Hormonal Therapy Is Associated With Better Self-esteem, Mood, and Quality of Life in Transsexuals

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Abstract: Few studies have assessed the role of cross-sex hormones on psychological outcomes during the period of hormonal therapy preceding sex reassignment surgery in transsexuals. The objective of this study was to assess the relationship between hormonal therapy, self-esteem, depression, quality of life (QoL), and global functioning. This study incorporated a cross-sectional design. The inclusion criteria were diagnosis of gender identity disorder (*Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*) and inclusion in a standardized sex reassignment procedure. The outcome measures were self-esteem (Social Self-Esteem Inventory), mood (Beck Depression Inventory), QoL (Subjective Quality of Life Analysis), and global functioning (Global Assessment of Functioning). Sixty-seven consecutive individuals agreed to participate. Seventy-three percent received hormonal therapy. Hormonal therapy was an independent factor in greater self-esteem, less severe depression symptoms, and greater "psychological-like" dimensions of QoL. These findings should provide pertinent information for health care providers who consider this period as a crucial part of the global sex reassignment procedure.

Key Words: Transsexualism, gender identity disorder, hormonal therapy, self-esteem, mood, quality of life, global functioning.

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For countries involved in transsexual care, the standard of care is based on hormonal-surgical treatment (Meyer et al., 2001). In France, a chart based on the principles of the World Professional Association for Transgender Health (WPATH) and the French Health Authority (HAS, 2009) was developed by the French Society for Transsexual Management (Société Française d'Etudes et de Prise en Charge du Transsexualisme, SoFECT deontology [June 2011; http://www.transsexualisme.info]) to standardize the management of transsexuals. The chart identifies three main steps: a) a 12-month minimum period of multidisciplinary evaluation to obtain a ruling on eligibility for a sex reassignment procedure, b) a 12-month minimum period of hormonal therapy before sex reassignment surgery, and c) sex reassignment surgery when the subject persists in the request (Meyer et al., 2001). Although the effects of sex reassignment surgery have been extensively explored, few data are available concerning the independent impact of hormonal therapy on psychological outcomes. Cross-sex hormonal therapy is useful for transsexuals as a means of changing their physical appearance to become congruent with the opposite sex. Previous studies have suggested that hormonal therapy may have a positive effect on anxiety and depression (Gomez-Gil et al., 2012) and cognitive function (Gomez-Gil et al., 2009; Slabbekoorn et al., 1999) and may have other nonspecific emotional repercussions (Slabbekoorn et al., 1999). We previously reported data suggesting a positive role of hormonal therapy in the quality of life (QoL) (Gorin-Lazard et al., 2012), as determined by the 36-item Short-Form Health Survey, which is a commonly used generic questionnaire. Few studies have assessed the role of cross-sex hormones on psychological outcomes during the 12-month period of hormonal therapy preceding sex reassignment surgery. We aimed to assess the relationship between hormonal therapy; the self-esteem, depression, and mental aspects of QoL (assessed using the Subjective Quality of Life Analysis [SQUALA] questionnaire); and global functioning in transsexuals who have been diagnosed by a multidisciplinary team of specialists and who have not undergone sex reassignment surgery.

METHODS

Design and Population

This study incorporated a cross-sectional design and was conducted in three psychiatric departments of public university teaching hospitals in France. The inclusion criteria were as follows: 18 years or older; diagnosis of gender identity disorder (302.85) according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (*DSM-IV-TR*; American Psychiatric Association [APA], 1994); inclusion in a standardized sex reassignment procedure after the agreement of a multidisciplinary team (HAS, 2009; Hembree et al., 2009); and pre–sex reassignment surgery (see previous publication for details; Gorin-Lazard et al., 2012). All participants provided written informed consent. This study was supported by the French Ministry of Health (Programme Hospitalier de Recherche Clinique) and was approved by the local ethics committee (Comité de Protection des Personnes, Marseille, France).

This study was proposed to each consecutive eligible subject by the care team during a routine visit.

Data Collection

The following data were collected:

1. Sociodemographic information: age, gender identity (male to female [MtF]/female to male [FtM]), education level (<12 years/≥12 years), partnership status (not single/single), living arrangement (partner or parents/alone), employment status (no/yes), and sexual orientation (same biological sex or not).
2. Hormonal therapy: a patient was categorized into the hormonal therapy group if he/she received cross-sex hormones prescribed

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by a physician as part of the sex reassignment procedure. Hormonal therapy involves a reversible phase followed by an irreversible phase, consisting mainly of the following: for MtFs, "devirilization" using cyproterone acetate followed by "feminization" using estrogens combined with antiandrogens (luteinizing hormone–releasing hormone analogues); for FtMs, "defeminization" using synthetic progestagens followed by "virilization" using testosterone.

