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# Mode of Conception of Twin Pregnancies: Willingness to Reply to Survey Items and Comparison of Survey Data to Hospital Records

C. E. M. Toos van Beijsterveldt,<sup>1</sup> Chantal Hoekstra,<sup>1</sup> Roel Schats,<sup>2</sup> Grant W. Montgomery,<sup>3</sup> Gonneke Willemsen,<sup>1</sup> and Dorret I. Boomsma<sup>1</sup>

<sup>1</sup> Department of Biological Psychology, VU University Amsterdam, the Netherlands

<sup>2</sup> Division of Reproductive Endocrinology and Fertility and the IVF Centre, Department of Obstetrics and Gynaecology, VU University Medical Centre, Amsterdam, the Netherlands

<sup>3</sup> Molecular Epidemiology Laboratory, Queensland Institute of Medical Research, Brisbane, Australia

Based on results from a survey study in a sample of Australian parents of twins, Raj and Morley (2007) reported that questions concerning the mode of conception of twins may be offensive to parents. We looked at the willingness to reply to questions about mode of conception of twin pregnancies in a large survey study that was completed by 20,150 mothers of twins from the Netherlands Twin Registry. Data collection took place in 2005/2006. The amount of missing data was examined and by using data from earlier survey studies, responders and nonresponders were compared with respect to their answers to questions on assisted reproduction techniques. In addition, we assessed the reliability of the question on mode of conception by comparing the survey data with hospital records in a subsample of 80 mothers of twins. We found no indication that mothers of twins were not prepared to reply to questions on mode of conception. Only a small number of mothers did not fill in the question on mode of conception (0.8%). Also, the use of artificial fertility techniques did not differ between mothers who returned and mothers who did not return the 2005/2006 survey. The comparison of the survey data with the hospital records showed that mothers can accurately report on the mode of conception of their twins.

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According to Raj and Morley (2007) questions about mode of conception can be offensive to some parents of twins. In an anonymous survey they examined the willingness of parents of twins to report about the mode of conception of their twins. Participants were members of the local branch of the Australian Multiple Birth Association. About 6% of the twin parents indicated that they were not prepared to inform the researchers about the mode of conception when asked for this information in studies about

twinning and twin offspring. The authors suggested one should include questions about the mode of conception only when there is a need for it.

We looked at the willingness to reply to questions about the mode of conception by mothers of twins registered with the Netherlands Twin Register (NTR; Bartels et al., 2007; Boomsma et al., 2006) who participated in a large questionnaire survey of fertility and twin pregnancies (Hoekstra et al., 2008) that was carried out in 2005/2006.

In addition to looking at the willingness to respond to this question, we also examined the reliability of reporting about the mode of conception in a subsample by comparing the responses to the survey question to data from hospital records.

In the 2005 survey mothers of twins were asked how their twins were conceived. In the same questionnaire we also asked for permission to link the survey data to other registration systems in The Netherlands, such as hospital records. For a subgroup of 80 mothers of twins, whose children were born in the VU University Medical Centre Amsterdam, we retrieved information on whether the twin pregnancy was assisted or unassisted and whether assisted reproduction had involved in vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI) or intrauterine insemination (IUI).

## Methods

A two-page survey with questions about familial twinning, fertility and twin pregnancy was sent to all

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Address for correspondence: C. E. M. van Beijsterveldt, Department of Biological Psychology, VU University Amsterdam, Van der Boechorststraat 1, 1081BT Amsterdam, the Netherlands. E-mail: toos@psy.vu.nl

mothers of twins who were registered with the NTR ( $N = 33,528$ ; Hoekstra et al., 2008). From the mothers who had participated in NTR studies before ( $N = 25,620$ ), we received 17,683 completed questionnaires, and 1674 completed questionnaires were received from mothers who had never previously participated. In subsequent years, the survey was also sent to newly registered mothers of the NTR. In total 20,150 surveys were available. Of this group, 8% of the twin pairs were born before 1980, 10% between 1980 and 1989, 49% between 1990 and 1999, and 33% after 1999.

The survey contained one question about mode of conception. Possible answers were (1) naturally conceived (with a specification of the time it took to conceive the twins), (2) IVF, (3) ICSI, (4) IUI, (5) ovulation induction, or (6) other, with additional space for comments. In addition, the survey also asked whether the mother gave permission to link the data to other registration systems in The Netherlands. A total 94.3% of mothers gave a positive reply to this question, 4.4% said no and 1.3% did not reply to this question (their answers were treated as *no* responses).

Mothers of young twins (twins born after 1986) who registered their children with the NTR also completed a questionnaire about the twin pregnancy shortly after registration (average age of the twins when this first questionnaire was completed = 8.4 months). From this database we could retrieve information for the mothers who took part in the present study ( $N = 14,423$ ) as well as for 6062 nonresponders to the 2005 survey. We compared responders and nonresponders with respect to the use of assisted reproduction techniques to see if there was a response bias in the 2005 survey.

