PRUVN

Virtual Trial - Elite Performance Study

Report

Prepared for

MAX INTERNATIONAL
THE GLUTATHIONE COMPANY ™

Presented by

PRUVN

Evaluating the impact of Max products on regular exercisers and athletes in a real world setting.

Overview: This study aimed to evaluate the effects of three core Max International products on fatigue, stress, recovery, mood, quality of sleep, and exercise performance.
The supplementation protocol required:

- **Cellgevity -** Every morning with at least 8 ounces of water.
- **MaxATP -** Daily 15-20min before workout. If no workout, to be taken during middle of the day.
- **MaxN~Fuze** - Daily within 40min after workout or else to be taken during middle of the day.
- **Cellgevity -** Every evening with at least 8 ounces of water.

The study consisted of 17 adults aged 20 to 60 who exercise regularly (at least 3 times per week). The trial design was pre-post observational.

Recruitment: Subjects were recruited who expressed interested in testing the Max International products and self reported high levels of regular physical activity. Three individuals were professional triathletes and some others were prominent figures in the world of health optimization. Staff from the study sponsor and from PRUVN Research invited people to apply via a HIPAA complaint form to join this Elite Performance Study.

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Data Collection: Sleep metrics, activity metrics, heart rate and stress index and were collected by a Garmin wearable device. Data were divided into three evaluation periods as follows: Baseline assessments (approximately 15 days); Intervention Phase (approximately 32 days); and Washout Period (approximately 12 days). All data presented in milliseconds was converted into hours. The mean value from each phase was calculated and then analyzed with the Graph Pad Prism® software (v. 8.0).

The data underwent the Shapiro-Wilk normality test. For normally distributed data, we applied an ordinary one-way ANOVA followed by Tukey's multiple comparisons test. For non-normally distributed data, the Kruskal-Wallis test followed by Dunn’s multiple comparisons test was utilized. Results from the Satisfaction and Exercise Recovery Surveys were analyzed using either a paired t-test or the Wilcoxon test. Statistical significance was determined at $p<0.05$. Percentual differences from baseline for each evaluation were calculated using Microsoft Excel®.

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Results: Moderate improvements in the objective data as measured by the Garmin wearable were observed. However, these changes did not reach statistical significance, possibly due to the small sample size.

Self reported outcomes were more pronounced and participants reported a statistically significant increase in four assessments.

Conclusion: The LiveMax Elite Performance Study demonstrated several notable trends and statistically significant outcomes related to the use of Max International products. While no statistically significant differences were observed in overall sleep duration, deep sleep, light sleep, or awake duration, there was a noticeable increase in REM sleep duration that persisted into the washout period. Participants reported significant improvements in athletic performance, recovery, energy levels, mental acuity, and overall well-being. Additionally, there was a slight reduction in heart rate during the Intervention phase, and participants expressed high satisfaction with both the supplements and the study overall.

Section 1. Results observed from the biometric wearable device based on averages across the entire cohort.

Overall Sleep Duration

No statistically significant differences were observed. Additionally, there were no significant percentual differences, only a slight increase of 1% in sleep duration during the Intervention phase compared to the Baseline, as shown in Figure 1.

Sleep duration refers to the total amount of time an individual spends asleep during a specific period.

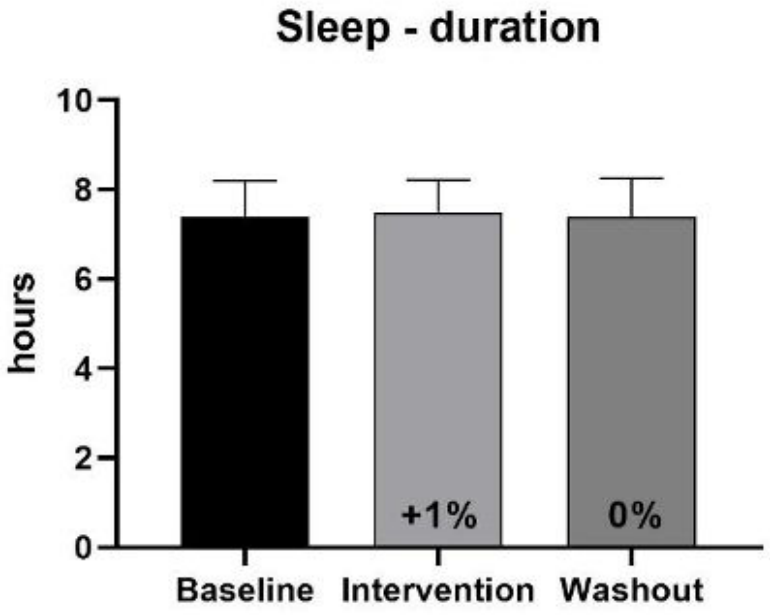

Figure 1. Sleep duration.

