CEIPE THE CONSORTIUM OF EVIDENCE-INFORMED PRACTICE EDUCATORS

# The Savvy Practitioner

A bulletin for practitioners and teachers of evidence-based practice.

***"Many learners may be better served by teachers who assist them in finding answers by raising salient questions that can be answered with evidence."***

*Target audience this issue:*

- ✓ *Classroom faculty*
- ✓ *Clinicians*
- ✓ *EIP core instructors*

**Ron LeFebvre, DC**
Executive Director CEIPE
University of Western States

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## Reading the Results of an RCT

Your patient with a history of supraventricular tachycardia suddenly has a heart rate of 175 after being treated in your office! What should you do? You have him lie down, perform a Valsalva maneuver, and then quickly raise his legs. You did this because you just read a one-page synopsis sent to you by Evidence Updates.

EvidenceUpdates is a free "push" service from BMJ and McMaster University that provides alerts and summaries of key articles covering the current best research evidence. The literature cited is pre-appraised in the sense that the studies have to meet certain basic quality standards to be included.

You read that in a RCT conducted in emergency rooms in England, Appelboam et al (2015) compard two methods to normalize the heart rate without the use of drugs: a traditonal Valsalva maneuver and a new modfied version. In 214 cases, semi-recumbant patients (lying at 45° incline) performed the traditional Valsalva maneuver by blowing into an aneroid manometer repsirator at a sustained pressure of 40 mm Hg sustained for 15 seconds. In another 214 cases, a modified Valsalva was performed instead. Participants performed the same Valsalva, then immediately afterwards were laid flat and had their legs raised by a member of the staff to 45° for 15 seconds. Participants were then returned to the semi-recumbent position for a further 45 seconds. If the cardic rhythm was not normalized, the procedure was repeated a second time and if they still were not normalized, a drug was administered.

The update reported that "…37 (17%) of 214 participants assigned to standard Valsalva manoeuvre achieved sinus rhythm compared with 93 (43%) of 214 in the modified Valsalva manoeuvre group (adjusted odds ratio 3.7 (95% CI 2·3–5·8; p<0·0001)."

Let's take a few moments to learn how to read the results that were cited.

Research results are usually referred to as *outcomes*. Outcomes are often reported as odds ratios (ORs) and so it is important to be able to read them. In this study the advantage of the modified maneuver was reported as an OR of 3.7. But what does this literally mean? It means the *odds* that a patient could normalize their heart rate without drugs were almost 4 times (400%) better if they performed the modified Valsalva maneuver instead of the more traditional method.

We also see that the OR was followed by a range of numbers:

3.7 **(95% CI 2.3-5.8)**

You will see that the reported 3.7 OR falls somewhere between 2.3 and 5.8. This range is caled the *confidence interval* (CI). The CI essentially is a sort of margin of error. The statisiticans are telling us that the 3.7 OR is their best estimate (called a *point estimate*) of how well the modfied Valsalva per-formed. If the study were repeated over and over again, however, the

Help your students understand how to use read and understand the results from research studies.

## Want to know more? Want handouts for your students?

### Consult the Educator's Exchange!

**Click through the following webpages: EIP Resources > Reading Results and download more materials on statistical significance, confidence intervals, odds ratios and number needed to treat.**

**Lost your link to the Educator's Exchange?**

**Try http://bit.ly/CEIPE.**

You will need your password and user name.

exact same outcome might not occur every time just on a statistical basis alone. But they are *95% certain* that the outcome would favor the modified manuever, and the OR would consistently fall between as small a difference as 2.3 and perhaps as large as 5.8. The CI reflects the confidence of the statistician in the numerical result and reflects what is called the *precision* of their estimate. The narrower the confidence intevral, the more precise the estimate is; the wider the confidence interval the less precise and more uncertain we are of where the true outcome lies.

We also see that another number is reported regarding the 3.7 OR. We read p<0·0001. The **p value** essentially reports the *probability* that the results were due to random chance alone, suggesting that the difference in outcomes may have had nothing to do with the interventions themselves. By general agreement, < 5% chance that the outcome is due to pure luck is thought to be a resonable cut off for significance. We see that the probability that this OR was due just to luck is much, much less than 1%! We would conclude that this outcome was *statistically signnificant*.

**Whenever reading a result, always check to see if the result is *precise* (is the confidence interval wide or narrow?) and *statsicially significant* (is the p value is < 0.05?).**

There are two limitaitions to ORs that we need to keep in mind. One is they are just a relative comparison. So sometimes it is hard to know exaclty how big or helpful the difference is. For example, increasing one's odds of winning the lottery 3.7 times is a drop in the bucket compared to the absolute chances of actually winning. Secondly, thinking in terms of odds is not at all intuitive (unless you are a statistician or bet a lot on sports). So generally we should look for more useful outcome measures to be reported.

We do see that ony 17% of the participants who did the standard Valsalva manoeuvre achieved sinus rhythm compared with 43% who performed the modfied version. If we simply subtract these two numbers from each other, we see that 26% more patients normalized their heart rate with the modified version. That seems like a resonably large difference. When we subtract the actual percentage of patients who experienced one outcome compared to another, we get what is called the *absolute risk reduction* (ARR) or *absolute risk difference*. Whenever possible, this is key information that we should look for. When we have this number we can also divide it into 100% and derive something called the *number needed to treat* (NTT). In this case 100/26 is 4. This means that for every 4 patients that have their legs raised after perfoming the Valsalva maneuver, one more person would be spared having to use a drug to slow their heart down!

With practice you and your students can become more comfortable reading and interpeting the language of research results.

To sign up for your own EvidenceUpdates account, register at http://plus.mcmaster.ca/EvidenceUpdates/Registration.aspx.

References

Appelboam A, Reuben A, Mann C, et al. Postural modification to the standard Valsalva manoeuvre for emergency treatment of supraventricular tachycardias (REVERT): a randomised controlled trial. Lancet. 2015 Oct 31;386(10005):1747-53.