3. Self-esteem: self-esteem was assessed using the French version of the Social Self-Esteem Inventory (Gauthier et al., 1981), which is used to assess self-esteem in social situations. It consists of 30 items that are balanced for positive and negative self-esteem. The participants were required to rate each statement on a 6-point Likert-type scale, ranging from completely unlike me (1) to exactly like me (6). Higher scores reflect more positive self-esteem.
4. Depressive symptoms: depressive symptoms were examined using the self-administered Beck Depression Inventory (BDI) short version, which contains 13 items (Beck et al., 1961). This version is used frequently by French professionals, particularly in the psychopharmacology domain. Higher scores indicate greater depression.
5. QoL: QoL was determined using the SQUALA. The SQUALA is a self-administered, multidimensional QoL instrument that covers 22 domains of life, such as perceived health; mental well-being; physical autonomy; environment; family and social relations; safety; and general conceptions such as justice, freedom, truth, beauty, and politics (Nadalet et al., 2005). All domains are rated in terms of importance and satisfaction. Importance and satisfaction scores were multiplied to obtain a profile for each domain of life. Higher scores indicate greater QoL for both questionnaires.
6. Global functioning: global functioning was assessed using the Global Assessment of Functioning (GAF) Scale (Hall, 1995; Hilsenroth et al., 2000), which considers psychological, social, and occupational functioning. The scale ranges from 0 to 100. Higher scores indicate higher functioning.

Statistical Analysis

Continuous variables were expressed as means and standard deviations or medians and ranges, depending on whether the variable had a parametric or a nonparametric distribution. Qualitative variables were expressed as percentages. Nonparametric statistics were used. Comparisons of mean self-esteem, depression, QoL, and global functioning scores between different subgroups (hormonal status, gender identity, educational level, partnership status, living arrangement, employment status, and sexual orientation) were performed using Mann-Whitney's *U*-tests. Associations between these scores and continuous variables (age) were analyzed using Spearman's correlation tests.

Multiple linear regressions (forward-stepwise selection) were performed to determine which variables predicted self-esteem, depression, QoL, and global functioning scores. Variables relevant to the models were selected on the basis of their clinical interest and/or a threshold *p*-value of less than 0.30 in the univariate analysis (hormonal therapy, age, gender identity, educational level, partnership status, children at home, and sexual orientation). The final models incorporated the standardized beta coefficients, which represent a change in the standard deviation of the dependent variable resulting from a change of one standard deviation in the various independent variables.

Statistical significance was defined as $p < 0.05$. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 15.0 software package (SPSS Inc, Chicago, IL).

RESULTS

A total of 67 consecutive individuals agreed to participate in this study. The mean age of the sample was 35.1 years (SD, 10.2). Thirty-six (53.7%) of the subjects were MtFs, 33 (50.0%) had more than 12 years of education, 57 (86.4%) were single, 34 (75.4%) were workers/employees, and 46 (75.4%) individuals reported having a sexual orientation toward the same biological sex. Seventy-three

TABLE 1. Sociodemographic and Self-reported Characteristics at Inclusion

		Without Hormonal Therapy (n = 18)	With Hormonal Therapy (n = 49)	p
Gender identity	MtF	7 (38.9%)	29 (59.2%)	0.173
	FtM	11 (61.1%)	20 (40.8%)	
Age group	<35 yrs	15 (83.3%)	19 (38.8%)	0.002*
	≥35 yrs	3 (16.7%)	30 (61.2%)	
Educational level	<12 yrs	8 (47.1%)	25 (51.0%)	1.000
	≥ 12 yrs	9 (52.9%)	24 (49.0%)	
Partnership status	Not single	1 (5.9%)	8 (16.3%)	0.427
	Single	16 (94.1%)	41 (83.7%)	
Employment status	No	8 (50.0%)	18 (40.9%)	0.568
	Yes	8 (50.0%)	26 (59.1%)	
Sexual orientation	Same biological sex	16 (94.1%)	30 (68.2%)	0.047*
	Others	1 (5.9%)	14 (31.8%)	
Self-esteem	SSEI	125.1 ± 23.9	146.5 ± 20.0	0.002*
Depression	BDI	5.0 ± 5.9	1.7 ± 3.1	0.044*
QoL	SQUALA PWB	10.9 ± 3.8	13.3 ± 4.3	0.067
	SQUALA TCOS	9.0 ± 3.0	11.5 ± 3.6	0.012*
Global functioning	GAF	86.1 ± 12.3	84.7 ± 9.7	0.215

