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Effects of an 8-week of brief mindfulness meditation combined with a running programme on physical performances and health in runners: a randomized controlled study.

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1. INTRODUCTION

➤ **Mindfulness-Based Interventions (MBI)** + **Physical Activity (PA)** → performance = **unclear**. Studies proposed **long MBI** with **low-intensity PA** programme.^{1,2}
 ➤ → investigate the effects of **Brief Mindfulness Meditation (BMM)**-based MBI + running programme based on **High-Intensity Intermittent Training (HIIT)** on performance and health in runners.

2. METHODS

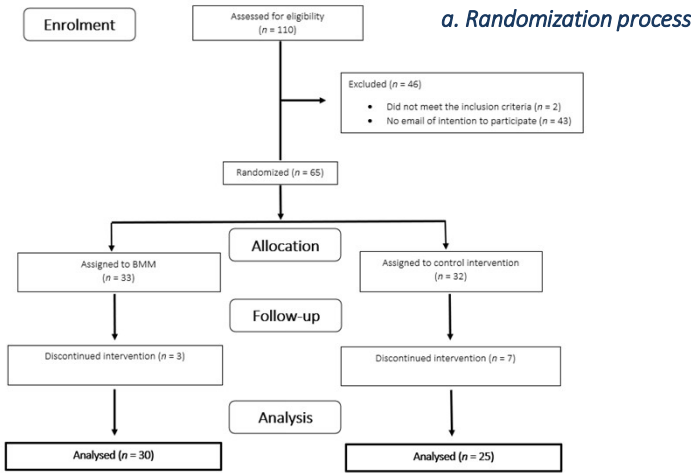


Fig.1. CONSORT chart demonstrating group sizes for enrolment, allocation, follow-up, and analysis

b. Measurements

➤ Realised at baseline (T0), at 4 weeks (T4) and at 8 weeks (T8) after T0.



- Heart Rate Variability (HRV)
- Global evaluation of Physical Fitness (PF)
- Intermittent Maximum Speed (IMS)
- Fat Mass (FM) percentage
- Ratings of Perceived Exertion (RPE)

c. Interventions

HIIT-based running programme

3 running training/week :

- HIIT training
- Tempo run training
- Long run



BMM-based MBI

6 BMM sessions/week :

- Before/after running training
- Session time: 5-12 minutes
- Possibility of practising independently



Control group

Interventions by video conference on themes related to running (e.g., shoes with carbon blades, data from connected watches) and relaxation (i.e., introduction to muscle relaxation techniques).



d. Statistical analysis

- Shapiro-Wilk (normality) / Levene (homogeneity)
- Two-way repeated measure ANalysis Of VAriance (ANOVA)



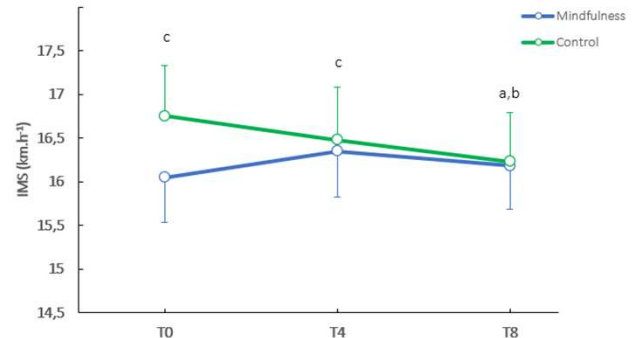
3. RESULTS

Tab.1. Results from physical performance measurements at different times according to groups

