

## ORIGINAL RESEARCH—INTERSEX AND GENDER IDENTITY DISORDERS

### Transsexualism in Serbia: A Twenty-Year Follow-Up Study

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#### ABSTRACT

**Introduction.** Gender dysphoria occurs in all societies and cultures. The prevailing social context has a strong impact on its manifestations as well as on applications by individuals with the condition for sex reassignment treatment.

**Aim.** To describe a transsexual population seeking sex reassignment treatment in Serbia, part of former Yugoslavia.

**Methods.** Data, collated over a period of 20 years, from subjects applying for sex reassignment to the only center in Serbia, were analyzed retrospectively.

**Main Outcome Measures.** Age at the time of application, demographic data, family background, sex ratio, the prevalence of polycystic ovarian syndrome (PCOS) among female-to-male (FTM) transsexuals, and readiness to undergo surgical sex reassignment were tabulated.

**Results.** Applicants for sex reassignment in Serbia are relatively young. The sex ratio is close to 1:1. They often come from single-child families. More than 10% do not wish to undergo surgical sex reassignment. The prevalence of PCOS among FTM transsexuals was higher than in the general population but considerably lower than that reported in the literature from other populations. Of those who had undergone sex reassignment, none expressed regret for their decision.

**Conclusions.** Although transsexualism is a universal phenomenon, the relatively young age of those applying for sex reassignment and the sex ratio of 1:1 distinguish the population in Serbia from others reported in the literature.

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**Key Words.** Transsexual; Sex Ratio; Prevalence

#### Introduction

Transsexualism is the condition in which a person with apparently normal somatic sexual differentiation has the unshakable conviction that he or she is actually a member of the other sex. This conviction is accompanied by the irresistible urge to live in that preferred gender, thereby requiring hormonal, anatomical, legal, and psychosocial adaptations.

There are indications that biological factors are involved in the phenomenon of transsexualism. The human bed nucleus of the stria terminalis

(BSTc) is sexually dimorphic in size and neuron number [1–3]. A relationship with gender identity has been observed [1,2]. Male-to-female (MTF) transsexuals have, regardless of their adult endocrine status, been found to have a BSTc with a size and neuron numbers found in females. Interestingly, a male type development pattern was found in the only available brain so far of a female-to-male (FTM) transsexual [2]. These findings support a concept that transsexualism is a sexual differentiation disorder of the sex dimorphic brain.

Although expressions of cross-gender behavior are universal, the prevailing political, social, and

religious climate will affect (public) manifestations of cross-gender behavior, and will also impact on the readiness of the medical profession to provide medical services for those who seek sex reassignment treatment.

This is an account of the experiences over the past 20 years in Serbia, part of former Yugoslavia. In former Yugoslavia, a gender team operated in Slovenia, but it ceased to exist in 1982 and the gender team in Serbia is currently the only one functioning. This part of the world went through a tumultuous period of transition and conflict in recent history, associated with significant migration.

Data are available on 147 transsexuals.

### Procedures

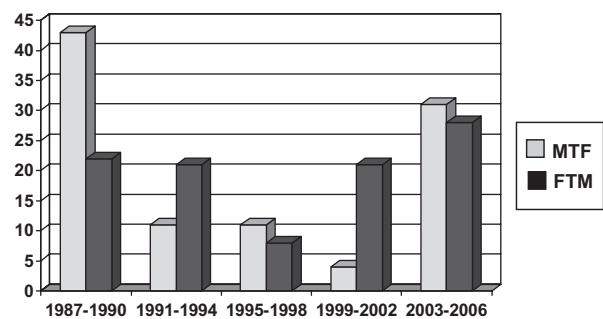
The diagnosis of transsexualism and eligibility for somatic treatment were both assessed by a psychiatrist. Diagnostic criteria and indications for treatment followed the specifications of the Diagnostic and Statistical Manual of Mental Disorders, 4th Ed., Text Revision (DSM-IV-TR) and the Standards of Care as formulated by the World Professional Association of Transgender Health (<http://wpath.org>). Following assessment, subjects deemed to be eligible for somatic treatment were referred to the endocrinologist, first author of this article. Following 1 year of hormone treatment and completion of a successful real-life test, a determination was made as to whether, in the opinions of the psychiatrist, endocrinologist, and surgeon, the candidates were eligible for sex reassignment surgery.

