



Comment on vitamins D and E supplementation

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LETTER TO THE EDITOR

Comment on vitamins D and E supplementation

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Key words: *analysis of variance, UMPU, Central Limit Theorem, Behrens–Fisher problem, t-statistics*

The article by Javanbakht et al. (1) is flawed by its use of analysis of variance (ANOVA). This compares the means of normal populations assuming that they have equal but unknown variances.

Table I. SCORAD and its components in four groups before and after intervention.

	Group P (Placebo)	Group D (Vitamin D)	Group E (Vitamin E)	Group DE (Vitamins D, E)	<i>p</i> -value
<i>n</i>	11	12	11	11	
Male/female	1/10	3/9	3/8	3/8	NS
Age (years)	26.1 ± 2.8	21.2 ± 1.6	29.0 ± 2.09	27.5 ± 2.3	NS
SCORAD					
Before	31.7 ± 3.5	36.0 ± 3.7	33.3 ± 3.6	35.6 ± 3.7	0.82
After	22.3 ± 3.0	23.3 ± 2.8	20.4 ± 2.4	12.5 ± 2.3	0.01
Topical steroid (times per day)					
Before	1.10 ± 0.2	0.66 ± 0.17	0.66 ± 0.18	0.80 ± 0.21	0.34
After	0.54 ± 0.13	0.23 ± 0.11	0.20 ± 0.09	0.12 ± 0.09	0.05
Extent					
Before	11.0 ± 2.9	9.3 ± 2.6	12.9 ± 3.2	11.2 ± 2.8	0.85
After	5.4 ± 1.6	4.5 ± 1.8	4 ± 1.1	3.1 ± 1.4	0.69
Intensity					
Before	6.1 ± 0.8	7.4 ± 0.7	5.7 ± 0.6	7.0 ± 0.8	0.37
After	4.5 ± 0.7	4.5 ± 0.5	4.3 ± 0.5	2.6 ± 0.4	0.04
Subjective symptoms					
Before	8.2 ± 0.7	8.0 ± 1.2	10.6 ± 1.5	8.7 ± 1.6	0.48
After	4.6 ± 0.7	6.4 ± 1.3	4.8 ± 1.0	3.0 ± 1.0	0.18
Objective SCORAD					
Before	23.6 ± 3.4	27.9 ± 2.8	22.7 ± 2.8	26.9 ± 3.1	0.56
After	15.3 ± 1.8	17.2 ± 1.9	15.5 ± 1.8	1.2 ± 1.7	0.01

Values are expressed as means ± SE.

ANOVA was used to test the differences between baseline and after-intervention values of four groups.

NS = not significant.

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Table II. Intensity and subjective items, before and after intervention.

	Group P (Placebo)	Group D (Vitamin D)	Group E (Vitamin E)	Group DE (Vitamins D, E)	<i>p</i> -value
Erythema					
Before	1.4 ± 0.2	1.4 ± 0.1	1.3 ± 0.2	1.7 ± 0.2	0.67 ^a
After	1.1 ± 0.09	0.9 ± 0.1	1.1 ± 1.1	0.6 ± 0.1	0.09 ^a
Edema					
Before	0.7 ± 0.1	1.1 ± 0.2	1.0 ± 0.2	1.3 ± 0.2	0.19 ^a
After	0.5 ± 0.2	0.4 ± 0.1	0.4 ± 0.1	0.1 ± 0.1	0.21 ^a
Oozing					
Before	0.18 ± 0.1	0.5 ± 0.2	0.36 ± 0.1	0.4 ± 0.1	0.61 ^a
After	0.18 ± 0.1	0.2 ± 0.1	0.0	0.0	0.13 ^a
Excoriation					
Before	1.2 ± 0.2	1.3 ± 0.1	1.1 ± 0.1	1.3 ± 0.2	0.69 ^a
After	0.7 ± 0.2	0.8 ± 0.1	0.8 ± 0.1	0.4 ± 0.1	0.19 ^a
Lichenification					
Before	1.1 ± 0.3	1.3 ± 0.2	0.8 ± 0.2	1.1 ± 0.1	0.52 ^a
After	0.9 ± 0.2	1.0 ± 0.1	0.3 ± 0.1	0.5 ± 0.2	0.03 ^a
Dryness					
Before	1.2 ± 0.2	1.5 ± 0.2	1.4 ± 0.2	1.4 ± 0.1	0.68 ^a
After	1.2 ± 0.1	1.0 ± 0.08	1.0 ± 0.1	0.9 ± 0.1	0.4 ^a
Pruritus					
Before	7.0 ± 0.5	5.7 ± 0.6	6.2 ± 0.7	5.5 ± 1.0	0.52 ^b
After	4.0 ± 0.6	5.0 ± 0.8	3.4 ± 0.5	2.0 ± 0.5	0.009 ^b
Sleeplessness					
Before	1.1 ± 0.3	2.3 ± 0.7	4.3 ± 0.9	3.2 ± 0.7	0.07 ^a
After	1.0 ± 0.4	1.4 ± 0.6	1.3 ± 0.5	1.0 ± 0.6	0.85 ^a

