

BRIEF COMMUNICATION

Recall of obstetric events by mothers of schizophrenic patients

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ABSTRACT

Background. The aim of the current study was to evaluate the utility of maternal recall for obtaining history of obstetric complications (OCs) in psychiatric research.

Methods. Obstetric information from in-depth structured maternal interviews and from hospital birth records was compared in 45 mothers of schizophrenic patients and 34 control mothers. Both types of information were blindly and independently scored for OCs using the McNeil-Sjöström OC Scale.

Results. Considerable discrepancies were observed between interviews and records, irrespective of maternal group. No significant differences were found between patient and control mothers in error type (omission, commission, total retrospective error) or recall facility for selected events. More errors of commission were made by mothers of patients with negative family history than mothers of patients with positive family history for psychiatric disorder. Patients had significantly more OCs than controls only when hospital record information was utilized.

Conclusions. OC history obtained by maternal recall has methodological limitations.

INTRODUCTION

While a growing number of studies have found excess obstetric complications (OCs) in schizophrenic patients (McNeil, 1995), negative findings (e.g. Done *et al.* 1991; McCreddie *et al.* 1992) raise questions concerning methodology (McNeil *et al.* 1994a; McNeil, 1995).

OC history obtained by maternal recall is necessary in some studies (e.g. McNeil *et al.* 1994b; Rifkin *et al.* 1994), although potentially subject to error. Response bias and retrospective errors of commission have been found in mothers with unfavourable obstetric outcome, e.g. malformation (MacKenzie & Lippman, 1989), while mothers with normal outcome report fewer OCs over time (Oates & Forrest, 1984).

Systematic evaluation of the maternal inter-

view's viability in psychiatric research seems warranted. Schizophrenic patients' mothers may have poorer recall in general, due to cognitive impairment (Harris *et al.* 1996). Moreover, patients' mothers may tend to confabulate OCs (errors of commission) in order to 'explain' their offspring's illness, a possibility that has not been formally tested. The one psychiatric study, which investigated maternal recall for OCs (O'Callaghan *et al.* 1990), found it to be satisfactory. However, that study lacked a control group, and the question of whether obstetric recall differs in patient *versus* control mothers remains unanswered.

The current study examines the utility of maternal recall for obstetric history in mothers of adult schizophrenic patients and mothers with psychiatrically normal offspring. Information obtained from maternal interview was compared with prospectively recorded information from hospital records. We examined recall 'errors' and memory for selected obstetric

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events, hypothesizing that patient mothers would show more errors in total (errors of omission and commission) than control mothers and that more errors of commission would be found for mothers of patients without family history for psychiatric disorder than those with such a history. We also investigated the impact of information source upon OC rates and birthweight in patients *versus* controls.

METHOD

Mothers to adult patients with schizophrenia ($N = 45$) receiving in-patient or out-patient psychiatric treatment in Malmö during 1995–6 were recruited for participation in the study. The study requirements for patients were: DSM-III-R (American Psychiatric Association, 1987) schizophrenia diagnosis, and birth in a Swedish hospital with the mother still alive. Patients gave consent for contact with their mothers. Psychiatric diagnoses were established by case records (S.C. and L. Lovén), with satisfactory pre-test of inter-rater agreement. Mean patient age at the time of the study was 36.0 (range 20–49). Control mothers ($N = 34$) were recruited from recreational, political, and church organizations and non-medical personnel at the school of dentistry in Malmö. Their offspring had to be > 20 years of age, free from current or past psychiatric or neurological disorder and born in a Swedish hospital. Control mothers with several offspring were instructed prior to the interview to select at random the 'index event'. Offspring gender was 38 males/7 females (patients) and 12 males/22 females (control births). Patient and control mothers gave consent for examination of obstetric records.

Mothers received a structured obstetric history questionnaire by mail prior to the interview. After its completion and return, they were contacted for an in-depth interview for detailed discussion of the same questions. The interview covered life circumstances during pregnancy (economic/living situation, occupation), health during pregnancy (disorders, infections, medications, vaccinations, X-rays, smoking, alcohol/controlled substances), labour/delivery (onset, duration, membrane rupture, analgesics, instruments, foetal presentation, bleeding, cord complications), and neonatal status prior to hospital discharge (birthweight, disorders, treatment,

malformations). Structured family history interviews for psychiatric disorder (FH-RDC, Endicott *et al.* 1978) were conducted with patient mothers following the OC interview (S.C.). None of the mothers themselves had major psychiatric illness or schizoid personality disorder. Cases were categorized as 'family history positive' if psychosis or schizoid personality disorder was present in a first- or second-degree relative to the patient: 22/45 patient mothers were family history 'positive'. Maternal socio-economic background was categorized as upper, middle, or lower class utilizing Swedish government norms for mother and spouse's current occupation.