Informed written consent to undergo hormonal and surgical sex reassignment treatment was obtained from each subject.

### Results

Between 1987 and 2006, 71 MTF transsexuals and 76 FTM transsexuals presented themselves for treatment. All subjects were of Caucasian ethnicity, with more than 95% originating from Serbia and the remainder from neighboring states in former Yugoslavia. Numbers per 3-year periods are presented in Figure 1. Numbers peaked between 1987 and 1990, declined subsequently, then rise again from 2003 on. It is likely that this pattern relates to the political/social situation associated with the war in Serbia in those years.

Twenty-five percent of MTF and 32% of FTM transsexuals were born in the capital city, Belgrad



**Figure 1** Prevalence of applications for sex reassignment therapy over 20 years in Serbia.

(population of 2 million), others from other places in Serbia (population of 6 million), and a few from abroad.

### Age at First Consultation

Figure 2 presents the age of subjects at the time of the first consultation. Of the total population, 58.9% MTF and 48.2% FTM transsexuals were 18–25 years old. Nineteen percent MTF and 24% FTM transsexuals were over 31 years old and only 1% MTF and 2% FTM transsexuals were over 40 years of age.

### Polycystic Ovarian Syndrome (PCOS) in FTM Transsexuals

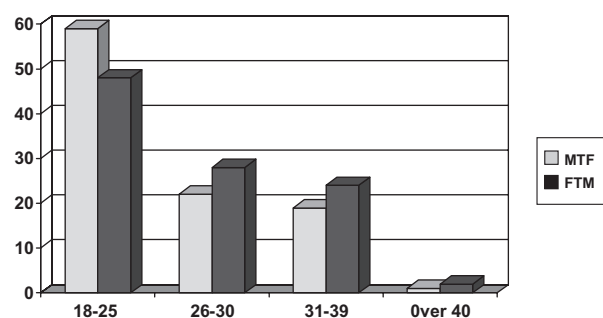
Using clinical and laboratory assessments as well as sonography, and using the Rotterdam criteria for PCOS [4], a prevalence of PCOS of 14.4% was found. This is higher than the 6–8% reported in the literature for the general population [5].

### Karyotyping

Karyotype examination was carried out in all subjects and no abnormalities were encountered.

### Sex Ratio

Another remarkable characteristic of this transsexual population is the current sex ratio which is



**Figure 2** Age of transsexuals at start of consultation.

close to 1:1 (71 MTF and 76 FTM). The ratio of MTF vs. FTM has changed from 2:1 when the center first accepted referrals to 1:1 20 years later.

### **Education/Professions**

The educational level attained by applicants was completion of secondary school (79% MTF and 69% FTM), and 8.0% of FTM, compared to 3.6% of MTF, had completed higher education. Preferred occupations of MTF transsexuals were models, musicians, dancers, waiters, and cooks, with no manual workers. Among the FTM transsexuals there were no housewives, while many of this group were hairdressers.

### **Family Background**

With regard to characteristics of family background it was found that at the time of the transsexual's birth, the mean age of the mother was 20–25 years and that of the father was 26–30 years. In the light of demographics of Serbia, these were young parents. Mothers were predominantly housewives and fathers were often policemen and soldiers. Parents of FTM transsexuals were higher educated than parents of MTF transsexuals. One MTF transsexual had a dizygotic twin and one FTM transsexual had a dizygotic twin-sister. Neither of these twins is transgendered.

### **Surgical Sex Reassignment**

Breast augmentation surgery, because of insufficient breast development following hormone therapy, was performed in 15.3% of MTF transsexuals.