Values are expressed in means ± SE.

^aKruskal-Wallis test; ^bANOVA.

The Central Limit Theorem justifies the normality assumption for inferences on means, but there is no reason for unknown variances to be equal. This makes the ANOVA unsuitable for general mean comparisons.

Since Linnik (2) has shown that *t*-statistics for the difference of means based on their sample means and standard deviations do not exist, this problem is not circumvented by futilely (3) testing for the equality of variances, avoiding normality using rank tests such as the Kruskal–Wallis test, or simply making arbitrary assertions about their variances. Being a comparison of distributions, these nonparametric rank tests say nothing about the means if significant, and are biased (4) to one side in a two-sided test.

Tsakok (5) has solved this Behrens–Fisher problem of comparing the means of normal populations at exact significance levels, simultaneously showing that the Tsakok solution is more effective in detecting

significant mean differences even with equal variances. Its exposition (6) is available.

The software GSP (AD Tsakok Mathematical Centre, London) implements the Tsakok technique. It is now used to compare means at 0.02 significance levels (one significant figure) per pair.

In Table I (1), there are significant mean differences in Topical Steroid (after) between placebo and each of groups D, E, and DE. In Table II (1), there is a significant mean difference in Erythema (after) between placebo and group DE. Considering the attention given to the data, there is every reason to analyse them correctly.

The Tsakok technique is extended to the nonparametric two-sample problem using the Tsakok article (7) on constructing exact Uniformly Most Powerful Unbiased (UMPU) tests, superseding rank tests such as the Kruskal–Wallis test. This is discussed further in Tsakok (8), where the Tsakok articles are reprinted.

References

1. Javanbakht MH, Keshavarz SA, Djalali M, Siassi F, Eshrahan MR, Chamari M, et al. Randomized controlled trial using vitamins E and D supplementation in atopic dermatitis. *J Dermatolog Treat.* 2011;22:144–150.
2. Linnik Yu. V. Latest investigations on Behrens–Fisher problem. *Sankhya A.* 1966;28:15–24.
3. Kendall MG, Stuart A. *The Advanced Theory of Statistics.* Vol. 2, London: Charles Griffin and Co, 1973. p 484.
4. Lehmann EL. *Testing Statistical Hypotheses.* New York: John Wiley and Sons Inc, 1959. p 187.
5. Tsakok AD. A solution to the generalized Behrens–Fisher problem. *Metron.* 1978;36:79.
6. Tsakok AD. Comment on visual acuity. *Ophthalmic Epidemiol.* 2002;9:347.
7. Tsakok AD. A test of fit satisfying some optimality criteria non-asymptotically. *Metron.* 1978;36:105.
8. Tsakok AD. *Statistics and the Unified Field.* London: AD Tsakok Mathematical Centre, 1987.