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# WELL-BEING QUESTIONNAIRE AS A TOOL TO MONITOR THE STATE OF READINESS IN SPRINTER ATHLETES

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## ABSTRACT

We determined the effects of the last two days of tapering before the World Athletics Championship using a questionnaire related to the state of readiness. 4x100 m relays athletes (n=4, sprinters [age: 24.5 ± 2.5y; best performance at 100 m: 10.03 ± 0.04 seconds]) performed two training sessions. The Well-being Questionnaire was applied on each day and they were instructed to indicate the individual perception of fatigue and stress on a five-point scale. The athletes presented lowered levels of Well-being on the first day, and after the coaches regulate the training volume according to the Well-being Questionnaire reports, on the second day the athletes reported improvement in the wellbeing. The use of Questionnaires such as the Well-being Questionnaire proved to be a good predictor of the state of readiness indicating stress and fatigue in elite athletes performing the last two days of tapering before an international competition.

**Key words:** Athletics. Training load. Fatigue. Stress. Taper.

## RESUMO

Questionário de bem-estar como ferramenta de monitoramento do estado de prontidão em atletas velocistas

Determinamos os efeitos dos últimos dois dias de polimento antes do Campeonato Mundial de Atletismo utilizando um questionário relacionado com o estado de prontidão. Atletas de 4x100 m (n=4, velocistas [idade: 24,5 ± 2,5y; melhor desempenho nos 100 m: 10,03 ± 0,04 segundos]) realizaram duas sessões de treinamento. O Questionário do Bem-estar foi aplicado em cada dia e foram instruídos a indicar a percepção individual de fadiga e estresse numa escala de cinco pontos. Os atletas apresentaram níveis mais baixos de bem-estar no primeiro dia, e após os treinadores regularem o volume de treino de acordo com os relatórios do Questionário de Bem-estar, no segundo dia os atletas reportaram uma melhoria de bem-estar. A utilização de questionários como o Questionário de Bem-estar provou ser um bom preditor do estado de prontidão indicando stress e fadiga em atletas de elite que realizaram os dois últimos dias de afinação antes de uma competição internacional.

**Palavras-chave:** Atletismo. Carga de treino. Fadiga. Estresse. Polimento.

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## INTRODUCTION

As a result of high-level competitions, elite athletes are constantly under pressure to maintain and improve their performance.

Different training models have been proposed aiming to maximize their performance through high-volume and intensity training (Soligard et al., 2016).

However, in athletes the training load is frequently elevated and it has been related to maladaptation on physical and psychological function, increasing the risk of illness and injury (Meeusen et al., 2013).

Training monitoring has been widely used by strength and conditioning practitioners as a tool for athletes' state of readiness (Blanch, Gabbett, 2016).

There are several methods for monitoring training responses, and among them, subjective and low-cost methods stand out, including rating of perceived exertion (RPE) and session-RPE (sRPE) adapted by Foster (Foster et al., 2001), the Total Recovery Quality scale (TQR) (Brink et al., 2010), and the Well-being Questionnaire, which also evaluate external factors that may compromise the training session (Mclean et al., 2010).

The Well-being Questionnaire has been used in several sports such as volleyball (Clemente et al., 2020), soccer (Nobari et al., 2020), rugby (Conte et al., 2022), and other sports (Biggins et al., 2021), and the included items in this questionnaire demonstrated to be sensitive to training load variations (Pisa et al., 2022).

Indeed, its results must be interpreted with care, as much as they indicate training maladaptation, decreases in the recovery status, and loss of athletic performance, even when these signs are not observed on physical tests (Freitas et al., 2014).

Therefore, the purpose of this study was to describe the last two days of training in elite 4x100m relays athletes.

Also, we aimed to apply the Well-being Questionnaire during the two last days of training before the World Athletics Championship and describe the internal/external variables that may interfere with the training adaptation.

We Hypothesized the athletes would be ready for the competition without any impairment related to the Well-being Questionnaire according to the narrative review published by Mujika et al. (Mujika et al., 2004) who described the positive effects of tapering in athletes.

## MATERIALS AND METHODS

Four elite top 7 world athletics championships (age: 24.5 ± 2.5y; height: 183.5 ± 3.8cm; body mass: 80.2 ± 1.8kg, best performance at 100 m: 10.03 ± 0.04 seconds) were enrolled in this study. The athletes were training isolated throughout COVID-19, and none of them reported injury or any disease that could affect the training (prior 6 months).

