

Factors predictive of regret in sex reassignment

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The objective of this study was to evaluate the features and calculate the frequency of sex-reassigned subjects who had applied for reversal to their biological sex, and to compare these with non-regretful subjects. An inception cohort was retrospectively identified consisting of all subjects with gender identity disorder who were approved for sex reassignment in Sweden during the period 1972–1992. The period of time that elapsed between the application and this evaluation ranged from 4 to 24 years. The total cohort consisted of 218 subjects. The results showed that 3.8% of the patients who were sex reassigned during 1972–1992 regretted the measures taken. The cohort was subdivided according to the presence or absence of regret of sex reassignment, and the two groups were compared. The results of logistic regression analysis indicated that two factors predicted regret of sex reassignment, namely lack of support from the patient's family, and the patient belonging to the non-core group of transsexuals. In conclusion, the results show that the outcome of sex reassignment has improved over the years. However, the identified risk factors indicate the need for substantial efforts to support the families and close friends of candidates for sex reassignment.

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Introduction

In Sweden, the annual incidence of requests for sex reassignment is 0.17 per 100 000 inhabitants over 15 years of age, and the male:female sex ratio is 1.4:1 (1). Present intervention techniques are based upon science and approved experience. A typical course of treatment lasts several years and includes extensive psychological/psychiatric/somatic evaluations, completion of the '2-year real-life test', administration of hormones, surgery, and finally sex reassignment (2).

Given the irreversibility of sex reassignment surgery, the need for investigation of prognostic factors is compelling. For many years now surgery has been advised against when overt psychosis is present, although one author has argued that some psychotic patients may benefit from sex reassignment surgery, showing a decrease in symptomatology (3). The consensus is that surgical results are a major determinant of postoperative outcome (4, 5). It has further been stated that personal and social instability (6), personality disorders (7), diagnosis other

than genuine transsexualism (8), e.g. ageing transvestites (9), older age (over 30 years of age) at first request for surgery (6, 10–12), poor support from the patient's family (6), and traumatic loss of both parents in infancy (10), are all factors associated with poor outcome. While some authors report that high levels of sexual activity and bisexual experience may be associated with regret after sex change (6), others have found that regretful individuals had been asexual or hyposexual prior to surgery (10). Completed military service and a history of typically masculine physically demanding employment are reported to be negative prognostic factors in biological men (10), although some authors have found no such association (6). Males in general and heterosexual males in particular are considered more likely to regret sex reassignment surgery than females or homosexual males (6, 13–16).

The primary aims of this study were to calculate the frequency of regret and to elucidate whether the assessment factors, which have previously been

identified as being of prognostic significance and are clinically widely used, can be confirmed in view of 20 years experience of legal sex reassignment. The secondary aim was to provide a model for prediction of regret with logistic regression analysis.

Material and methods

Subjects

The study subjects and procedure have previously been described in detail (17). Briefly, the entire cohort of sex reassignment applicants in Sweden has been kept on file within the National Board of Health and Welfare since 1972. Between 1 July 1972 and 30 June 1992, a total of 233 individuals (136 men and 97 women) had applied to the Swedish authorities for sex reassignment. Twenty applications were disapproved by the authorities and were excluded for this reason, leaving a cohort of 213 individuals who constituted the basis for this investigation.

Up to 30 June 1996, nine biological men and four biological women had applied for a reversal to their original sex. However, of these patients, four biological men and one biological woman had had sex reassignment before 1 June 1972 (i.e. before the law concerning sex reassignment came into force), and were for this reason excluded from the frequency calculation. The frequency figure is accordingly computed on the basis of the remaining 213 patients, eight of whom regretted the measures taken. This gives a non-regretful group of 205 patients.