Deep Sleep Duration

No statistically significant differences were observed. There was a slight increase of 4% in duration of deep sleep during the Intervention. It is possible to observe in Figure 2, that in the Washout period, Deep sleep duration was the same as in the Baseline period.

Deep sleep duration refers to the amount of time an individual spends in the stage of sleep characterized by slow brain waves (delta waves), typically associated with restorative and restful sleep.

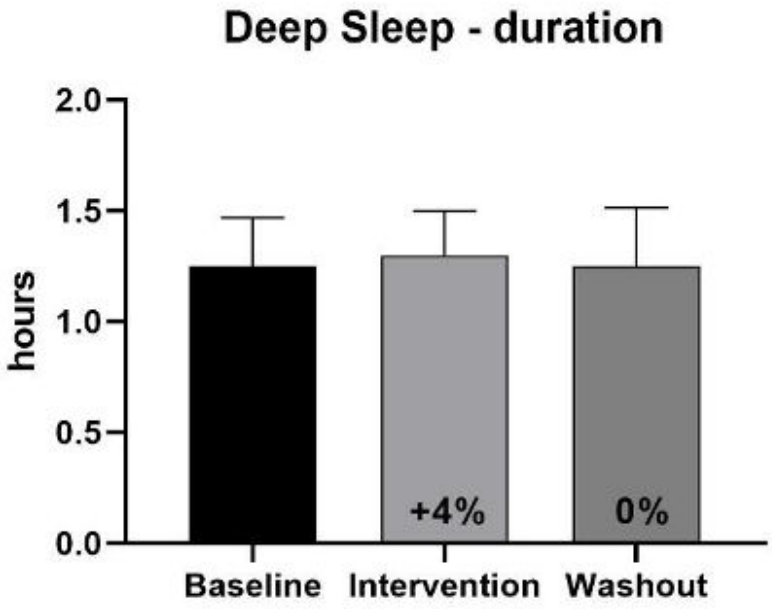

Figure 2. Deep Sleep duration.

Light Sleep Duration

No statistically significant differences were observed. Additionally, there were no significant percentual differences, only a slight decrease in light sleep duration during the Washout period compared to the Baseline, as shown in Figure 3.

Light sleep duration refers to the amount of time an individual spends in the stage of sleep characterized by reduced brain activity compared to wakefulness, typically associated with transitional periods between wakefulness and deeper sleep stages.

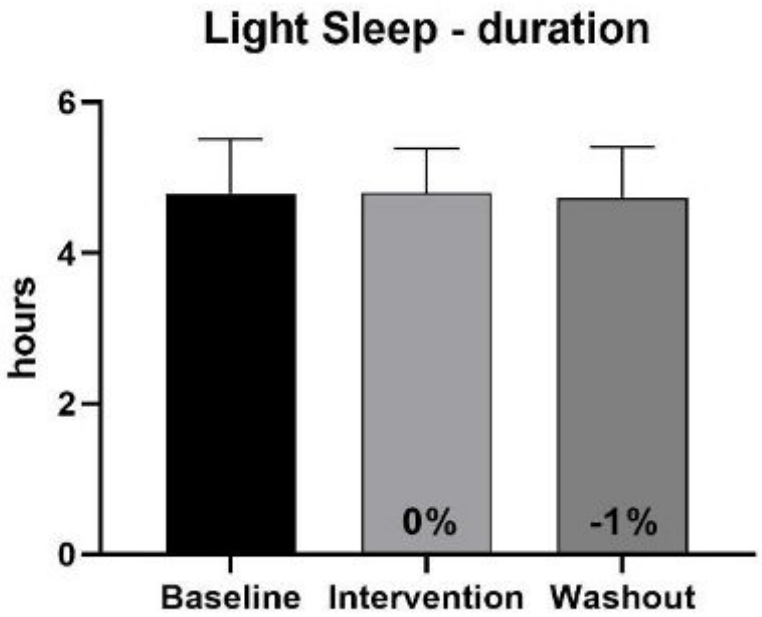

Figure 3. Light Sleep duration.

REM Sleep Duration

No statistically significant differences were observed. However, Figure 4 shows an increase in REM sleep duration during the Intervention period, which was sustained into the Washout period.

REM sleep duration refers to the amount of time an individual spends in the stage of sleep characterized by rapid eye movements, increased brain activity, and vivid dreaming, typically associated with cognitive processes and memory consolidation, measured in hours and minutes.

