Patterns of 2,4-Dinitrophenol Use as Discussed on Social Media

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Introduction

1. 2,4-dinitrophenol (DNP) is a mechanistically unique weight loss agent with a narrow therapeutic window as well as cardiovascular and mitochondrial toxicity.
2. Banned by the FDA for human consumption. But the public still consumes it.
3. Gap in our knowledge on the effects of DNP at nonlethal doses.

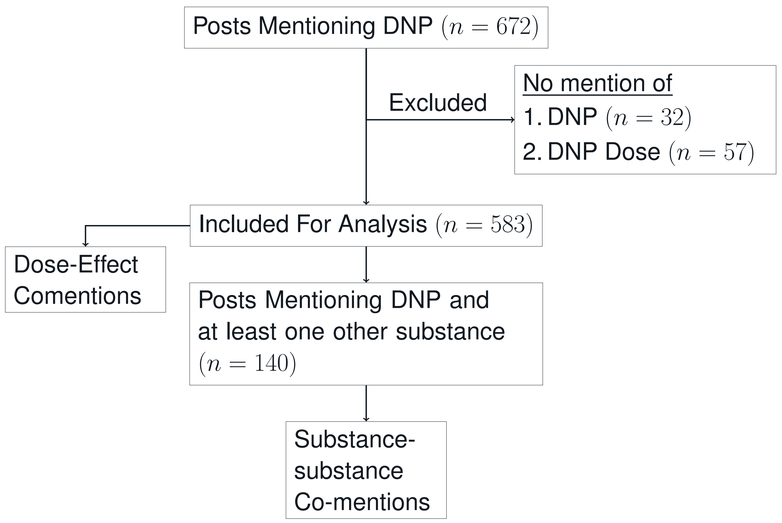
Prior Work

1. People discuss DNP use online[3].
2. We can infer dose-effects relationships of other substances from online discussions[2].
3. We can infer co-ingestants for other substances[1].

Question

Can we infer coingestants and dose-response relationships related to DNP from social media?

Methods



Statistical Significance χ^2**-test** on the contingency table between reported doses (< 150 mg, 150 to 300 mg, 300 to 450 mg) and type of effect (e.g., neurologic or thermoregulatory). **Post-hoc pairwise** χ^2**-tests adjusted by a Bonferroni correction factor** of ${}_3C_2 = 6$ for associations between effects and specific doses.

Validation MMB, MAC reviewed posts for plausibility & coherence.

Results

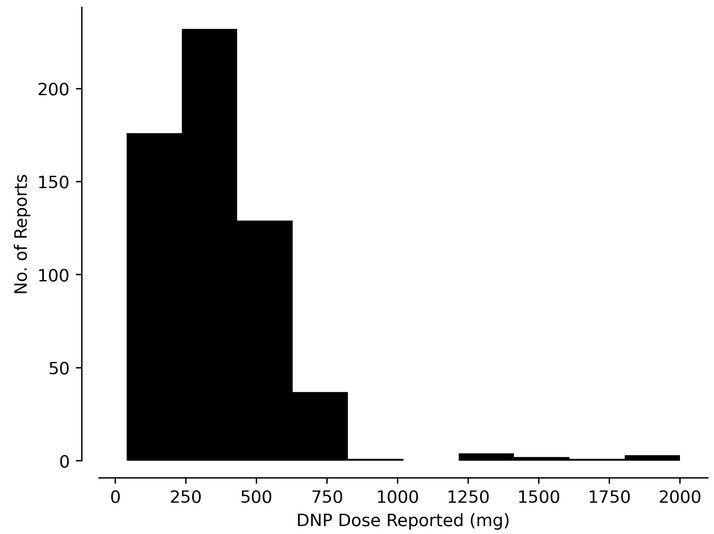


Fig. 1: **Distribution of doses mentioned for a single DNP ingestion.** X axis, dose (mg). Y-axis, number of posts mentioning each dose. Bin size 150 mg.