Three of four athletes were competing at the 2020 Summer Olympic Games, and all of them were training for the 2022 World Athletics Championship in 4x100m relays. The running speed benchmark for 100 m were 10"01 (athlete 1), 100m in 10" (athlete 2), 100m in 10"04 (athlete 3), and 10"10 (athlete 4).

### Design and procedures

This observational study was designed following the last two training days before the World Athletics Championships, Oregon, USA, 2022. The coaches teamed up with the running coordinator to modulate the intensity of the training.

The team of physiologists (two) administered the tapering follow-up Well-being Questionnaire between the last two days of tapering.

All the participants signed a written informed consent, which was approved by the local ethics committee that was conducted according to the Helsinki protocol (CAEE nº: 35825720.4.0000.5659).

### Training

The two training days were performed on an outdoor running track (temperature: 26 ± 1.7ºC; relative humidity: 62.3 ± 10%, wind: 12 ± 2.6 km/h). The athletes met at 08:00 AM on the first day, then they did mobility with a foam roller and tennis ball for 15 minutes.

They started running and hopping for warm-up at 08:30 AM, and at 08:45 AM they started the skill, and then speed exercises. On the second day the athletes met at 08:30h, they performed the same mobility and warm-up as the first day and then they started the skill. The athletes rested for three days after the second recorded training day (Day 2), then they

performed only training skills on the fourth day, and on the fifth day the competition started.

The training characteristics are described in tables 1a and 1b.

**Table 1a** - Day 1 training program.

**Day 1**

| Skill | Speed | After training practice |
|---|---|---|
| Pass the bat (static and rhythmed) | 5 sets 4x100m starting at different zones – Intensity at 80% of maximum performance – rest: 3'-5' between the attempts | Stretching + cryotherapy at 4º for 5 minutes |
| Reaction training (bat) | | **Total training time: 1h15'** |

**Table 1b** - Day 2 training program.

**Day 2**

| Skill | Speed | After training practice |
|---|---|---|
| Pass the bat (static and rhythmed) | 5 sets 5x200m at 90% of maximum performance – rest: 5'between attempts | Stretching + massage (physiotherapist) |
| | | **Total training time: 1h30'** |

**Ratings of Perceived exertion and Wellbeing scale**

All the athletes answered the Well-being Questionnaire in the breakfast on day 1 and 2.

The Well-being Questionnaire comprehends a custom-made psychological questionnaire based on the recommendations of Hooper, Mackinnon (1995) and McLean et al., (2010).

This questionnaire assesses the individual perception of fatigue, sleep quality, general muscle soreness, stress levels, and mood on a five-point scale (score 1 to 5, 1-point increments [figure 2]).

The sum of the scores varies from low well-being (5 to 10 points), average (11 to 15 points), high (16 to 19 points) to very high well-being (20 to 25 points), following the Dalda questionnaire (Rushall, 1990) (figure 1).

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| | 5 | 4 | 3 | 2 | 1 | Result |
|---|---|---|---|---|---|---|
| **Fatigue** | Very fresh | Fresh | Normal | More tired than normal | Always tired | |
| **Recovery** | Very recovered | Recovered | Normal | Low recovery | Not recovered at all | |
| **Stress Levels** | Very relaxed | Relaxed | Normal | Feeling stressed | Highly stressed | |
| **Mood** | Very positive mood | A generally good mood | Less interested in others &/or activities than usual | Snappiness at teammates, Family and co-workers | Highly annoyed/irritable/down | |
| **General Muscle Soreness** | Feeling great | Feeling good | Normal | Increase in soreness/tightness | Very sore | |
| | | | | | **Total score:** | |

**Figure 1 -** The Well-being questionnaire.

**Statistical analyses**

The sample size in this study was composed of four athletes. As recommended earlier, the homogeneity test is not recommended for a small sample size (Lumley, et al., 2002).

Data are presented as mean ± SD. The data analyses were computed utilizing the software Microsoft Excel® 2021 for Mac (v.16.54, Cupertino, CA).

**RESULTS**

In general, on the first-day athlete 1 reported low recovery through the Well-being Questionnaire; athlete 2 reported increases in soreness/tightness in general muscle soreness; athlete 3 reported being more tired than normal in fatigue, and finally, athlete 4 did not report any impairment in Well-being.