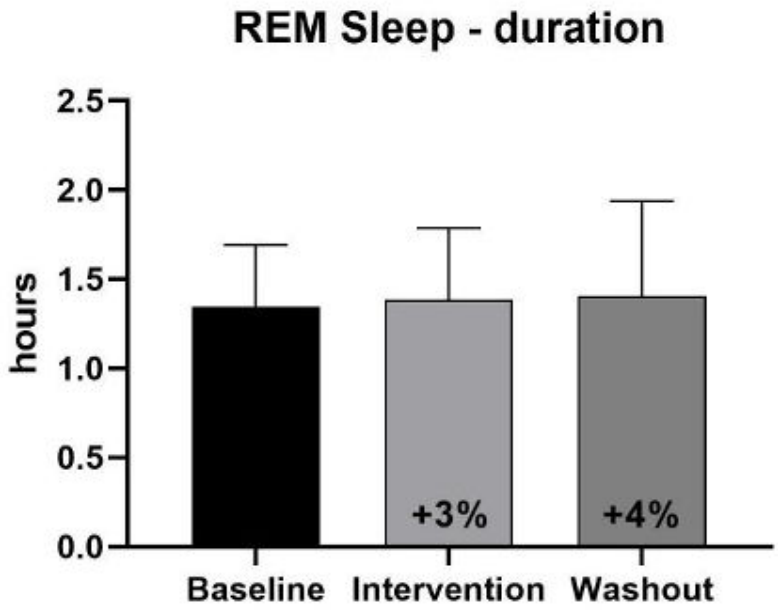

Figure 4. REM Sleep duration.

Awake Duration

No statistically significant differences were observed. However, it is possible to observe in Figure 5, that the Awake duration reduced during the study, mostly in the Washout period when compared to the Baseline.

Awake time refers to the periods when an individual is not in any of the sleep stages, which include rapid eye movement (REM) and non-rapid eye movement (NREM) stages 1, 2, and 3. It encompasses both the time before sleep onset and any awakenings during the sleep period, reflecting moments of full consciousness and alertness.

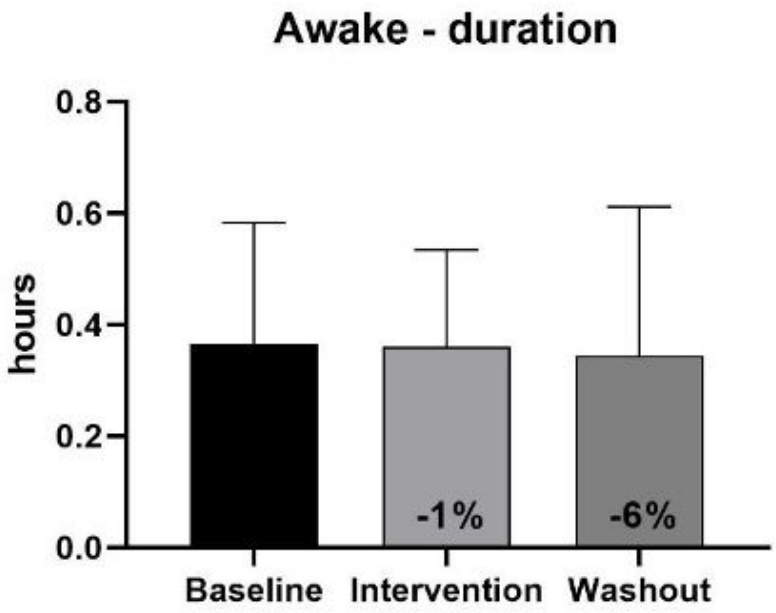

Figure 5. Awake Sleep duration.

Overall Sleep Score

No statistically significant differences were observed. However, it is possible to observe in Figure 6, that the Overall Sleep Score reduced during the study, mostly in the Washout period.

The Overall Sleep Score, as measured by a Garmin wearable, is a composite metric that evaluates the quality and quantity of sleep. It integrates various factors such as total sleep duration, the time spent in different sleep stages (light, deep, and REM sleep), sleep movement, and disturbances. This score helps provide an overall assessment of how restful and restorative the sleep was, typically presented on a scale from 0 to 100.

