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(301) EVIDENCED-BASED ANALYSIS OF THE TOP 50 TESTOSTERONE BOOSTER SUPPLEMENTS ON AMAZON MARKETPLACE

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Introduction: As the population ages, the prevalence of age-related hypogonadism is expected to rise. Demand for testosterone replacement therapy (TRT) has increased, as evidenced by revenue from T prescriptions in the world increasing from \$150 million USD in 2000 to \$1.8 billion in 2011. A market research analysis shows the market for T was 10.9 billion USD in 2019. The NHIS survey in 2012 revealed that consumers in the United States spend annually \$30.2 billion on dietary supplements of which include T supplements. Dietary supplements have gained in popularity, as they are more accessible since the advent of online marketplaces and relaxed testing protocols for safety and effectiveness. Of the online marketplaces available to purchase supplements, Amazon Marketplace has the majority share of online sales at 41%, with the next largest retailer occupying only 6% of online sales. The aim of our study was to determine and evaluate the evidence behind the top 50 dietary T supplements (ranked in terms of sales) sold on Amazon Marketplace.

Objective: 1. Determine the product characteristics and claims made by the Top 50 T supplements sold on Amazon Marketplace. 2. Determine the cost to the consumer and customer satisfaction with these products.

Methods: The top 50 T supplements were determined by visiting the Amazon page, “Best Sellers in Sports Nutrition T Boosters,” which lists the top products based on sales and revenue. Active ingredients, number of active ingredients, 30-day costs, 5-star ratings, refunds, and claims of these products were documented. Ingredients present in a minimum of 50% of products were analyzed.

Results: A total of 50 supplements were analyzed. The three most common claims were “boosts/supports T” (46/50), “increases muscle mass” (46/50), and “increases energy” (45/50). The average number of claims a product made was 4. The average 30-day cost of a product was \$25.95, with cost ranging from \$6.66 to \$84.99. The average customer satisfaction rating of these products was 4.23 (1-5), ranging from 3.4 to 4.7. Forty-seven out of 50 products did not offer a refund. A total of 129 unique ingredients were identified with 57% of the ingredients being unique to one product. Only Tongkat Ali root extract (*Eurycoma Longifolia*, EL) was used in a minimum of 50% of the supplements analyzed (59%) and thus further analyzed for efficacy and safety. Two randomized, double-blinded, placebo-controlled trials examined the efficacy of EL. One of the trials only showed improvement in total T levels when EL was used concurrently with exercise. The second trial, which examined 32 patients either receiving placebo or EL, showed an increase of T levels

in the EL group. No clinical trial has examined the safety profile of EL in patients.

Conclusions: There is large heterogeneity in the composition of T supplements sold on Amazon Marketplace, and these products can present a significant 30-day cost to patients despite having no strong evidence regarding efficacy and more importantly safety. Further research and trials are needed to examine the most common ingredients needed in these supplements.

Disclosure: No