

Correspondence

Issues concerning psychomotor development of children after preimplantation genetic diagnosis and parental stress evaluation

Loretta Thomaidis and colleagues^[1] describe a significant study of assessing the psychomotor development of children born after preimplantation genetic diagnosis (PGD) and parental stress. Their results showed that PGD children have poorer cognitive and motor skills and lower parental stress compared with naturally conceived children. But there are several confounding factors that may bias the conclusion.

First, the high prevalence of twin and triplet pregnancies (33.3%) in PGD children may contribute greatly to the lower cognitive and motor ability, other than PGD itself. As we know, multiple pregnancies and deliveries have long been considered as risk factors, and the likelihood of adverse outcomes for subsequent development is usually elevated.^[2,3] There is considerable possibility that multiple pregnancies give rise to the poor developmental ability of PGD children. In addition, there are 41.7% of all pregnancies with complications. Both of the conditions result in a higher rate of premature delivery and children small for gestational age. Therefore, for the factors of technology of PGD, multiple pregnancies and peri-neonatal complications, it is really difficult to determine the key factors leading to the developmental adverse outcomes. We should control these factors if we try to reach a conclusion on any adverse consequences of PGD per se.

Second, there is no detailed information about the parents of PGD children and controls in evaluating the parent stress levels. The authors recruited a control group of 35 parents (19 mothers and 16 fathers), but did not clarify if the interviewee was the caregiver or not. Although mothers are the primary caregivers in the daily care for children, fathers are increasingly involved in family life. But in the present study, the authors did not specifically address whether the persons who provided the information were the caregivers; this would affect the reliability of the evaluation of parent stress because growing researches showed that different roles of mothers and fathers who experienced different aspects of their child's behavior as especially stressful.^[4,5] Moreover, the parity number of children in the control group was not noted. It is well known that parent experience would bias the results of parent

stress levels. Hence, it is difficult to draw a reasonable conclusion regarding the parent stress levels because information resources were not provided in detail.

Based on these issues, we should be careful when interpreting the results.

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Author reply

We have read very carefully all your comments regarding the results of our study and the way they should be interpreted. Several confounders and methodological issues may also affect the final results of our study, but we would like to make some clarifications.

Firstly, we decided not to exclude prematures, intra-uterine growth retardation and multiples although these factors could contribute to the adverse outcome of our study population. However, we are of the opinion supported elsewhere^[1] that developmental studies in *in vitro* fertilization or intracytoplasmic sperm injection (IVF/ICSI) children must be designed in such a way to include parameters as multiparity, prematurity, and low birth weight.

As far as the pregnancy complications are concerned, we must clarify that in most cases they were

Table. Comparison of the published and the upcoming results of our study of children born after preimplantation genetic diagnosis

	Mildly low			Severely low		
	MeQ	MoQ	GeQ	MeQ	MoQ	GeQ
Published results, n=31	6, 4%	22, 6%	12, 9%	9, 7%	6, 4%	6, 4%
Continuation of our study (unpublished results), n=51	8, 7%	17, 3%	11, 7%	4, 3%	6, 5%	5, 9%

MeQ: mental developmental quotient; MoQ: motor developmental quotient; GeQ: general developmental quotient.

the usual complications reported in preimplantation genetic diagnosis or preimplantation genetic screening (PGD/PGS) pregnancies,^[2] such as diabetes mellitus, hypertension and placental bleeding. In our study population, most of these maternal problems have been treated with medication at home, and they did not lead to an eventful perinatal period.

We should point out that PGD psychomotor development was evaluated using Bayley and Griffith's scales. As these tests do not measure intelligence quotients but general developmental quotients, their results can be useful for early intervention in children with lower scores. Bowen et al^[3] have commented on psychomotor assessment with Bayley scale that low developmental scores, especially if used in ages <12 months, are not implicating a poor developmental outcome but support the need of a close follow-up of the child. Future studies with long-term follow-up of PGD/PGS children to older ages could be useful to estimate permanent intelligent quotient scores.

We should inform that we are continuing our study by expanding our sample population, so far, to 51 PGD children. Psychomotor evaluation by the same team, using again Bayley and Griffith's scales, showed a lower incidence of severely low mental quotients, while motor and general quotients remained unchanged (Table). In the same study, the percentage of PGD children with normal quotients was consistent with the current literature.^[4] Furthermore, a significant percentage of PGD children showed advanced developmental skills (Table).

Regarding your second comment, in both parent-groups we asked the main caregiver of the child to complete PSI-SF questionnaire. As far as parity of the control group is concerned, all children of the control

group were singletons. Our finding that PGD parents do not experience high levels of total parental stress compared with parents of naturally conceived children, it is consistent with the current literature^[4] while it was argued in studies of IVF parents as well.^[5,6]

Thank you for your arguments. Multi-centre, long-term and carefully-designed studies are needed to further elucidate the exact impact of confounders such as prematurity, multiparity, low birth weight, perinatal complications in PGD children.

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