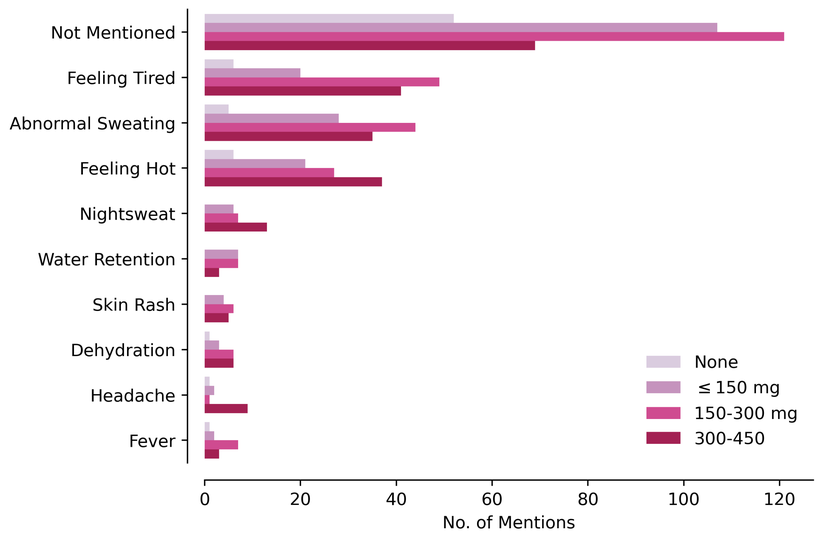


Fig. 2: **Reported effects of DNP**. Y-axis, reported dose in mg. X-axis, number of mentions. Color of bar indicates dosage.

Acknowledgements

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Results

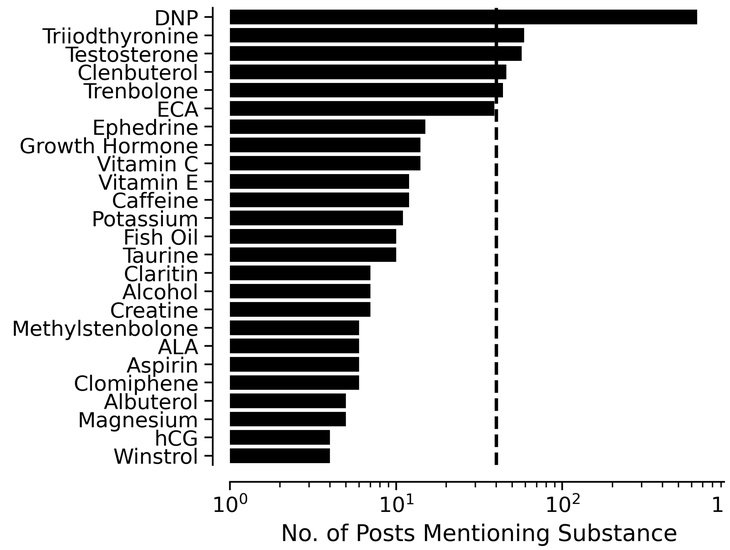

Fig. 3: **Distribution of substance mentions over all unique posts.** The Y axis indicates the name of substance; IUPAC or generic name used when applicable. The X-axis indicates the number of posts in which substance was mentioned on log scale. Horizontal dashed line indicates threshold for statistical significance after Benjamini-Hochberg correction.

Conclusions

1. Doses of 150-300 mg are associated with fatigue and hyperthermia and doses between 300 mg and 750 mg with increasing signs of hyperthermia (abnormal sweating, elevated temperature, sensation of dehydration), but not fatigue.
2. Most frequently co-mentioned substances are T3, testosterone, clenbuterol, and trenbolone.
3. A computational linguistic analysis of social media can identify credible coingestants and dose-effect relationships for 2,4-DNP.

Limitations

1. No analytic confirmation of dose or independent observation of effect; we assume truth in the aggregate, like PCC data.
2. This approach cannot assign effect to substance when a post mentions multiple comments, which limits automation.

References (via QR Code)