In order to enlarge the repentance cohort when calculating group differences, we included the above-mentioned five patients who applied for reversion to the original sex, but were sex reassigned before 1 June 1972. These patients were in all essentials treated in the same way as the group who were sex reassigned after 1 June 1972, and carry a similarly extensive medical and psychological documentation on file. This gives a regretful group of 13 patients. We have thus compared all those individuals who sought and received approval for reversion ($n=13$) with the non-regretful group ($n=205$).

Definitions

DSM-IV (18) employs the term 'gender identity disorder' which corresponds to the condition 'gender dysphoria'. Thus under the more inclusive term 'gender identity disorder' DSM-IV includes three previous DSM-III-R (19) diagnoses, namely 'transsexualism', 'gender identity disorder of childhood' and 'gender identity disorder of adolescence or adult-

hood, non-transsexual type'. The DSM-IV concept is consequently more extensive than the concept of transsexualism, and includes non-fetishistic transvestism as well as homosexual conditions with gender identity problems. Transsexualism, according to this spectrum disorder view, has been proposed to represent the extreme end of the spectrum (20), thereby forming a *core* group.

In addition to a strong sense of belonging to the opposite sex, the prominent features of this *core* group of transsexuals are as follows: an aversion to biological sex characteristics; effeminate behaviour as a child; lack of sexual arousal when cross-dressing; being sexually attracted to the same biological sex; and no fluctuation in gender dysphoria symptoms (4). Previously low sexual libido was also held to be a hallmark of the *core* group (4). However, in the authors' experience, decreased libido is not a universal characteristic. Rather, as a consequence of being unable to form satisfactory relationships, the patient suffers from an *erotic aloneness*, although with ordinary strength of libido. The *non-core* group includes (i) conditions bordering on transvestism (often a history of recurrent sexually arousing fantasies, sexual urges, or behaviours involving cross-dressing) and (ii) conditions bordering on homosexuality (often lacking aversion for one's own sex characteristics). Transsexualism can be further distinguished from effeminate homosexuality by the extent and persuasiveness of the cross-gender wishes, interests and activities, and finally by a history of one or more protracted homosexual relationships.

In 1978, unfavourable prognostic factors were identified based on five male-to-female transsexuals who regretted the measures taken (6). The conceivably influencing factors employed in the present study are derived from that investigation and the literature reviewed above. Detailed definitions have been presented elsewhere (17), with the exception of two of the variables used:

- (i) poor support from the patient's family — this means that the patient either entirely lacks family or close friends, or that the relatives take a negative attitude towards sex reassignment.
- (ii) Differential diagnosis — see above for items that discriminate between the *core* and *non-core* groups.

A retrospective cohort study design was used. The time period from application to our follow-up ranged from 4 years for those who obtained permission for sex reassignment in 1992, to 24 years for the first applicants. All of the data was extracted from the medical records and verdicts, and subsequently coded and quantified according to the definitions used. However, in some cases,

Table 1. Comparison of the non-regretful group with regard to presence of the factors suspected of being of prognostic significance for sex reassignment^a