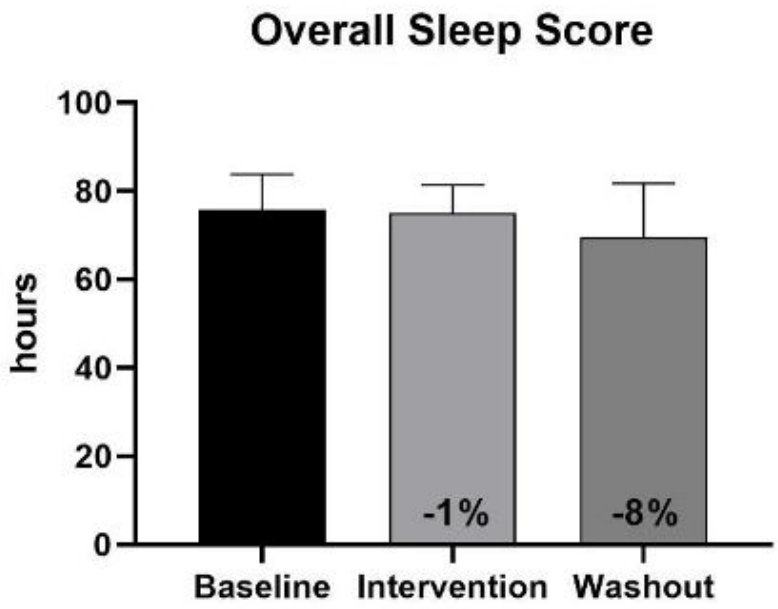

Figure 6. Overall Sleep Score.

Sleep Phases - Mean Calculations

Due to variations in the total number of hours slept in each assessment, the observed differences in sleep phases may not necessarily indicate an improvement in sleep patterns. To evaluate the results more accurately, we calculated the percentage representation of each sleep phase relative to the total sleep period for each assessment. These values are presented in Table 1, where changes in sleep patterns can be observed.

In statistics, the mean, often referred to as the arithmetic mean or average, is a measure of central tendency that is calculated by summing all the values in a dataset and then dividing by the number of values. It represents the central point of the data distribution and is commonly used to describe the typical value in a dataset.

Study Phase	Total amount (mean)	Deep sleep (mean)	Light Sleep (mean)	REM sleep (mean)	Awake (mean)
Baseline	7.40	1.25 = 16.89%	4.79 = 64.73%	1.35 = 18.24%	0.36 = 4.86%
Intervention	7.50	1.30 = 17.33%	4.80 = 64%	1.39 = 18.53%	0.36 = 4.8%
Washout	7.39	1.25 = 16,91%	4.74 = 64.14%	1.40 = 18.94%	0.34 = 4.6%

Table 1. Sleep phases.

Average Heart Rate (HR)

No statistically significant differences were observed. However, Figure 7 shows a 2% reduction in resting heart rate (RHR) during the Intervention phase compared to the Baseline. RHR is a marker of cardiovascular health and fitness level, reflecting the efficiency of the heart's functioning at rest.

it is worth noting that reducing RHR even 2% in an active /athletic population is significant because athletes typically have lower resting heart rates due to their enhanced cardiovascular efficiency and greater stroke volume, which means their hearts can pump more blood with each beat. A further reduction in resting heart rate among such individuals suggests even greater cardiovascular adaptations and improved overall heart health as a result of their high fitness levels.

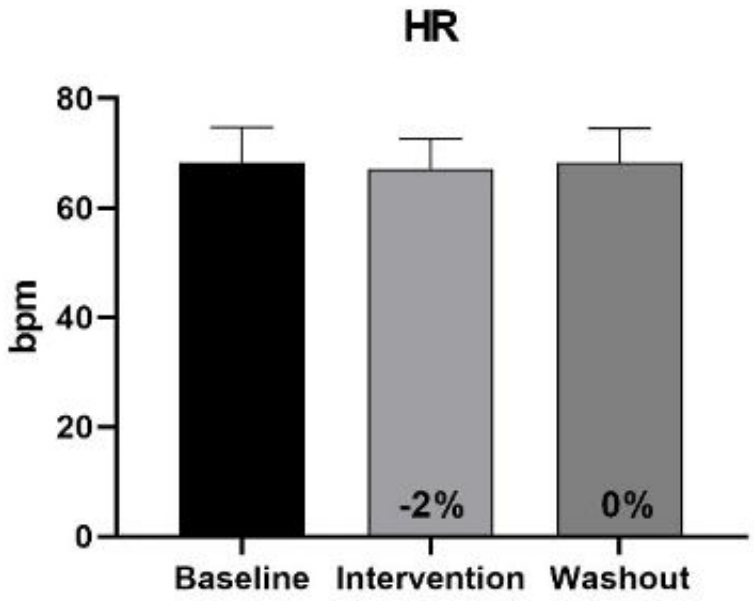

Figure 7. Resting Heart Rate

Section 2. Results self-reported by participants based on averages across the entire cohort.

Exercise Recovery Survey

Athletic Performance and Recovery after exercise

It is possible to observe in Figure 8, that the participants reported a statistically significant increase in Athletic Performance (p= 0.0010) and Recovery (p= 0.0002) after exercise while taking the supplements.

