

Ability of bottle cap color to facilitate accurate glaucoma patient-physician communication regarding medication identity

It is unclear if medication bottle cap color facilitates proper patient-physician communication, particularly amongst individuals with glaucoma who may have color vision deficiency. We performed a cross-sectional, clinical study to determine the accuracy of patient-physician communication about topical ophthalmic medications based on cap color.

Glaucoma patients provided color descriptions of 11 distinct medication caps. Patient-produced color descriptors were presented to three physicians, and each matched a color descriptor to the medication they thought it was describing. Frequency of patient-physician agreement, occurring when all three physicians matched the patient-produced color descriptor to the correct medication, was calculated. Multivariate regression models evaluated whether patient-physician agreement decreased with degree of better-eye visual field (VF) damage, heterogeneity of color descriptors, and/or color vision deficiency, as determined by Hardy-Rand-Rittler (HRR) score and Lanthony D15 testing index (D15 CCI).

The 100 patients studied had a mean age of 69 (11) years, with mean VF mean deviation of -4.7 (6.0) and -10.9 (8.4) dB in the better- and worse-seeing eyes, respectively. A total of 102 unique color descriptors were used to describe tested bottle caps. Among individual patients, the mean number of medications demonstrating patient-physician agreement was 6.1/11 (55%). Agreement was less than 15% for 4 medications (prednisolone acetate, betaxolol HCl, brinzolamide/brimonidine, and latanoprost). Lower HRR scores and higher D15 CCI (both indicating worse color vision) were associated with greater VF damage ($p < 0.001$). Degree of better-eye VF damage, color vision deficiency, and color descriptor heterogeneity were associated with a lower likelihood of patient-physician agreement in univariate analyses ($p < 0.05$). Greater color vision deficiency and heterogeneity were both significant predictors of agreement in multivariate models (odds of agreement = 0.90 per 1 point decrement in HRR score, $p < 0.001$; odds of agreement = 0.30 for medications exhibiting high heterogeneity [≥ 11 descriptors], $p = 0.007$).

Physician understanding of patient medication usage based solely on bottle cap color is frequently incorrect. Errors based on communication using bottle cap color alone are highly probable and could lead to confusion and harm.