Information from interviews and from records was compiled separately and without knowledge of the case's diagnostic or family history status (E.C.-G.) and evaluated blindly for OCs (E.C.-G. and T.M. conjointly) using the McNeil-Sjöström Scale for Obstetric Complications (McNeil & Sjöström, 1995). In this scale several hundred pregnancy, labour/delivery and neonatal complications/conditions are scored on a 6-point scale according to their potential somatic harm to the foetus (Turnbull & Chamberlain, 1989; Brody, 1993). Pregnancy complications were *a priori* included \geq severity level '3', while the more frequently occurring labour/delivery and neonatal complications were *a priori* included \geq severity level '4'. OC scores represent the total number of complications occurring during a given period rather than sums of weighted scores. Hospital birth records were located for all mothers except one patient mother.

Recall accuracy for birthweight, gestational age, labour duration and number of retrospective recall errors (omission, commission) was ascertained for each case using the hospital record as baseline for accuracy. Errors of omission were operationally defined as OCs present in the records but absent in the interview; errors of commission were OCs present in the interview but absent in the records, with pregnancy OC errors not included due to non-standardized antenatal care. Total OC score and birthweight comparisons in patients *versus* control offspring were examined per information source. Within each mother group, pregnancy, labour/delivery, and neonatal OC scores were examined per information source.

Statistical analyses were based on Mann–Whitney Wilcoxon rank sum and Wilcoxon matched-pairs signed-ranks tests (OCs), independent t tests (birthweight), Spearman rank correlation (ordinal variables), and Fisher's exact tests (categorical variables). Analyses were conducted with SPSS/PC+, 6.1 (SPSS, 1994), with significance at $P \leq 0.05$, two-tailed.

RESULTS

Patient mothers and control mothers were similar in mean age at interview (63.7 v. 61.8), age at delivery (27.1 v. 28.7), years elapsed since index event (36.6 v. 33.1) and index event parity (1.1 v. 1.0). Patient mothers more frequently had lower socioeconomic status (46.7%) than control mothers (23.5%) (Fisher's exact, two-tailed $P = 0.03$).

Recall accuracy for obstetric events varied, although no significant between-group differences were found. Birthweight was remembered exactly or within 100 g by 63.6% of patient mothers and 76.5% of control mothers with no group differences on absolute amount or direction of error. In contrast, only 13.3% of patient mothers and 11.8% of control mothers correctly remembered gestational age. Labour duration was remembered by 25.0% patient mothers and 34.3% control mothers, with no group differences on amount or direction of error. Six patient mothers (v. 0 controls) had no recollection of labour duration (Fisher's exact, two-tailed $P = 0.04$).

In the total sample, errors of omission (mean 0.69, s.d. 0.87) were more frequent than errors of commission (mean 0.33, s.d. 0.77). Patient mothers did not differ significantly from controls on total number of errors (omission plus commission), errors of omission or errors of commission (Mann–Whitney Wilcoxon rank sum tests, $z = 1.86$, two-tailed $P = 0.06$; $z = 1.67$, two-tailed $P = 0.09$; $z = 0.85$, two-tailed $P = 0.39$, respectively). Negative family history patient mothers ($N = 21$) made more errors of commission than positive family history patient mothers ($N = 22$) (Mann–Whitney Wilcoxon rank sum test, $z = 2.39$, two-tailed $P = 0.02$); no difference was found between these groups regarding errors of omission ($z = 0.82$, two-tailed $P = 0.41$). In the total sample, an association was found between errors of omission

Table 1. OC scores and birthweight in schizophrenic patients versus healthy offspring of control mothers, separately by information source