Self-assessments can provide subjective data on perceived exertion, fatigue, soreness, and overall well-being, which are critical for understanding individual variations in recovery and performance. This subjective data complements objective measures such as heart rate, sleep and performance metrics, offering a comprehensive view of how athletes experience and respond to training and recovery protocols.

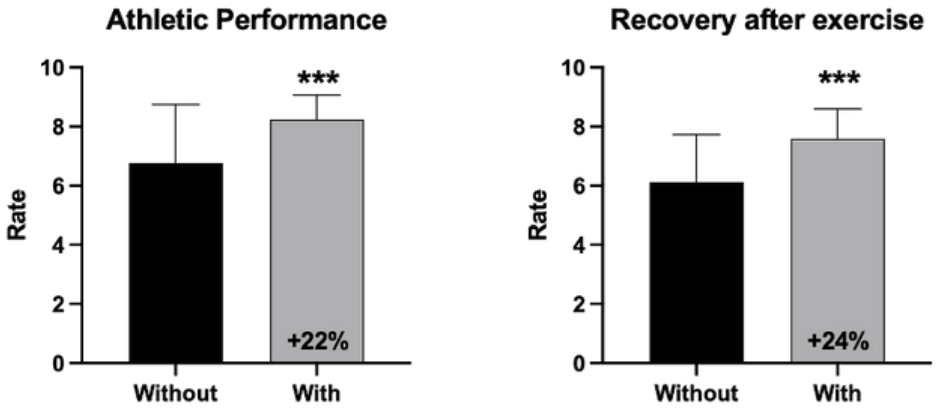

Figure 8. Athletic Performance, Recovery after exercise.

Energy level, sense of Physical Comfort, and Overall well-being

Figure 9 shows that participants reported a statistically significant increase in energy levels (p = 0.0039, 21%) while taking the supplements, along with a 5% increase in physical comfort and a 9% increase in overall well-being.

