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Cumulative in vitro fertilization success rates: estimation by multiple imputations

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Introduction. The effectiveness of In Vitro Fecundation (IVF) treatment has been largely investigated for the last thirties years. However, the evaluation of IVF outcomes has been mostly based until now on success rates per oocyte retrieval. There has been a great international debate in 2004 on the relevance of this indicator. It is now questioned to the benefit of more global indicators taking into account all the IVF attempts of a couple. These global success rates may greatly depend on the

proportion of couples who give up before having got a baby because their success probability is likely nor null, nor identical to the one of couple who did carry on the IVF program. Our objective is to investigate new statistical methods to estimate the cumulative success rates after 4 IVF attempts taking into account treatment interruptions.

Material and methods. We analysed data from 3,037 couples beginning an IVF treatment in two French IVF centres between 1998 and 2002, one in Paris and the other in Clermont-Ferrand (a mid-town in the centre of France). We defined IVF success rate as the percentage of couples beginning treatment at an IVF center who finally obtain a liveborn child, taking into account fresh and frozen transfers for one attempt and taking into account successive attempts of the couple in the center. Multiple imputations have been used to provide an estimated success rate among couples who gave up before getting a child. A global success rate after 4 IVF attempts for the whole population has then been computed.

Results. At the first attempt 21% of the couples obtained a child and 32% gave up. Taking into account the whole course in the centre, 37% (n=1117) of couples obtained a birth, 52% (n=1576) interrupted IVF before the 4th attempt and 11% (n=344) had completed 4 unsuccessful attempts. This 37% success rate supposed that none of the couples who gave up would succeed if they had carried on. The multiple imputation method, provided estimated success rate at each attempt as if no couples give up: 18% at the second attempt, 11% at the third and 9% at the 4th. The cumulative success rate after 4th attempts was thus estimated at 48%.

Conclusions. Methods to estimate the cumulative success rates in IVF should be developed in order to bring new insight on IVF evaluation. The multiple imputation method is a promising way to obtain such estimation but other methods should also be investigated.