Factor	Non-regretful group	Regretful group	P-value
Sex ratio (male : female)	115:90 (1.3:1)	9:4 (2.25:1)	0.52
Previously married	32 (16%), <i>n</i> =205	1 (7.7%), <i>n</i> =13	0.71
Previously parented children	27 (13%), <i>n</i> =205	1 (7.7%), <i>n</i> =13	0.89
Educational level (years)	<i>n</i> =190	<i>n</i> =12	0.83
Remedial class, ≤9	18 (9.5%)	3 (25%)	
Compulsory school, 9	103 (54%)	5 (42%)	
Vocational school, 11	26 (14%)	1 (8.3%)	
Upper secondary school, 12	24 (12%)	1 (8.3%)	
University, >12	19 (10%)	2 (17%)	
Unemployed	23 (11%), <i>n</i> =202	3 (25%), <i>n</i> =12	0.34
On sick benefit	31 (15%), <i>n</i> =202	2 (17%), <i>n</i> =12	0.77
Alcoholism/drug addiction	28 (14%), <i>n</i> =205	2 (15%), <i>n</i> =13	0.81
Criminality	15 (7.3%), <i>n</i> =205	3 (23%), <i>n</i> =13	0.14
OR (95% CI)	1.00 ...	3.15 (0.81–12.3)	
Unstable personality	20 (10%), <i>n</i> =205	4 (31%), <i>n</i> =13	0.059
OR (95% CI)	1.00	4.11 (1.16–14.6)	
Poor support from the family	65 (38%), <i>n</i> =171	10 (91%), <i>n</i> =11	0.0017
OR (95% CI)	1.00 ...	16.3 (2.04–130)	
Psychiatric treatment	71 (35%), <i>n</i> =205	9 (69%), <i>n</i> =13	0.027
OR (95% CI)	1.00 ...	4.25 (1.26–14.3)	
Mood disorder	18 (8.8%), <i>n</i> =205	2 (15.4%), <i>n</i> =13	0.76
Psychotic disorder	3 (1, 5%), <i>n</i> =205	2 (15%), <i>n</i> =13	0.022
OR (95% CI)	1.00 ...	12.24 (1.85–81.0)	
Age at onset of transsexualism (years)	<i>n</i> =199	<i>n</i> =12	0.88
0–9	148 (74%)	9 (75%)	
10–14	37 (18%)	3 (25%)	
15–18	8 (4%)	0 (0%)	
≥19	6 (3%)	0 (0%)	
Not sissy/tomboy as child	23 (12%), <i>n</i> =193	2 (17%), <i>n</i> =12	0.97
Mean age at request for intervention (years)	24.4 (SD 8.3)	25.7 (SD 8.3)	0.61
Heterosexual experience	65 (35%), <i>n</i> =188	4 (33%), <i>n</i> =12	0.82
Homosexual experience	138 (74%), <i>n</i> =187	6 (50%), <i>n</i> =12	0.15
OR (95% CI)	1.00 ...	0.36 (0.11–1.15)	
Non-core group of gender identity disorder	38 (19%), <i>n</i> =200	7 (64%), <i>n</i> =11	0.002
OR (95% CI)	1.00 ...	7.46 (2.07–26.8)	
Conditions bordering on transvestism ^b	24 (21%), <i>n</i> =112	4 (50%), <i>n</i> =8	0.16
OR (95% CI)	1.00 ...	3.66 (0.85–15.8)	
Conditions bordering on homosexuality	15 (7.5%), <i>n</i> =201	3 (27%), <i>n</i> =11	0.08
OR (95% CI)	1.00 ...	4.65 (1.11–19.4)	

^a For definition of factors, see text. OR, odds ratio; CI, confidence interval. Estimates of statistical significance between categorical variables were obtained by Pearson Chi-square test with Yates' correction for small samples. When a *P*-value of ≤0.20 was obtained, the odds ratio with 95% confidence interval was calculated.

^b The factor 'Conditions bordering on transvestism' was computed on the basis of males only, since there were no women in this group.

items pre-selected for examination were not available or reliable for all subjects. Consequently, *n* varies and is specified for each consecutive item (Table 1).

Statistical analysis

Data were stored and analysed using a personal computer and the Statistica™ software package. In order to determine the statistical significance of the relationship between categorical variables, the Pearson Chi-square test together with the conservative Yates' correction for small samples (21) was used. If a *P*-value of ≤0.2 was obtained by the Chi-square test, the data were subjected to an analysis

of odds ratio and 95% confidence interval for the population odds ratio according to Altman (21).

The Kruskal-Wallis ANOVA by ranks test was used to compare rank order variables (educational level and age at onset of transsexualism). The logistic regression analysis is outlined in the results section.

The study was approved by the Ethics Committee of Göteborg University.

Results

In total, 8 of the 213 sex-reassigned patients during the period 1972–1992 applied for reversal to their original sex, giving a frequency of regret of 3.8%.