	Patients		Controls	
	Mean	(s.d.)	Mean	(s.d.)
Total number of OCs (hospital records)	2.02	(1.61)	1.21	(1.61)
	$N = 44^*$		$N = 34$	
Mann–Whitney Wilcoxon rank sum test, $z = 2.65$, two-tailed $P = 0.008$				
Total number of OCs (maternal recall)	1.91	(1.78)	1.56	(2.00)
	$N = 41$		$N = 34$	
Mann–Whitney Wilcoxon rank sum test, $z = 1.27$, two-tailed $P = 0.203$				
Birthweight in grams (hospital records)	3390	(513)	3488	(489)
	$N = 44^*$		$N = 34$	
Independent t test, $t = -0.86$, two-tailed $P = 0.39$				
Birthweight in grams (maternal recall)	3357	(591)	3480	(479)
	$N = 41^\dagger$		$N = 34$	
Independent t test, $t = -0.98$, two-tailed $P = 0.33$				

* One hospital record missing in patient group ($N = 44$).

† Four patient mothers had no recollection of birthweight ($N = 41$).

and commission (Spearman rank correlation, $r_s = 0.31$, $P = 0.006$), but not between total retrospective errors and mother's age, parity, or interval between index event and interview (Spearman $r_s = -0.13$, $r_s = -0.13$, $r_s = -0.10$, respectively).

Sixteen of the entire 78 cases had no OCs by either source. Only 4/62 cases with OCs had identical OC histories in both information sources, while the remaining 58 cases (93.5%) had discrepancies between sources. Among these, 10 cases had equivalent numbers but different types of OCs (e.g. mother reporting labour/delivery OC, record showing neonatal OC). In 48 cases the total number of OCs also differed. Considerable differences in patient versus control OCs were obtained by the two information sources (Table 1). OCs were significantly elevated in patients only when hospital record data were utilized. Birthweight comparisons were not affected by information source.

In the specific groups, control mothers reported significantly more pregnancy complications than were noted in their records (Wilcoxon matched-pairs signed-ranks tests, $z = 2.25$, two-tailed $P = 0.02$), while patient mothers reported significantly fewer labour and delivery complications than were noted in their records ($z = 3.51$, two-tailed $P < 0.001$).

DISCUSSION

A vast majority of both patient and control mothers with OCs in their medical records did not report fully compatible OC histories by interview. Report accuracy varied by OC, from adequate recall for birthweight to poor recall for gestational age. While patient mothers did not differ greatly from controls in retrospective error type, patient mothers underestimated labour/delivery OCs. Such 'omissions' appear all the more serious, as labour/delivery OCs appear to be elevated in pre-schizophrenics (McNeil, 1995; Cantor-Graae *et al.* 1997). The current findings differ from those of O'Callaghan *et al.* (1990) who found relatively few discrepancies between recall and records, and little effect on designation of cases as 'OC positive' or 'negative'. While that study used the Lewis *et al.* (1989) scale in which one or more OCs are regarded as equivalent, the present scale may be more sensitive to differences in OC information source, as each specific OC is counted (McNeil *et al.* 1994a). Interestingly, O'Callaghan *et al.* (1990) found a tendency towards 'false positive' errors, when records and recall disagreed. Our mothers to patients with negative family history were particularly prone to 'false positive' types of error, possibly representing an attempt to explain their offspring's illness.

O'Callaghan *et al.* (1990) have questioned, relevantly, whether hospital records are necessarily complete sources of information. A limitation in our study is that the accuracy of the records could not be checked against independent source of information, e.g. attending midwives. Medical records are not invariably error-free (Hewson & Bennett, 1987). Some of the current 'errors of commission' may actually have constituted valid maternal information which was not recorded in the medical records. Complications reported by the mothers but not contained in the records (e.g. early bleeding, viral infection) suggest that it may be premature to regard maternal interview as entirely without value despite its inherent weaknesses.

In the current study control mothers with several offspring could choose their 'index' event. However, equivalent proportions of first-born found in the two groups (44% patients, 47% controls) does not suggest a parity bias regarding recall or elevated risk for OC oc-

currence (Turnbull & Chamberlain, 1989). Also, while some controls may have chosen their most 'memorable' parturition, their hospital records yielded fewer OCs than their interviews (Table 1), and their rate of errors was not significantly lower than that for patient mothers. Furthermore, while patient mothers were more frequently from the lower class, *post hoc* analyses showed that within both upper and lower classes patient mothers still tended to make more errors (omission, commission, total) than control mothers. Indeed, across groups, lower class mothers tended to make fewer errors than upper class mothers. Thus, recall was not likely biased by social class differences.

