USING LATENT CLASS MODEL FOR EVALUATING THE PERFORMANCE OF DIAGNOSTIC TESTS IN ABSENCE OF A GOLD STANDARD: A SIMULATION STUDY

E.A. Kanik[†1], B. Taşdelen[1], M. Arslan[1], M. Morshedi[2], M.M. Ozkan[3], S. Oehninger[2]

[1] *Mersin University, Mersin, Turkey*
[2] *Eastern Virginia Medical School, Norfolk, USA*
[3] *AnkaraUniversity, Ankara, Turkey*

[†] E-mail: *arzukanik@mersin.edu.tr*

In most of the medical studies it is a big problem that evaluating the performance of the diagnostic tests in the absence of a gold standard. In this study, we propose an example data using latent class analysis to evaluating diagnostic performance of the sperm parameters as predictors of pregnancy outcome in patients undergoing controlled ovarian hyperstimulation (COH) and intrauterine insemination (IUI) with out exact gold standard. Intrauterine insemination (IUI) is widely used for treating couples with a variety of infertility diagnoses including cervical factor, ovulatory dysfunction, mild endometriosis, male factor and unexplained infertility, as it is less expensive and simpler than the more advanced assisted reproductive techniques. In this example, 82 couples with unexplained or male factor infertility were prospectively evaluated. In this example, pregnancy outcome is not a real gold standard for fertilization. For this reason fertilization is accepted as a latent class in this study. In latent class analysis with LEM software, sperm quality variables; motility, sperm concentration, morphology and hemizona index (HZI) were used. Probabilities of latent class were calculated and discussed for each pattern. In addition a simulation study was performed in this study. Some population experiments with size 1000 were simulated using binary diagnostic variables from Bernoulli distributions with some specific prevalence values. Detail results of these simulations were given in tables. We hope that these results will be helpful for selection of diagnostic tests combinations and patterns in absence of a gold standard.