Predictors of regret in sex reassignment

Table 2. Logistic regression analysis of regret of sex reassignment on the variables shown to differ in the between-group analysis (see text)

Predictor	β	SE	Wald statistics	P-value	e^{β}
Poor support from the family	3.14	1.18	7.00	0.0081	0.043
Psychotic disorder	3.36	1.36	6.11	0.014	28.90
Constant	-2.04	0.36	31.47	0.000	

The total group of patients who regretted their sex reassignment ($n=13$) (see Table 2) was compared with the non-regretful group consecutively with regard to the conceivably unfavourable prognostic factors outlined above. The results are summarized in Table 1.

Temporal analysis

The mean time period from approval of sex reassignment to the request for reversal of the measures taken was 7.4 years (95% CI, 4.7–10.1, range 1–15 years). The last year of approval for any subject who expressed regret was 1982.

Logistic regression analysis

By providing a predictive equation model for regret concerning sex reassignment, a logistic regression analysis was performed. The criterion variable (0–1) was regret or no regret. Predictor variables with a P -value of <0.05 in Table 4 were considered for inclusion in the model, i.e. poor support from the family, previous psychiatric treatment, history of psychotic disorder, and belonging to the non-core group of transsexuals.

First, a logistic regression analysis was performed for each separate variable and the risk of regret. The analysis showed that, for each of the variables, the β -coefficient was significantly different to 0. A multivariate procedure with forward stepwise elimination, via the Wald statistics, was then developed. The results of the procedure indicated that only two of the variables predicted future regret of sex reassignment, namely 'poor support from the family' and 'history of psychotic disorder'. In this computation, all patients with missing values on any of the variables were deleted casewise. In the next calculation, only those cases who had missing values on the variables 'poor support from the family' and 'psychotic disorder' were deleted casewise. Table 2 shows the results obtained for this equation.

Since the variable 'belonging to the non-core group' was highly significant in the between-group comparison, an attempt was made to include this variable, this time with casewise deletion of missing

values restricted to the examined variables, i.e. 'poor support from the family', 'history of psychosis' and 'belonging to the non-core group'. The equation showed that the variable 'poor support from the family' was associated with regret, and the variable 'non-core group' was closer to the level of statistical significance ($P=0.068$) than was the variable 'psychosis' ($P=0.13$). Therefore a final computation was performed in which the variable 'non-core group' replaced the variable 'psychosis'. The results of this final computation are shown in Table 3.

Accordingly, a prediction of regret after sex reassignment can be based upon the variables 'poor support from the family' and 'history of psychotic disorder', or the variables 'poor support from the family' and 'belonging to the non-core group'. We decided to construct a prediction model based upon the last two variables because the prevailing consensus is that a history of psychosis constitutes a practical contraindication for sex reassignment. Therefore the number of patients with a history of psychosis is very low, and the variable is consequently of limited clinical relevance. However, patients who do not belong to the core group are frequent and of substantial clinical interest.

Five patients who regretted the measures taken were added to the total cohort for reasons mentioned in the methods section. An adjustment of the logistic model must therefore be computed in order to make the approximation valid for a randomized selection of applicants for sex reassignment. On the basis of this corrected version of the logistic model, the following prediction of likelihood of regret after sex reassignment can be made (see Table 4).

Discussion

Every effort must be made to avoid individuals who ask for a reversal of sex reassignment. However, prospective controlled studies designed to assess outcome and prognostic factors are lacking. Nevertheless, several much-needed follow-up studies have been published during the last few decades (4, 7, 13, 22, 23), and there is no reason to doubt that

Table 3. Logistic regression analysis of regret of sex reassignment on a selection of variables (see text); the more clinically relevant variable, belonging to the non-core group, has replaced the variable history of psychosis

Predictor	β	SE	Wald statistics	P-value	e^{β}
Poor support from the family	2.40	1.08	4.92	0.026	0.091
Non-core group of transsexuals	1.40	0.70	3.99	0.046	4.04
Constant	-2.58	0.55	22.38	0.000	