Sex reassignment surgery was performed 1 year after the initiation of hormone therapy in 75% of MTF transsexuals, and after 2 years in 8%. Twelve percent of MTF transsexuals rejected surgery and 5% were lost for follow-up. Mean age at operation for MTF transsexuals was  $25.4 \pm 2.1$  years. Fifty-five percent of FTM transsexuals had surgery after 1 year, 22.5% after 2 or 3 years. Eighteen percent of FTM transsexuals rejected the operation and were satisfied with hormonal treatment only and 4.5% were lost for follow-up. Mean age at the time of surgery was  $25.7 \pm 3.5$  years for FTM transsexuals.

### **Partnerships**

Following sex reassignment surgery, 16.6% MTF and 16.4% FTM transsexuals have married a partner with a sex opposite to that of their reassigned sex. Whereas FTM transsexuals tended to

stay with the same partner, MTF transsexuals were more likely to change partners. After sex reassignment surgery, they feel more attractive and confident to live the lives of women.

### **Regrets**

We have so far not encountered a single patient who expressed regret for their sex reassignment treatment.

### **Discussion**

Expressions of gender dysphoria are universal among mankind. Human sexuality is multifaceted and it is reasonable to believe that prevailing social context and attitudes of the helping professions will have a strong impact on its manifestations and on applications for sex reassignment treatment. In this report, we present data on gender dysphoria in Serbia, part of former Yugoslavia. The country has had a very turbulent recent history of warfare and ethnic conflicts.

The prevalence figures based on the numbers of applications for sex reassignment are considerably lower than those from countries such as The Netherlands [6] or Belgium [7] for which recent data are available.

Remarkable for Serbia is the young age at which people seek sex reassignment treatment [6,7]. We have compared our data to those of the Amsterdam gender clinic [6]. In that clinic, the majority of FTM transsexuals applied for reassignment between the ages of 20–25, with very few (3%) presenting in middle age. In the Amsterdam clinic, the majority of MTF transsexuals did so between the ages of 25–30 although middle-aged subjects are not rare (approximately 18%). In our clinic, MTF transsexuals presented themselves at a younger age than the FTM (although quantitatively the differences between ages of MTF and FTM transsexuals were not large). Wallinder [8] found 66:62% in Sweden, and Hoenig and Kenna 66:71% in England [9] to be younger than 25 years of age at the time of application for sex reassignment. Middle-aged transsexuals (approximately 18% in Amsterdam) [6] were a rarity in our clinic. Also in the study of Schlatterer et al. [10], 16% of MTF transsexuals were diagnosed when they were older than 41 years of age compared to only 1% in our clinic.

We found that the prevalence of PCOS in the FTM subgroup was almost twice that of the general female population. Ultrasound of breasts, abdomen, uterus and adnexa or testis are routinely

performed in our clinic. Several studies have found that there is higher-than-normal prevalence of the PCOS in FTM transsexuals [11–14]. The latter studies examined small numbers ( $N = 16$  [12],  $N = 16$  [13]). Sonography was not used to diagnose PCOS [11] or not always [15,16]. In a series of 96 FTM transsexuals, Gooren was unable to confirm the higher prevalence of PCOS in FTM transsexuals, but this assessment was based on the history of menstrual periods, levels of luteinizing hormone and testosterone, and no sonography of the ovaries was carried out [17]. Reports on the regularity of the menstrual cycle of FTM transsexuals have been published and there appear to be significant differences between studies. Bosinski et al. reported that only 18.3% of subjects had regular cycles (although the sample size was small with only 18 patients) [13], Pache and Fauser reported that 76% had regular cycles [18] compared to 91% in our study, while Goh and Ratnam [19] reported 100% in 20 FTM transsexuals. Bosinski et al. [13] found adiposity ( $BMI > 25 \text{ kg/m}^2$ ) in 25% of tested transsexuals [15], whereas in our group only 12% MTF and 9% FTM transsexuals were obese. This may be due to the younger age of our population and our recommendation for weight reduction to reduce risks of surgery.