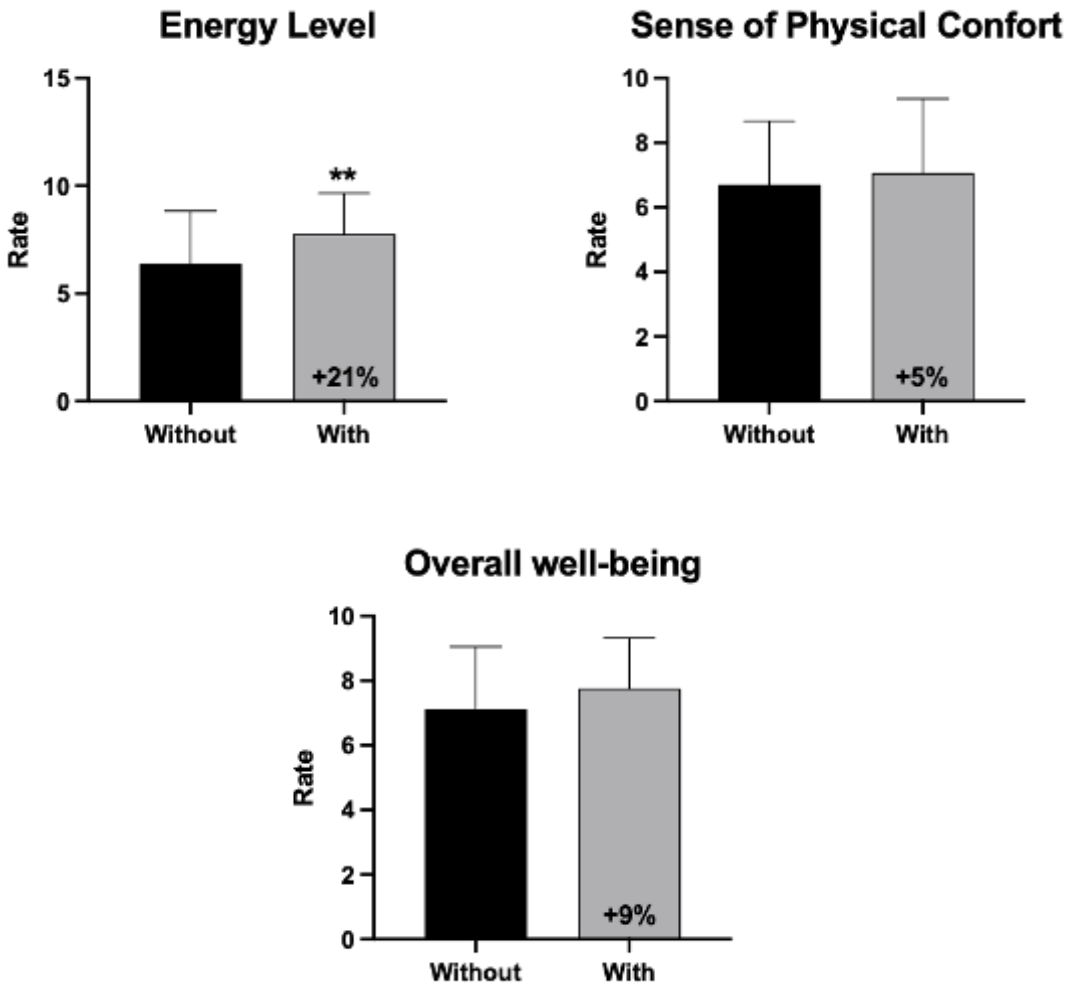

Figure 9. Energy level, sense of Physical Comfort, and Overall well-being.

Overall Sleep Quality, Relaxation level, Anxiety level, and Mental Acuity and Concentration

Figure 10 shows that participants reported a statistically significant increase in mental acuity and concentration ($p = 0.0134$) while taking the supplements. Additionally, there was a 6% increase in overall sleep quality and a 3% increase in relaxation levels reported by study participants.

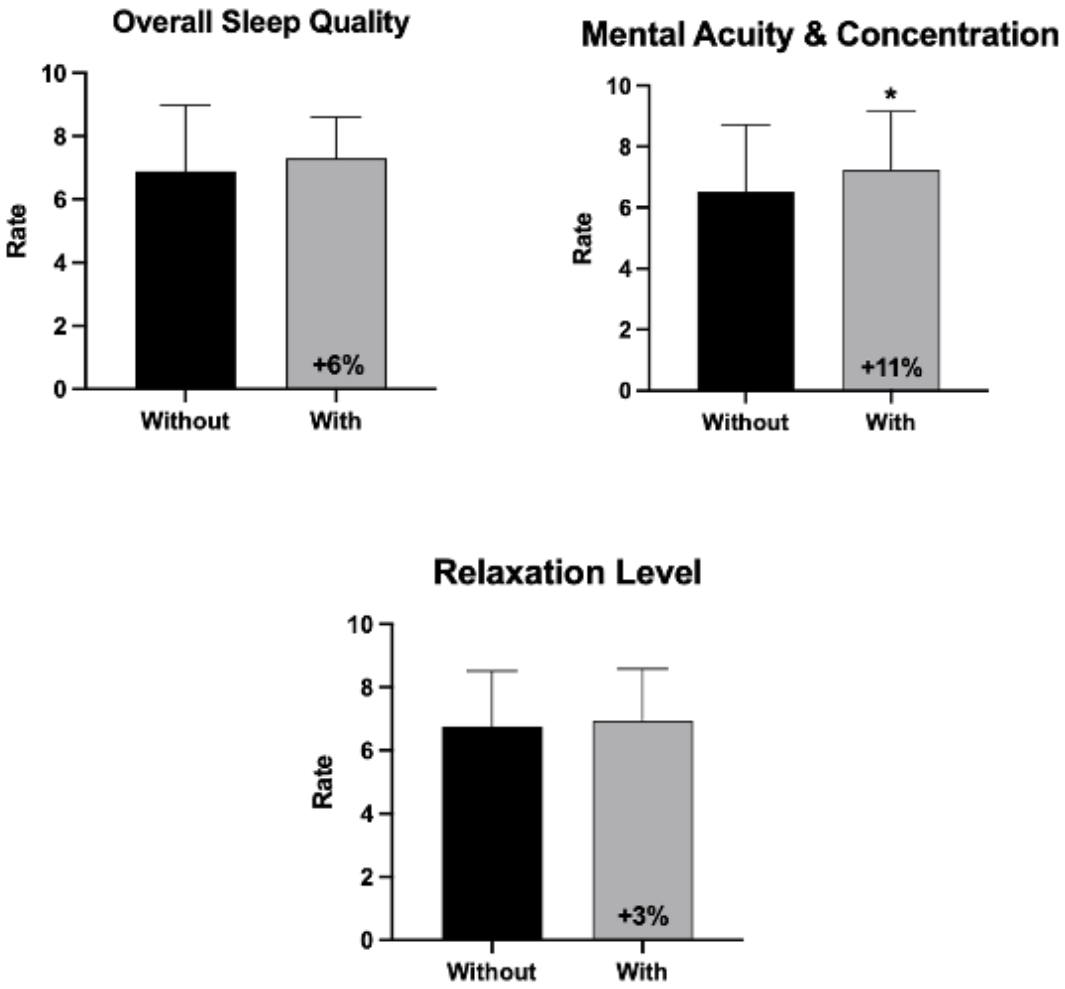

Figure 10. Overall Sleep Quality, Mental Acuity & Concentration and Relaxation level.