Table 4. Prediction of regret of sex reassignment: a model created on the basis of logistic regression analysis^a

Poor support from the family	Belonging to the non-core group of transsexuals	Probability of regret (%)
—	—	0.4
—	+	1.7
+	—	4.5
+	+	15.8%

^a+, positive for the putative risk factor; —, negative for the putative risk factor.

outcome has improved over the years, probably due to improved assessment, more restricted inclusion criteria for sex reassignment, improved surgical techniques and more attention being given to post-treatment psychosocial guidance (24). Moreover, statistically significant differences at follow-up have been found between early sex reassignment surgery vs. conservative support in terms of neuroticism and social and sexual activity, in favour of the group that received surgery (22, 25), a finding which supports the use of current intervention measures.

This study was conducted retrospectively and consequently has drawbacks. The factors were defined afterwards and could only be identified in the medical records kept on file. On the other hand, a substantial number of the variables represent hard facts, the reliability of which there is no reason to doubt. The group of regretful cases is small. For that reason, it is difficult to provide sufficient statistical power when analysing the data, and consequently the results need to be interpreted with caution. Finally, two important putative prognostic factors are not discussed in this study: first, the subject's physical build in relation to his or her new sex role, and secondly the impact of a possible poor surgical outcome. With regard to the first factor, the data in the medical records did not always allow for a proper evaluation, which led us to omit this item. The latter factor was also omitted because it is not a premorbid factor *per se*, and we were only evaluating the medical records up to the date of sex reassignment. However, the surgical result is a well-established prognostic factor with little demand for further confirmation (4).

The frequency of regret in earlier reports varies widely, from 0% (23, 26, 27), 2% (28), 3% (11), 5% (6, 11, 29) and 6–8% (14, 30) to 30–38% (10, 31). In the present study, eight subjects (i.e. 3.8%) regretted the measures taken and applied for a reversal to their original sex. This figure has changed for the better over the years (6). A limitation of the frequency analysis is that the cut-off point for including regretful cases is set to 4 years after the last day (30 June 1996) for including subjects who had received approval for sex reassignment

(30 June 1992). One may argue that we have not yet seen all of the regretful cases among those last included.

Poor support from family and relatives is the variable revealed by logistic regression analysis to be most important in predicting regret. The attitude of individuals close to the patient seems to be crucial to the process of adaptation to the new gender role. Consequently, efforts must be made to inform and support the patient's relatives. Psychoeducational programmes such as those used to support the relatives of schizophrenic and mood disordered patients should be seriously considered (32).

Factors indicating a history of psychotic disorder and previous psychiatric treatment for reasons other than gender dysphoria are also predictive of an unfavourable outcome. The importance of sufficient mental resilience cannot be underestimated, and may be a prerequisite for a satisfactory outcome.

The diagnostically uncertain cases (i.e. the non-core group) were found to be more numerous among the regretful group. In fact, 64% of the patients in the regretful group had conditions bordering on homosexuality or transvestism, yielding an odds ratio for regret of 7.46. Yet it is important to bear in mind that 38 (84%) of 45 subjects belonging to the non-core group did *not* regret the sex reassignment.

Heterosexual experience was expected to be a feature of the regretful group (13). By contrast, however, the regretful group had the same level of heterosexual experience as and less homosexual experience than the non-regretful group. This argues against the view that sexual activity *per se* constitutes a risk factor.

The results shown in Table 4 were computed on the basis of this logistic regression equation. The postulated risk in each consecutive group should not be interpreted in a rigorous manner, but rather the results should serve as a clinical and therapeutic guideline. A patient who lacks support from his or her family and who also belongs to the non-core group should receive particular attention and care.

In summary, 3.8% of the patients regretted the measures taken and applied for reversal to their original sex. The most important risk factors for predicting regret were 'poor support from the family' and 'belonging to the non-core group of transsexuals'.

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