Men's Health Journal. 2023; 7(1): e11

LETTER TO EDITOR

Choosing Laboratory Tests in an Evidence-based manner; a Letter to Editor

Reza Hashemi[1] *

1. Men's Health and Reproductive Health research center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Received: September 2023; Accepted: October 2023; Published online: December 2023

Cite this article as: Hashemi R. Choosing Laboratory Tests in an Evidence-based manner; a Letter to Editor. Mens Health J. 2023; 7(1): e11.

Physicians use a variety of para-clinical tests to confirm their diagnosis. There are some common ways to use these tests: 1- Parallel strategy means to request all the necessary tests in one step, and 2- Serial strategy, which is of two types: "serial or" and "serial and". (1) In the former type, the doctor first requests test A and if it is negative, requests test B. But in the latter type (serial and), despite the positiveness of test A, they also ask for test B to eliminate possible doubts.

Now the question is whether, in the "serial or" method, the precedence and delay of the tests can affect the results. That means when the clinician first orders test A, and if it is negative, requests test B, or vice versa, first orders test B, and if negative, then requests test A; is the final result the same? Or not?

In a pilot study involving 54 physicians with different specialties, the question was asked whether the priority and delay of the tests affect the final result or not. The results showed that 74% believed that the priority and delay of the test selection affected the final result. And each of them tried to prove their point by reasoning. (2) Now we have to see what is the truth using mathematical language using an evidence-based manner. If we start with test request A, the result will be seen in Table (1).

Now, if we apply test B to the negative result of test A, the result is shown in Table (2).

The final result is seen after adding tables (1) and (2) in relation (1).

Relation (1) = pse_A+ pse_B+q-$pse_A se_B$-$qsp_A sp_B$

Now, if we do the opposite, that is, first test B and if the result is negative, we request test A, tables (3) and (4) are obtained. In this case, after adding the results of Tables (3) and (4) and summarizing it, relation (2) is found.

Relation (2) = pse_B+ pse_A+q-$pse_B se_A$ -$qsp_B sp_A$

Notice that these two final lines (Relation 1 and 2), follow the law of permutation: that is, a + b = b + a and the displacement of the sentences have no effect on the final result, and the components of both sentences are the same and only index of tests are shifted.

As mentioned earlier, in a pilot study, 74% of physicians believe that if necessary, performing tests A and B, their precedence and delay, will affect the final result and cause differences in decision making. Therefore, regardless of the price of the tests, they only pay attention to their characteristics, i.e. their sensitivity and specificity. (2) They request a test that has a higher sensitivity and specificity, while in this letter it is shown that the final result does not depend on sensitivity and specificity and should not be of concern.

Nevertheless, more importantly, the skill of the doctor in making the correct diagnosis i.e. pretest probability (P), which is in fact the hypothesis or H1, which unfortunately becomes less important day by day due to the strength of paraclinical tools, and the other is the cost of testing. Therefore, the recommendation of this letter in the first stage is to pay more attention to clinical diagnosis in order to reduce the possible diagnoses and in the second stage to pay attention to the cost of tests to reduce the financial burden in diagnosing, treatment and to promote professionalism.

Conclusion

Prioritizing or delaying tests is ineffective in the end result, and physicians must first rely on their clinical experience and skill and then prioritize cheaper tests over expensive tests.

References

1. Detesk AS Naglie IG. A clinicians guide to cost-effectivness analysis, Ann lnt Med 1990. 113:147-154.
2. Gviner pf , mayewski RI , mushlin AI Green land p: Selection and Interpertation of diagnostic test and procedure ann Int med 94:453-600 1981

Table 1: Disease probability if we start with test request A.

Disease probability	Test A (+)	Test A (-)
p	Pse_A	$p(1\text{-}se_A)$
q	$q(1\text{-}sp_A)$	qsp_A
P + q	$Pse_A+q(1\text{-}SP_A)$	$P(1\text{-}Se_A)+qsp_A$

Table 2: Disease probability if we apply test B to the negative result of test A (Test B "Serial or").

Disease probability	Test B (+)	Test B (-)
$P(1\text{-}se_A)$	$P(1\text{-}se_A)\ se_B$	$P(1–se_A)(1–se_B)$
qsp_A	$qsp_A(1\text{-}sp_B)$	qsP_AsP_B
$P(1–se_A) + qsp_A$	$P(1–se_A)se_B+qsp_A(1–sp_B)$	$P(1–se_A)(1–se_B)+qsp_Asp_B$

Table 3: Disease probability if we start with test request B

Disease probability	Test B (+)	Test B (-)
p	Pse_B	$p(1\text{-}se_B)$
q	$q(1\text{-}sp_B)$	qsp_B
P + q	$Pse_B+q(1\text{-}SP_B)$	$P(1\text{-}Se_B)+qsp_B)$

Table 4: Disease probability if we apply test A to the negative result of test B (Test A "Serial or").

Disease probability	Test A (+)	Test A (-)
$P(1\text{-}se_B)$	$P(1\text{-}se_B)\ se_A$	$P(1–se_B)(1–se_A)$
qsp_B	$qsp_B(1\text{-}sp_A)$	qsP_BsP_A
$P(1–se_B) + qsp_B$	$P(1–se_B)se_A+qsp_B(1–sp_A)$	$P(1–se_B)(1–se_A)+qsp_Bsp_A$