A subgroup of twins whose mothers gave permission to link survey data to hospital records, was born in the VU Medical Centre between 1999 and 2006. From the hospital records information on IVF, ICSI, and IUI was retrieved. By comparing the survey data with the hospital records, we first investigated whether the two databases differed in the reporting of assisted versus spontaneous conception, and secondly in the method of conception (IVF or ICSI).

## Results

In the survey, only a small number of mothers did not fill in the question on mode of conception ( $N = 159$ , 0.8%). This amount of missing data does not differ from the amount on a more neutral question, such as height of the mother ( $N = 168$ ). For those who responded, 75% of the mothers reported a natural conception, 16.9% reported IVF/ICSI/IUI, 6.4% a conception after ovarian stimulation, and 0.7% indicated other ways of conception.

Part of the sample had also replied to questions about mode of conception in previous surveys. We compared the frequency of the use of assisted reproduction techniques from previous surveys in the

responders and nonresponders of the 2005 survey. We found no differences in use of artificial fertilization techniques between the responding and nonresponding group ( $\chi^2 = 0.002$ ,  $p = .969$ ).

Comparison to hospital records in a small subset showed that most mothers reported accurately on the mode of conception. The agreement between maternal report and hospital records was 94% — only five out of 80 responses differed between the survey and hospital records. There was a spontaneous pregnancy for these five twin pairs according to the hospital records, but in the survey two mothers reported an assisted conception (IVF/ICSI), two mothers reported an IUI, and one mother reported conception by donor eggs. Agreement was found for 36 twin pairs conceived spontaneously, 31 twin pairs conceived by IVF/ICSI, and eight twin pairs conceived by IUI. Mothers of the assisted conception group did not always distinguish correctly between the methods of assisted reproduction. Of the 31 mothers there were four mothers who reported ICSI while the hospital records indicated IVF.

Inspection of the comments field of the 'other' option of our survey question revealed that the meaning of the five answer categories was not always clear and that the comments field was used also by those who marked one of the five answer categories. Table 1 gives an overview of some of the most frequent comments. One of the most frequent comments related to the 'ovulation induction' category suggesting that the term was not clear to the participants. In addition, a large number of comments were from mothers with naturally conceived twin pairs, and included comments such as 'after birth of first child', 'after stopping contraception', 'normal way', 'on holiday', 'was an accident', or 'was not planned'. A large group also mentioned falling pregnant while using contraception or whilst still breastfeeding.

**Table 1**

Selection of Comments from Survey Question on Mode of Conception of Twin Pregnancy

	Frequency
Spontaneous, accident, not planned, during holiday	202
Ovulation induction, hormones, hormones injections, hormones pills	168
During contraceptive use, during breast feeding	100
Artificial insemination (with and without hormones)	64
After medical treatment, like rinsing oviduct; removing oviduct	48
Shortly after miscarriage	38
Artificial insemination with donor sperm	28
Medical help for conception but not in the cycle of the twin pregnancy	24
Egg donation	14
Cryo frozen eggs	8
Alternative medical help	8

## Discussion

The response pattern in a large survey study completed by mothers of twins does not indicate that mothers of twins were not prepared to reply to questions on mode of conception. We observed less than 1% of missing answers. The comparison of hospital records in a small subgroup with the NTR survey data showed that parents can quite accurately report on the mode of conception of their twins.

In a study from Australia, Raj and Morley (2007) reported that about 6% of the parents were not be prepared to tell researchers in twin studies about the mode of conception of their twins, while in our study only a small number of mothers did not complete the question effectively. There may be cultural differences between the two countries in the willingness to reply to this question, but it may also reflect differences in the organization of the approach of the parents. In the case of the Australian sample, parents were approached through a branch of the Australian Multiple Birth Association, whose main interest does not involve research participation. In the case of the NTR, however, participants agree to take part in scientific research projects and expect to be sent questionnaires on their twins and on twinning. This may have influenced the rates of willingness to answer the question on mode of conception. Our results demonstrate that within a research group, parents of twins are prepared to answer questions on mode of conception. Unwillingness to answer these questions may be linked to unwillingness to participate in research per se.

It is possible that nonresponse to the questionnaire was influenced by questions on mode of conception. If this influenced response rate, results from Raj and Morley (2007) would predict a higher proportion of assisted conceptions in nonresponders. To address this question we compared the replies of responders and nonresponders in this survey on the answers to similar questions from earlier survey data.

There was no difference between responders and nonresponders with respect to the frequency of assisted conception of the twin pregnancy. In this Dutch sample, including a question on mode of conception seems unlikely to affect the participation rate.

On the basis of the comments from the survey question on the mode of conception, we would advise the incorporation of a field for comments in the survey.

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