differences at 3 months and 12 months
- There were no significant group differences in exercise level (measured by metabolic equivalent of task), fat percentage , fasting glucose levels and lipid profile (total cholesterol level, high density lipoprotein, triglyceride, low density lipoprotein) immediately after the intervention period

Table 1. BP levels at baseline and immediately after the intervention period

Outcome	Intervention		Control		p-value
	Baseline	3-month	Baseline	3-month	
24h SBP	122.5 (10.1)	123.5 (9.1)	121.8 (9.3)	122.7 (10.1)	0.72
24h DBP	73.4 (7.1)	73.8 (7.0)	73.1 (6.2)	73.4 (7.1)	0.82
Daytime SBP	124.1 (10.2)	126.4 (9.5)	123.6 (9.4)	125.2 (10.4)	0.41
Daytime DBP	74.8 (7.3)	75.9 (7.3)	74.7 (6.4)	75.2 (7.4)	0.43
Nighttime SBP	118.9 (10.6)	117.1 (10.6)	118.3 (10.0)	117.4 (11.3)	0.52
Nighttime DBP	70.7 (7.6)	69.2 (7.7)	69.9 (6.6)	69.2 (7.4)	0.40
Dipping percentage	4.2 (4.4)	7.3 (6.2)	4.2 (4.3)	6.1 (6.2)	0.13
Office SBP	136.9 (13.4)	132.9 (14.7)	137.6 (15.1)	132.5 (13.3)	0.60
Office DBP	80.9 (9.4)	78.2 (8.6)	80.4 (9.1)	78.4 (9.9)	0.59

Table 2. BP levels at other end-points

Outcome	Time point (month)	Intervention	Control	p-value
24h SBP	12	124.5 (10.2)	123.1 (9.7)	0.33
24h DBP	12	73.9 (7.8)	73.2 (7.0)	0.52
Daytime SBP	12	127.6 (10.5)	125.7 (9.8)	0.19
Daytime DBP	12	75.9 (8.1)	75.1 (7.2)	0.27
Nighttime SBP	12	117.6 (11.2)	117.0 (11.1)	0.89
Nighttime DBP	12	69.3 (8.5)	68.9 (7.5)	0.71
Dipping percentage	12	7.7 (5.8)	6.8 (6.29)	0.25
Office SBP	6	128.2 (12.4)	131.0 (13.2)	0.12
	12	130.4 (12.5)	131.2 (14.0)	0.81
Office DBP	6	75.9 (9.0)	77.3 (9.1)	0.12
	12	77.2 (8.6)	76.43 (8.8)	0.62

Discussion



Underpowered: there was only approximately 5% group difference in proportion of non-dippers



Our findings suggest that exercise may not be useful for non-dipping in patients with normotension



? Work better in patients with hypertension: will need a sub-group analysis patients with high blood pressure at baseline

Conclusion

- Although intervention group had a lower proportion of non-dippers than control group at both 3 and 12 months, the differences were not significant.
- Despite incorporating interventions to encourage exercise habits, EIM program did not effectively increase exercise levels or improve non-dipping in hypertensive patients.