

patients with schizophrenia ($n=35$) compared to controls ($n=16\ 812$), are obscured by the authors' interpretation and conclusions.

It is proposed that OCs are under-reported in mothers of controls, whereas in mothers of schizophrenics, as a result of their subtle behavioural problems and a poorer obstetric history, they are monitored more closely by midwives and OCs are more accurately reported. The authors hypothesise that this explains the higher rates of OCs in schizophrenic patients *v.* controls that have been reported in the voluminous literature on the subject. This hypothesis appears to be based not on an examination of the previous literature, nor on any direct testing of the hypothesis in their own study, but solely on the basis that mothers of schizophrenics in their study had a poorer obstetric history and more behavioural problems than controls and on their suspicion that OCs have been under-reported in controls in previous studies. The hypothesis does not bear closer examination.

Firstly, many previous studies which found an excess of OCs in schizophrenics used normal siblings as the control group. Clearly as both the subjects and controls had the same mother, maternal differences cannot be invoked to explain different OC rates. Secondly, as the authors state in their introduction "certain OCs will be more salient to the midwife and will therefore be recorded in the birth records, while other less salient factors will be under-reported". The specific OCs which have been found to be significantly elevated in schizophrenics compared to controls, are, in almost all studies, complications such as low birthweight, prematurity, prolonged labour, abnormal fetal position, umbilical cord encircling and knot, premature rupture of membranes and asphyxia, all of which are clearly salient and unlikely to be under-reported in controls. Indeed, the authors own study, which relied on birth records, is one of the few examples of a study which focuses on 'less salient' OCs, and their findings of increased smoking in pregnancy and poor obstetric history in mothers of schizophrenics could thus be justifiably questioned on the basis of their own hypothesis.

In the authors discussion about the relationship between OCs and affective disorder they state that "in contrast to the work on OCs and schizophrenia, there is remarkable consistency between our findings . . . and the work of Kinney *et al* (1993). Both studies find the mothers to be older, with the births characterised by lower birth weight and forceps deliveries". This is in fact not the case and misleading. Kinney *et al*, in a study of 16 probands and 20 siblings, found an increase in summary total OC

scores but in fact ". . . No single OC was significantly more prevalent in (bipolar) probands than in their unaffected sibs . . .". Forceps delivery and low birth weight were just 2 of 15 single OCs present in at least one subject, none of which were significantly elevated in bipolar probands. Noticeably, there is remarkable consistency between Sacker *et al*'s findings and a previous study of 73 schizophrenic patients (Rifkin *et al*, 1994). In both studies 15% of schizophrenic probands were born with low birth weight (<2500 g), both studies found low birth weight to be the only individual OC to be significantly elevated in comparison to controls and the mean birth weights in schizophrenic probands was almost identical (3174 g *v.* 3175 g). Two further published studies have reported significantly lower mean birth weight in schizophrenics *v.* controls (Lane & Albee, 1966; McNeil *et al*, 1993).

The authors also speculate about the role of genetic liability and raise the question of whether the behavioural problems in the mothers of schizophrenics could be considered as part of a broad phenotype of schizophrenia. Given this speculation, it is unclear why it was possible to identify through patients' case notes those mothers with a history of affective disorder, and remove them from the analysis but a similar procedure was not applied to the schizophrenic group. It should also be noted that the issue of whether variables of maternal characteristics and those relating to the current pregnancy, birth and the baby's condition (in particular, antenatal bleeding, baby's weight) are an independent risk factor for developing schizophrenia can be tested in the framework of a logistic regression analysis.

KINNEY, D. K., YURGELUN-TODD, D. A., LEVY, D. L., *et al* (1993) Obstetric complications in patients with bipolar disorder and their siblings. *Psychiatry Research*, **48**, 47-56.

LANE, E. A. & ALBEE, G. W. (1966) Comparative birth weights of schizophrenics and their siblings. *Journal of Psychology*, **65**, 227-231.

MCNEIL, T. F., CANTOR-GRAAE, E., NORDSTROM, L. G., *et al* (1993) Head circumference in 'preschizophrenic' and control neonates. *British Journal of Psychiatry*, **162**, 517-523.

RIFKIN, L., LEWIS, S., JONES, P. B. *et al* (1994) Low birth weight and schizophrenia. *British Journal of Psychiatry*, **165**, 357-362.

SACKER, A., DONE, D. J., CROW, T. J., *et al* (1995) Antecedents of schizophrenia and affective illness: obstetric complications. *British Journal of Psychiatry*, **166**, 734-741.