Product Satisfaction

On a scale from 0 to 10, where 0 means "not satisfied at all" and 10 means "very satisfied," the mean satisfaction score with the supplements was 7.5. For the question “How likely are you to recommend these supplements to others?” participants scored an average of 7.2.

In the context of the supplement industry, a product satisfaction score of 7.5 out of 10 can be considered a relatively good result. The supplement industry often faces high consumer expectations regarding efficacy, safety, and value. Given the competitive nature of the market and the variability in consumer experiences with supplements, achieving a score of 7.5 indicates that a majority of users are satisfied with the product.

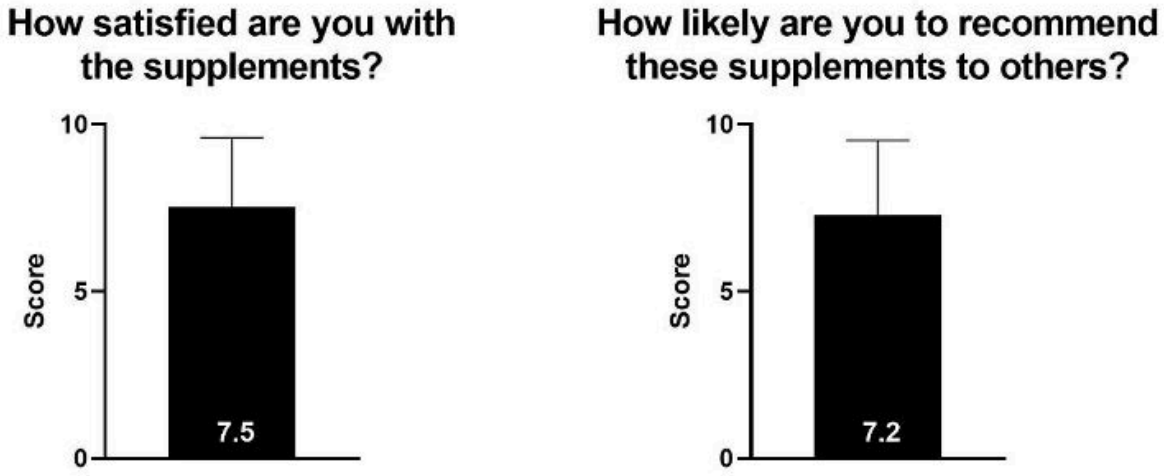

Figure 11. Participants' level of satisfaction with the supplement.

Study Satisfaction

On a scale from 0 to 10, where 0 means "not satisfied at all" and 10 means "very satisfied," the mean satisfaction score with the study was 8.0. Regarding the likelihood of participating in a PRUVN study again, participants scored an average of 8.8.