Very striking was the sex ratio which now is 1:1 MTF/FTM. Our findings differ from those reported elsewhere in Western Europe, which show a preponderance of MTF compared to FTM transsexuals (Table 1). In The Netherlands, the sex ratio has been consistently around 3:1 with no tendency to change since the last report of the

Amsterdam gender clinic in 1996 [6] (Gooren, personal communication, 2007). Recent statistics from Belgium and Catalonia/Spain find a much higher number of MTF than FTM transsexuals, although in Germany the sex ratio approximates 1:1. There has been a notion that there were many more FTM than MTF transsexuals in the former eastern European socialist countries with the exception of Poland with an unusually high ratio of FTM : MTF [20] (calculated from a cohort of less than 20 subjects), but there are no reports in the literature to confirm this.

There is as yet no reasonable hypothesis to explain differences or similarities in sex ratios of MTF and FTM transsexuals in general and to explain different sex ratios in different countries. Our findings cannot be explained by a skewed sex ratio in the general population, which would be a possibility in a country stricken by war.

There is so far no good theory to explain either gender identity development in the human species, nor gender identity disorders. Hormonal factors probably play a role but are not determinants in the true sense [21]. Therefore, it seemed appropriate to make an inventory of what distinguishes transsexuals from nontranssexuals. The incidence of being the only child in the family was 30.6% for MTF and 22.7% for FTM transsexuals. There are no data on single-child families in Serbia. The study of Dixon [22] found an incidence of being the only child in 12%. But in the study of Schlatterer et al. this was 50% [10].

In our study, transsexuals often had relatively young parents. Fathers were, more often than could be expected by chance, policemen or mili-

**Table 1** Incidence and sex ratio of transsexualism

Author	Year	Country	MTF	FTM	Ratio MTF : FTM
			(Per 100,000)		
Benjamin [27]	1966	USA	—	—	6:1
Pauly [28]	1968	USA	1.00	0.25	4:1
Walinder [8]	1968	Sweden	2.70	1.00	3:1
Hoening and Kenna [9]	1974	Great Britain	3.00	0.93	3:1
Ross et al. [29]	1981	Australia	4.2	0.67	9:1
O'Gorman [30]	1982	Ireland	1.90	—	3:1
Tsoi [31]	1988	Singapore	35.20	12.00	3:1
Eklund et al. [32]	1988	The Netherlands	18.00	54.00	3:1
Godlewski [20]	1988	Poland	—	—	1:5.5
Van Kesteren et al. [6]	1996	The Netherlands	8.8	3.2	3:1
Landen et al. [33]	1996	Sweden	—	—	3:1
Weitze and Osburg [34]	1996	Germany	—	—	2.3:1
Garrels et al. [35]	2000	Germany	—	—	1.2:1
Olsson and Moller [36]	2003	Sweden	—	—	2:1
Gomez Gil et al. [37]	2006	Catalonia/Spain	4.7	2.1	2.6:1
De Cuypere et al. [7]	2007	Belgium	7.7	3.0	2.4:1
Vujovic	2008	Serbia	0.88	0.95	1:1



tary men. The educational attainment levels of the parents of FTM transsexuals were higher than those of the parents of MTF transsexuals. The significance of these findings for the development of a gender identity disorder is unknown.

Twelve percent of the MTF transsexuals and 18% of FTM transsexuals did not opt for sex reassignment surgery and were satisfied with hormonal treatment only, not giving a detailed explanation why surgical adaptation was not desirable for them. The first 13 years of the gender clinic surgery was free of charge and later a fee was asked which, however, was not an impediment to undergo surgery. So, for those who did not undergo surgical sex reassignment, financial constraints were not a contributing factor although these subjects expressed the view that hormonal treatment was sufficient to alleviate their gender dysphoria. There are not many data of other clinics available to compare these figures. Schlatterer et al. found the number who refused any surgical intervention to be less than 5% [10]. Factors were fear of surgery and family pressure. Eldh et al. [23] found that patients who rejected surgery were older than 30 years, which is in agreement with our findings.