Finally, while maternal recall for certain events appears commendable (i.e. birthweight), the lack of precision and depth in interview information suggests that medical records may be preferable for OC research.

This research was supported by grants from the Swedish Medical Research Council (3793), the Faculty of Medicine, Lund University, Sweden and the Söderström-König Foundation, Sweden.

REFERENCES

- American Psychiatric Association (1987). *Diagnostic and Statistical Manual of Mental Disorders, 3rd edn-Revised*. American Psychiatric Association: Washington, DC.
- Brody, S. (1993). *Obstetrik och gynekologi*. Almqvist & Wiksell: Stockholm.
- Cantor-Graae, E., McNeil, T. F., Sjöström, K., Nordström, L. G. & Rosenlund, T. (1997). Maternal demographic correlates of increased history of obstetric complications in schizophrenia. *Journal of Psychiatric Research* **31**, 347-357.
- Done, D. J., Johnstone, E. C., Frith, C. D., Golding, J., Shepherd, P. M. & Crow, T. J. (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.
- Endicott, J., Andreasen, N. & Spitzer, R. L. (1978). *Family History Research Diagnostic Criteria*. New York State Psychiatric Institute, Biometrics Research: New York.
- Harris, J. G., Adler, L. E., Young, D. A., Cullum, C. M., Rilling, L. M., Cicerello, A., Intemann, P. M. & Freedman, R. (1996). Neuropsychological dysfunction in parents of schizophrenics. *Schizophrenia Research* **20**, 253-260.
- Hewson, D. & Bennett, A. (1987). Childbirth research data: medical records or women's reports? *American Journal of Epidemiology* **125**, 484-491.
- Lewis, S. W., Owen, M. J. & Murray, R. M. (1989). Obstetric complications and schizophrenia: methodology and mechanisms. In *Schizophrenia: Scientific Progress* (ed. S. C. Schulz and C. A. Tamminga) pp. 56-68. Oxford University Press: New York.
- McCreadie, R. G., Hall, D. J., Berry, I. J., Robertson, L. J., Ewing, J. I. & Geals, M. F. (1992). The Nithsdale schizophrenia surveys X: obstetric complications, family history, and abnormal movements. *British Journal of Psychiatry* **161**, 799-805.

- MacKenzie, S. G. & Lippman, A. (1989). An investigation of report bias in a case-control study of pregnancy outcome. *American Journal of Epidemiology* **129**, 65–75.
- McNeil, T. F. (1995). Perinatal risk factors and schizophrenia: selective review and methodological concerns. *Epidemiologic Reviews* **17**, 107–112.
- McNeil, T. F. & Sjöström, K. (1995). *The McNeil-Sjöström Scale for Obstetric Complications*. Department of Psychiatry, Lund University: Malmö.
- McNeil, T. F., Cantor-Graae, E. & Sjöström, K. (1994a). Obstetric complications as antecedents of schizophrenia: empirical effects of using different obstetric complication scales. *Journal of Psychiatric Research* **28**, 519–530.
- McNeil, T. F., Cantor-Graae, E., Torrey, E. F., Sjöström, K., Bowler, A., Taylor, E., Rawlings, R. & Higgins, E. S. (1994b). Obstetric complications in histories of monozygotic twins discordant and concordant for schizophrenia. *Acta Psychiatrica Scandinavica* **89**, 196–204.
- Oates, R. K. & Forrest, D. (1984). Reliability of mothers' reports of birth data. *Australian Paediatrics Journal* **20**, 185–186.
- O'Callaghan, E., Larkin, C. & Waddington, J. L. (1990). Obstetric complications in schizophrenia and the validity of maternal recall. *Psychological Medicine* **20**, 89–94.
- Rifkin, L., Lewis, S., Jones, P., Toone, B. & Murray, R. (1994). Low birth weight and schizophrenia. *British Journal of Psychiatry* **165**, 357–362.
- SPSS (1994). *SPSS for Windows Base System User's Guide, Release 6.0 and SPSS 6.1 for Windows Update* SPSS Inc.: Chicago.
- Turnbull, A. & Chamberlain, G. (1989). *Obstetrics*. Churchill Livingstone: Edinburgh.