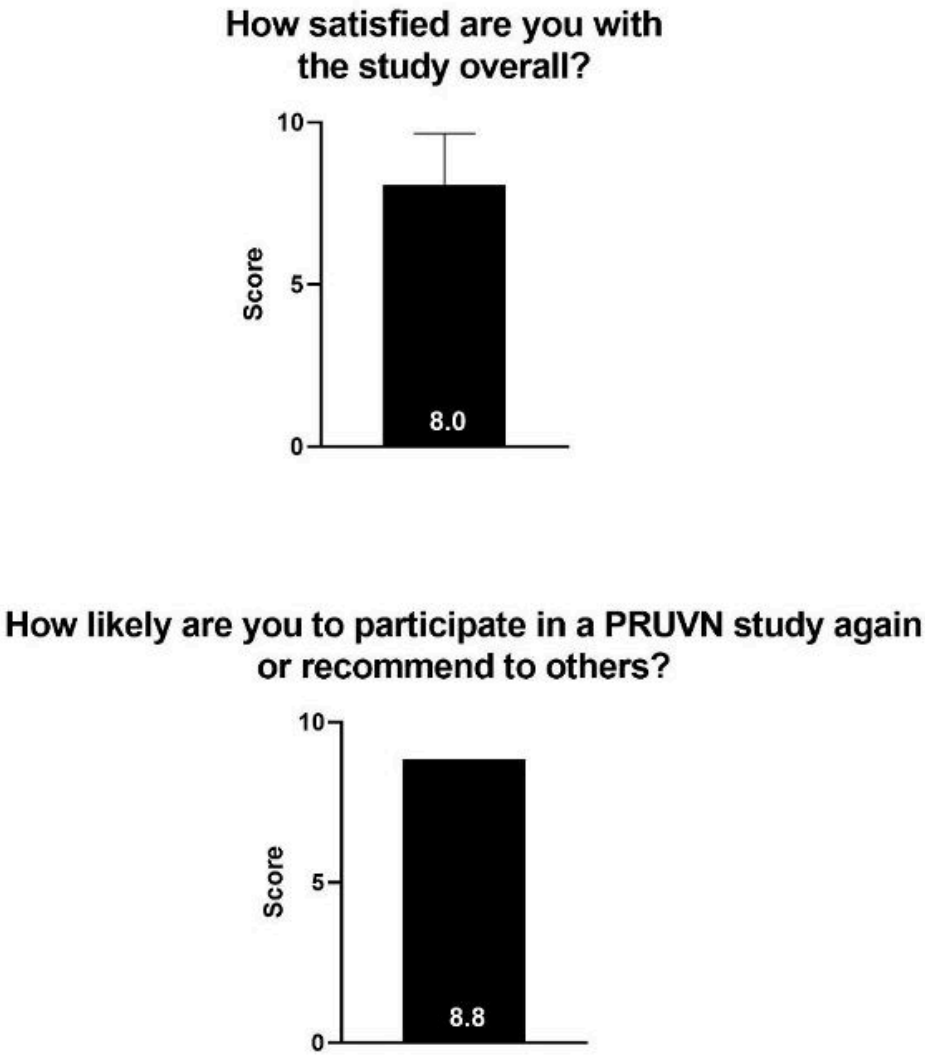

Figure 12. Participants' level of satisfaction with the study and PRUVN.

Discussion:
This virtual Elite Performance Study suggested that individuals derived positive results from the Max International products, primarily through self reported outcome measures.

Minor correlations were noted between objective observations, via the wearable data, and participant reported outcomes. For example - increased deep sleep (4%), REM sleep (3%) and reduced resting heart rate (2%) could explain the self reported increase in athletic performance (22%), recovery after exercise (24%) and increased energy levels (21%).

The statistically significant outcomes are all self reported:

- Athletic performance - 22%
- Recovery after exercise - 24%
- Increased energy levels - 21%
- Mental Acuity and Concentration - 11%

While some outcomes were incremental in nature, even moderate improvements in elite performers is considered highly meaningful because:

- High Baseline Performance: Athletes typically already perform at a high level, so even small improvements can signify significant gains in their performance, recovery, or overall health.
- Competitive Edge: In competitive sports, marginal gains can be the difference between winning and losing. Small enhancements in performance, endurance, or recovery can give athletes a crucial edge over their competitors.
- Cumulative Effect: Over time, incremental improvements can accumulate, leading to substantial progress in an athlete's overall performance and capabilities. Consistent small gains can result in significant long-term benefits.

Study Limitations:

1. Sample Size: The study included a relatively small sample size of 17 participants, which may limit the generalizability of the findings.
2. Study Design: The pre-post observational design lacks a control group, making it challenging to attribute changes solely to the intervention.
3. Assessment Periods: The varying lengths of the Baseline, Intervention, and Washout periods may affect the consistency of the data collected.
4. Self-Reported Data: Some measures, such as satisfaction and recovery surveys, rely on self-reported data, which can be subjective and prone to bias.
5. Device Limitations: The accuracy of data collected via Garmin wearable devices may be limited compared to clinical-grade equipment.
6. Bias: The study participants were in most cases known to either the study sponsor or the team at PRUVN Research. however no efforts were made to influence the study outcomes and participants were encouraged to be objective and honest as best possible.

Additional Notes:

- The Elite Performance Study began with 20 participants but one withdrew for personal reasons and two were non-complaint and their data had to be discarded.
- The sleep outcomes from the washout phase are suggestive that the cumulative effect of the Max International products on sleep require further investigation to better understand their influence on various sleep stages and overall recovery.

Next Steps

1. Larger Sample Size: Future studies should include a larger, more diverse sample to enhance the robustness and generalizability of the findings.
2. Controlled Trials: Implementing a randomized controlled trial design would strengthen the ability to draw causal inferences regarding the effects of the supplements.
3. Longer Follow-Up: Extending the duration of the study and including long-term follow-up assessments could provide insights into the sustained effects of the supplements.
4. Additional Biomarkers: Including a broader range of biomarkers, such as cortisol levels and inflammatory markers, could offer a more comprehensive understanding of the physiological impacts of the supplements.
5. Comparative Studies: Conducting comparative studies with other supplements or interventions could contextualize the effectiveness of Max International products.

Thank you for supporting evidence based wellness research!

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