Green and Fleming [24] have reported that 90% of patients replied affirmatively that they would undergo sex reassignment surgery again; this was 100% in our clinic indicating appropriate selection of patients.

## Conclusion

Although sex reassignment surgery is an effective treatment method with largely successful results, clinicians occasionally come across persons who regret their decision to undergo sex reassignment. In our population, there were no cases who regretted sex reassignment treatment. This may have to do not only with our diagnostic procedures but also the young age at which our subjects embarked on treatment. Pfäfflin has reviewed the reasons for regrets [25]. Regrets are mainly found in MTF transsexuals, in subjects with so-called late onset gender dysphoria, and sexually oriented toward the female sex [25,26]. These two latter factors were not prominently present in our population.

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*Conflict of Interest:* None declared.

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## References

- 1 Zhou JN, Hofman MA, Gooren LJ, Swaab DF. A sex difference in the human brain and its relation to transsexuality. *Nature* 1995;378:68–70.
- 2 Kruijver FP, Zhou JN, Pool CW, Hofman MA, Gooren LJ, Swaab DF. Male-to-female transsexuals have female neuron numbers in a limbic nucleus. *J Clin Endocrinol Metab* 2000;85:2034–41.
- 3 Chung WC, De Vries GJ, Swaab DF. Sexual differentiation of the bed nucleus of the stria terminalis in humans may extend into adulthood. *J Neurosci* 2002;22:1027–33.
- 4 Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. *Fertil Steril* 2004;81:19–25.
- 5 Carmina E, Azziz R. Diagnosis, phenotype, and prevalence of polycystic ovary syndrome. *Fertil Steril* 2006;86(1 suppl):7–8.
- 6 van Kesteren PJ, Gooren LJ, Megens JA. An epidemiological and demographic study of transsexuals in The Netherlands. *Arch Sex Behav* 1996;25:589–600.
- 7 De Cuypere G, Van Hemelrijck M, Michel A, Crael B, Heylens G, Rubens R, Hoebeke P, Monstrey S. Prevalence and demography of transsexualism in Belgium. *Eur Psychiatry* 2007;22:137–41.