L. RIFKIN
N. TAKEI

Institute of Psychiatry
London SE5 8AF

SIR: Sacker *et al* (1995) suggest that the reported association between obstetric complications (OCs)

and schizophrenia may not be a causal relationship. The authors hypothesise that the association may be explained by a broad genetically determined phenotype of schizotypal personality types, which lead to high-risk lifestyle in the mother, which in turn contributes to OCs in the birth. This is a highly interesting hypothesis that warrants empirical testing.

However, a demonstration of an increased occurrence of OCs in births to schizophrenic or schizotypal mothers would of course not exclude an independent effect of perinatal and birth complications on the risk for adult schizophrenia.

Sacker *et al* also find that the associations between OCs and schizophrenia demonstrated elsewhere may be explained partly by information bias. The irregular lifestyles and lack of attendance to antenatal care of the mothers of schizophrenics may lead the midwife to expect and record more obstetric complications in this group than among controls. However, it is not clear to us how the authors have demonstrated this selective under-reporting in controls in other studies, and it would appear that this is at least partly refuted in their own study. The significant variables as, for example, birth weight less than 2500 g would not seem to leave much room for personal judgement by the reporting midwife. Also in their first report of the study (Done *et al*, 1991), the high quality of the data was emphasised.

The word "negative" (page 734) is not the most precise characterisation of the prior work by Done *et al*, given the statistical power of that study, because the direction of the finding is a positive association, and the odds ratio is not trivial (1.4). Indeed, the present paper by Sacker *et al* seems to confirm and specify this positive association in more detail.

DONE, J., JOHNSTONE, E. C., FRITH, C. D., *et al* (1991) Complications of pregnancy and delivery in relation to psychosis in adult life: data from the British perinatal mortality survey sample. *British Medical Journal*, **302**, 1576–1580.

SACKER, A., DONE, J., CROW, T. J., *et al* (1995) Antecedents of schizophrenia and affective illness. Obstetric complications. *British Journal of Psychiatry*, **166**, 734–741.

P. B. MORTENSEN
B. BENNEDSEN

*Institute for Basic Psychiatric Research
Psychiatric Hospital in Aarhus
8240 Risskov, Denmark*

W. W. EATON

*Johns Hopkins University
624 North Broadway
Baltimore, MA 21205, USA*

AUTHOR'S REPLY: Rifkin & Takei refer to "the lack of direct testing of the hypothesis", and Mortensen *et al* state "it is not clear to us how the authors have demonstrated this selective underreporting in controls". However we wrote (p. 739)

"... previous studies have been under-reporting OCs in the controls and that this has contributed to the illusion of raised OCs in the schizophrenics. Lewis & Murray's (1987) composite scale provides rates of complications around 17% in the normal population and between 32% and 37% for the births of schizophrenics when derived from birth records (Nimgaonkar *et al*, 1988; O'Callaghan *et al*, 1992). This compares with rates of 39% for controls and 38% for schizophrenics when the same scale was used in our study. Werner and colleagues (1971) found that 44% of births in their Island of Kauai prospective cohort study incurred an obstetric complication".

Is it reasonable to suppose that midwives may systematically under report in some cases and over report in other cases? The use of guidelines, and procedures to ensure adherence, which were used in the Perinatal Mortality Study can have a marked impact (Emslie *et al*, 1993) and as such have become a priority topic in the latest NHSE R&D Implementation Programme.

Rifkin *et al* suggest that OCs that have been reported in the literature are unmissable to the midwife. This is untrue. Some of the key studies have needed to use 'equivocal OC' (sic), or 'mild complications' to obtain a significant odds ratio. Furthermore the only individual OC singled out in McNeil's (1987) review was 'prolonged labour', which is an 'equivocal OC' on rating scales, and may not even be a true OC (O'Callaghan *et al*, 1990). An equivocal measure may or may not be recorded depending on its perceived importance under the prevailing circumstances. Our conjecture is that 'equivocal OCs' are more likely to be recorded when the midwife is concerned about the competence of the mother.

Rifkin *et al* suggest that the Perinatal Mortality Survey 1958 focused on 'less salient OCs'. This is wrong. Appendix 1 provided a list of all variables examined which included all of those mentioned by Rifkin *et al*.

Contrary to the claim of Rifkin *et al* and Mortensen *et al* low birth weight has not been consistently reported in the studies of OCs in schizophrenia. We have counted five studies with negative results and four studies reporting raised OCs for an aggregated score only. Were birth weight to be reduced in the group of schizophrenics it would surely have been mentioned in these latter studies. Furthermore McNeil does not single out