On day 2, athlete 1 presented increases in recovery; athlete 2 did not recover the general muscle soreness; athlete 3 recovered the fatigue levels, and athlete 4 did not show impairment in Well-being. The Well-being scores were individually presented by the physiologists to the coaches and then they modulated the points (i.e., fatigue, recovery, stress levels, mood, general muscle soreness) in which the Well-being Questionnaire accused to be lowered.

On the last day of training (Day 2), the coaches applied lower volume training considering the fatigue, recovery, stress, and general muscle soreness score reported by the athletes, individually.

Figure 2 shows the individual Well-being scores through days 1 and 2.

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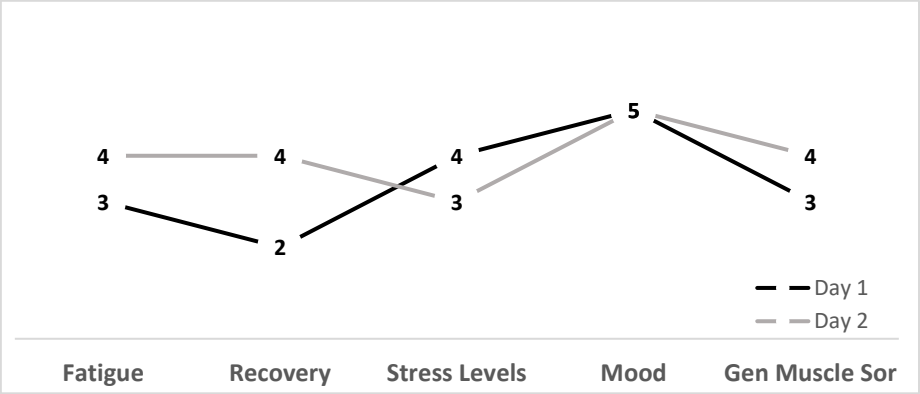
A

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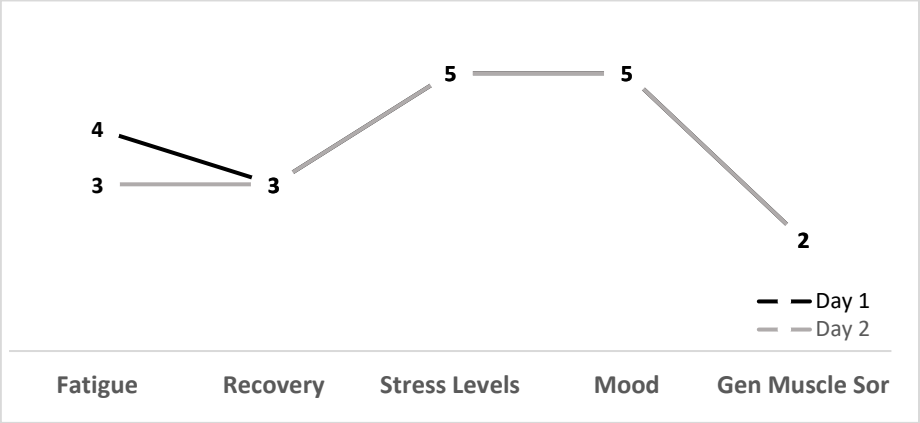


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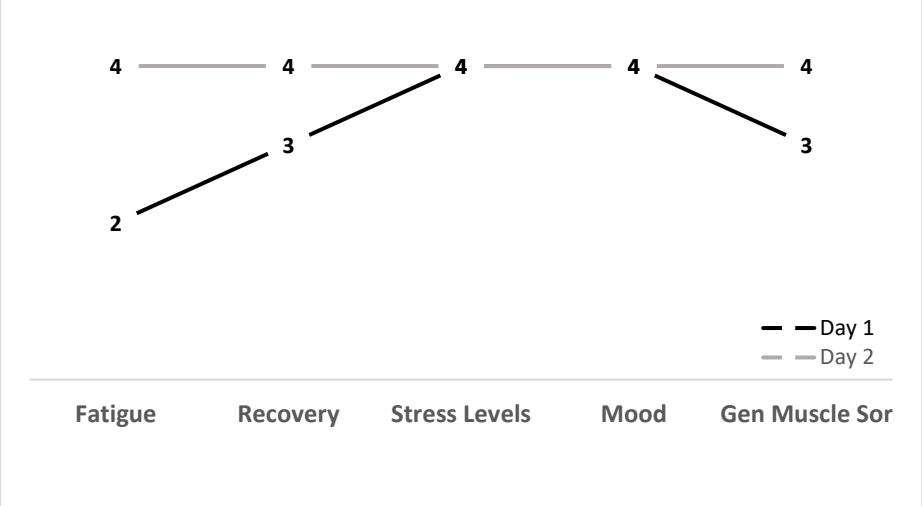