	Mindfulness group			Control group		
	T0	T4	T8	T0	T4	T8
Ln RMSSD	3.62 ± 0.55	3.59 ± 0.67	3.65 ± 0.69	3.70 ± 0.86	3.79 ± 0.71	3.76 ± 0.77
Intermittent maximum speed (km.h ⁻¹)	16.05 ± 2.93 ^c	16.35 ± 2.98 ^c	16.18 ± 2.82	16.75 ± 2.71 ^c	16.48 ± 2.85 ^c	16.23 ± 2.65 ^{ab}
RPE _{4s} (km.h ⁻¹)	13.71 ± 1.92 ^{bc}	11.45 ± 1.56 ^{bc}	11.00 ± 1.23 ^{ab}	13.13 ± 2.19 ^{bc}	11.60 ± 1.64 ^{bc}	11.03 ± 1.44 ^{ab}
RPE ₁₀ (km.h ⁻¹)	14.89 ± 2.01 ^{bc}	13.40 ± 1.97 ^{bc}	12.95 ± 1.75 ^{ab}	14.55 ± 2.08 ^{bc}	13.49 ± 1.79 ^{bc}	12.95 ± 1.71 ^{ab}
RPE ₁₇ (km.h ⁻¹)	18.06 ± 2.20 ^{bc}	15.94 ± 2.56 ^{bc}	14.90 ± 2.41 ^{ab}	15.98 ± 2.14 ^{bc}	15.38 ± 2.06 ^{bc}	14.87 ± 2.15 ^{ab}

	Mindfulness group		Control group	
	T0	T8	T0	T8
Body fat (%)	19.77 ± 6.45 ^c	20.08 ± 6.24 ^c	19.98 ± 5.79 ^c	20.94 ± 5.63 ^c
Quotient of physical fitness (score)	41.04 ± 10.68 ^c	45.74 ± 10.99 ^c	41.56 ± 10.16 ^c	44.46 ± 10.23 ^c
Cardiorespiratory endurance (m)	596.89 ± 75.01 ^c	595.93 ± 64.87 ^c	601.00 ± 70.06 ^c	580.96 ± 57.87 ^c
Motor coordination (n)	31.89 ± 10.35 ^c	36.89 ± 9.20 ^c	31.64 ± 9.96 ^c	36.56 ± 9.06 ^c
Force endurance (s)	159.32 ± 73.72 ^c	177.89 ± 86.63 ^c	162.96 ± 73.10 ^c	178.24 ± 75.16 ^c
Power (cm)	146.73 ± 31.89	146.04 ± 32.32	137.32 ± 29.53	143.80 ± 26.50
Speed lower limbs (s)	4.91 ± 0.78 ^c	4.57 ± 0.43 ^c	4.96 ± 0.77 ^c	4.89 ± 0.67 ^c
Speed upper limbs (s)	11.47 ± 1.89 ^c	10.64 ± 2.58 ^c	10.95 ± 1.82 ^c	10.25 ± 1.61 ^c
Balance (score)	3.67 ± 1.07	4.07 ± 0.96	3.54 ± 0.78	3.71 ± 1.04
Ln Arm strength (n)	3.37 ± 0.65	3.51 ± 0.48	3.52 ± 0.47	3.50 ± 0.40
Flexibility (score/5)	3.59 ± 0.97	3.59 ± 0.97	3.40 ± 0.91	3.44 ± 0.87

Fig.2. Intermittent maximum speed according to group and time



Legend: IMS : Intermittent Maximum Speed (IMS), RPE : Ratings of Perceived Exertion, RMSSD : Root Mean Square of Successive R-R intervals, ^asignificantly different from T0 (p < 0.05), ^bsignificantly different from T4 (p < 0.05), ^csignificantly different from T8 (p < 0.05).

4. DISCUSSION

IMS

Assumptions

Control group



High training load for runners at this season's time.
 Creation of 🧘 = 🚫 affect physical performance.³

Mindfulness group



Despite high training load, IMS stagnated. A trend (p = 0.06) would even seem to suggest an IMS ↗ between T0 and T4 probably due to the potential enhancement of mindfulness skills (awareness, refocusing) that MBI might generated.⁴

5. CONCLUSION

- ➊ Effect + of BMM-based MBI combined HIIT-based PA programme on **cardiorespiratory endurance physical performance**. MBI using brief sessions could 🏃 runners' performance.
- ➋ No effect on HRV, RPE, PF and FM percentage in trained runners.
- ➌ Longer studies over a whole season with laboratory and psychological measurements are needed to confirm these promising results.

References

¹Gardner et Moore (2004) / ²Ulrich-French et Cox (2021) / ³Meeusen et al. (2013) / ⁴Tebourski et al. (2022)