- 8 Walinder J. Transsexualism: Definition, prevalence and sex distribution. *Acta Psychiatr Scand Suppl* 1968;203:255–8.
- 9 Hoenig J, Kenna JC. The prevalence of transsexualism in England and Wales. *Br J Psychiatry* 1974; 124:181–90.
- 10 Schlatterer K, Yassouridis A, von Werder K, Poland D, Kemper J, Stalla GK. A follow-up study for estimating the effectiveness of a cross-gender hormone substitution therapy on transsexual patients. *Arch Sex Behav* 1998;27:475–92.
- 11 Baba T, Endo T, Honnma H, Kitajima Y, Hayashi T, Ikeda H, Masumori N, Kamiya H, Moriwaka O, Saito T. Association between polycystic ovary syndrome and female-to-male transsexuality. *Hum Reprod* 2007;22:1011–6.
- 12 Balen AH, Schachter ME, Montgomery D, Reid RW, Jacobs HS. Polycystic ovaries are a common finding in untreated female to male transsexuals. *Clin Endocrinol (Oxf)* 1993;38:325–9.
- 13 Bosinski HA, Peter M, Bonatz G, Arndt R, Heidenreich M, Sippell WG, Wille R. A higher rate of hyperandrogenic disorders in female-to-male transsexuals. *Psychoneuroendocrinology* 1997;22:361–80.
- 14 Futterweit W. Clinical features of polycystic ovarian disease. New York: Springer-Verlag; 1984.
- 15 Bosinski HA, Schroder I, Peter M, Arndt R, Wille R, Sippell WG. Anthropometrical measurements and androgen levels in males, females, and hormonally untreated female-to-male transsexuals. *Arch Sex Behav* 1997;26:143–57.
- 16 Futterweit W, Weiss RA, Fagerstrom RM. Endocrine evaluation of forty female-to-male transsexuals: Increased frequency of polycystic ovarian disease in female transsexualism. *Arch Sex Behav* 1986; 15:69–78.
- 17 Gooren L. The endocrinology of transsexualism: A review and commentary. *Psychoneuroendocrinology* 1990;15:3–14.
- 18 Pache TD, Fauser BC. Polycystic ovaries in female-to-male transsexuals. *Clin Endocrinol (Oxf)* 1993; 39:702–3.
- 19 Goh HH, Ratnam SS. Effect of estrogens on prolactin secretion in transsexual subjects. *Arch Sex Behav* 1990;19:507–16.
- 20 Godlewski J. Transsexualism and anatomic sex ratio reversal in Poland. *Arch Sex Behav* 1988;17:547–8.
- 21 Gooren L. The biology of human psychosexual differentiation. *Horm Behav* 2006;50:589–601.
- 22 Diken JM, Maddever H, Van Maasdam J, Edwards PW. Psychosocial characteristics of applicants evaluated for surgical gender reassignment. *Arch Sex Behav* 1984;13:269–76.
- 23 Eldh J, Berg A, Gustafsson M. Long-term follow-up after sex reassignment surgery. *Scand J Plast Reconstr Surg Hand Surg* 1997;31:39–45.
- 24 Green RF, Fleming DT. Transsexual surgery follow-up: Status in the 1990s. *Annu Rev Sex Res* 1990;1:163–74.
- 25 Pfäfflin F. Regretss after sex reassignment surgery. *J Psychology and Hum Sexuality* 1992;5:69–85.
- 26 Blanchard R, Steiner BW, Clemmensen LH, Dickey R. Prediction of regrets in postoperative transsexuals. *Can J Psychiatry* 1989;34:43–5.
- 27 Benjamin H. The transsexual phenomenon. New York: Julian Press; 1966.
- 28 Pauly IB. The current status of the change of sex operation. *J Nerv Ment Dis* 1968;147:460–71.
- 29 Ross MW, Walinder J, Lundstrom B, Thuwe I. Cross-cultural approaches to transsexualism. A comparison between Sweden and Australia. *Acta Psychiatr Scand* 1981;63:75–82.
- 30 O Gorman EC. A retrospective study of epidemiological and clinical aspects of 28 transsexual patients. *Arch Sex Behav* 1982;11:231–6.
- 31 Tsoi WF. The prevalence of transsexualism in Singapore. *Acta Psychiatr Scand* 1988;78:501–4.
- 32 Eklund PL, Gooren LJ, Bezemer PD. Prevalence of transsexualism in The Netherlands. *Br J Psychiatry* 1988;152:638–40.
- 33 Landen M, Walinder J, Lundstrom B. Prevalence, incidence and sex ratio of transsexualism. *Acta Psychiatr Scand* 1996;93:221–3.
- 34 Weitze C, Osburg S. Transsexualism in Germany: Empirical data on epidemiology and application of the German Transsexuals Act during its first ten years. *Arch Sex Behav* 1996;25:409–25.
- 35 Garrels L, Kockott G, Michael N, Preuss W, Renter K, Schmidt G, Sigusch V, Windgassen K. Sex ratio of transsexuals in Germany: The development over three decades. *Acta Psychiatr Scand* 2000;102:445–8.
- 36 Olsson SE, Moller AR. On the incidence and sex ratio of transsexualism in Sweden, 1972–2002. *Arch Sex Behav* 2003;32:381–6.
- 37 Gomez Gil E, Trilla Garcia A, Godas Sieso T, Halperin Rabinovich I, Puig Domingo M, Vidal Hagemeyer A, Peri Nogues JM. [Estimation of prevalence, incidence and sex ratio of transsexualism in Catalonia according to health care demand]. *Actas Esp Psiquiatr* 2006;34:295–302.