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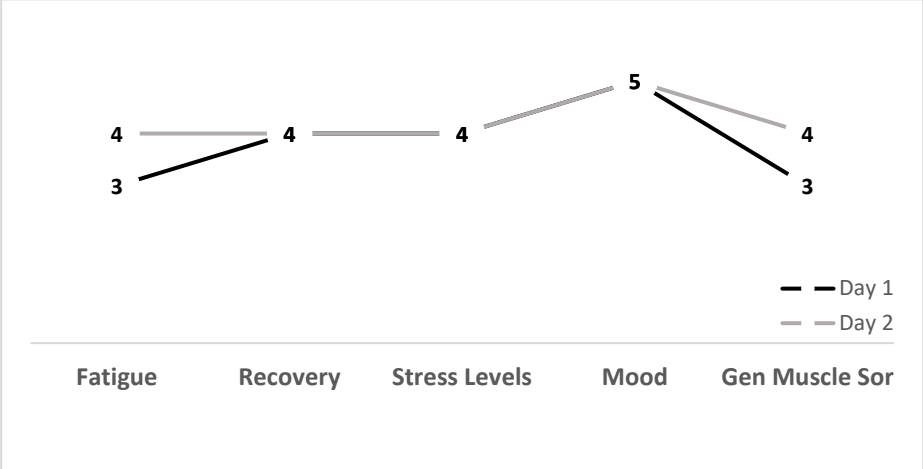


**Figure 2 -** Individual Well-being scores on day 1 and 2. Note: A, Well-being individual scores from athlete 1; B, Well-being individual scores from athlete 2; C, Well-being individual scores from athlete 3; D, Well-being individual scores from athlete 4.

Figure 2. Individual Well-being scores on day 1 and 2. Note: A, Well-being individual scores from athlete 1; B, Well-being individual scores from athlete 2; C, Well-being individual scores from athlete 3; D, Well-being individual scores from athlete 4.

In the World Athletics Championships, in the classifiers, they performed 4x100m relays in 38”41. They classified to the finals and finished in the seventh position performing the 4x100m relays in 38”25.

## DISCUSSION

The application of the Well-being questionnaire in the tapering training phase was considered essential for the training control. The coaches applied lowered volume training on Days 1 and 2 considering the individual scores reported by the athletes.

The use of the Wellbeing Questionnaire has been extensively used in multiple physical practices and sports such as CrossFit (Zecchin et al., 2022), rugby (Mclean et al., 2010), and endurance sports (Morgan et al., 1987).

The choice of strength and conditioning coaches to utilize this questionnaire is because of its practicality.

For instance, the DALDA Questionnaire was extensively studied in the last decade but this questionnaire presents 34 questions related to a mental and physical state divided into two parts, part A that are composed of nine questions about the general stress sources, and part B composed by 25 questions about stress-reaction symptoms. DALDA Questionnaire gives important information about the general state of the athletes, but it requires a long time to fill, and for daily analysis, it is not practical (Zecchin et al., 2022).

Finally, the use of different tools aiming to control the athletes’ internal training load is important mainly in elite athletes, in which small changes in the training and the habits (i.e., recovery, sleep) nearly a competition result in a large magnitude of development.

This study showed some limitations such as limited days of Well-Being analyses. Top elite athletes are not easy to monitor as much as the sponsors, coaches, and the proper country organization that the athletes are representing put some kind of pressure on them to perform greater as possible.

The use of different tools to analyze elite athletes’ well-being state nearly an important competition is not always well regarded.

The role of investigation in elite athletes in tapering through Wellbeing Questionnaire for more time (≥7 days application) must be proven in the future.

These present data suggest that 4x100m relays athletes and conditioning coaches adapt to the training and benefit from the Well-being Questionnaire.

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