SSEI indicates Social Self-Esteem Inventory, higher scores indicate greater self-esteem; BDI, higher scores indicate greater depression; PWB, psychological well-being; TCOS, taking care of oneself, higher scores indicate greater QoL; GAF, higher scores indicate greater functioning.

*$p < 0.05$.

TABLE 2. Potential Role of Hormonal Therapy on Self-esteem, Depression, Mental Aspects of QoL, and Functioning: Univariate and Multivariate Analysis (Multiple Linear Regression)

	SSEI		BDI		SQUALA PWB		SQUALA TCOS		GAF	
	U°	M°°	U°	M°°	U°	M°°	U°	M°°	U°	M°°
Age[a]	$R = 0.269$	−0.044	$R = -0.16$	0.128	$R = 0.013$	−0.020	$R = 0.138$	−0.239	$R = -0.227$	−0.259
p	0.036*	0.801	0.219	0.490	0.918	0.916	0.290	0.180	0.117	0.213
Sex identity[b]										
MtF	143.19 ± 22.38	0.071	2.61 ± 4.45	−0.117	12.52 ± 4.93	−0.016	11.68 ± 3.58	−0.239	83.75 ± 11.77	−0.040
FtM	137.77 ± 23.90	—	2.67 ± 4.10	—	12.80 ± 3.61	—	9.87 ± 3.51	—	86.24 ± 8.45	—
p	0.282	0.627	0.640	0.448	0.590	0.918	0.051	0.109	0.710	0.818
Educational level[b]										
<12 yrs	144.71 ± 23.45	−0.157	2.50 ± 4.45	0.032	12.75 ± 3.56	−0.028	11.50 ± 2.92	−0.186	81.80 ± 10.45	0.303
≥ 12 yrs	137.72 ± 22.49	—	2.66 ± 4.16	—	12.59 ± 4.97	—	10.22 ± 4.15	—	88.38 ± 8.91	—
p	0.260	0.208	0.680	0.808	0.644	0.828	0.058	0.139	0.014*	0.047*
Partnership status[b]										
Not single	153.75 ± 16.77	−0.118	0.75 ± 1.16	0.189	12.13 ± 4.16	−0.055	11.88 ± 2.90	−0.050	82.75 ± 10.81	−0.119
Single	139.02 ± 23.34	—	2.86 ± 4.50	—	12.75 ± 4.39	—	10.65 ± 3.76	—	85.22 ± 10.12	—
p	0.122	0.506	0.193	0.311	0.609	0.767	0.263	0.778	0.595	0.544
Employment status[b]										
No	138.08 ± 20.75	0.056	2.88 ± 4.74	−0.025	11.42 ± 3.92	0.274	9.96 ± 3.17	0.213	81.63 ± 10.38	0.209
Yes	143.21 ± 24.69	—	2.35 ± 3.91	—	13.62 ± 4.45	—	11.47 ± 3.91	—	86.42 ± 10.09	—
p	0.379	0.660	0.199	0.851	0.086	0.045*	0.160	0.101	0.061	0.192
Sexual orientation[b]										
Same biological sex	136.57 ± 23.61	0.170	3.07 ± 4.64	−0.074	12.78 ± 4.37	−0.217	10.30 ± 3.61	0.101	85.43 ± 10.57	−0.120
Others	152.97 ± 16.94	—	1.33 ± 2.38	—	12.27 ± 4.18	—	12.27 ± 3.41	—	82.40 ± 9.54	—
p	0.022*	0.371	0.207	0.711	0.549	0.278	0.061	0.596	0.279	0.567
Hormonal therapy[b]										
No	125.06 ± 23.88	0.363	5.00 ± 5.85	−0.365	10.88 ± 3.84	0.292	9.00 ± 3.04	0.308	85.5 ± 12.78	0.105
Yes	146.50 ± 20.04	—	1.73 ± 3.07	—	13.34 ± 4.31	—	11.18 ± 3.64	—	84.59 ± 9.77	—
p	0.002*	0.011*	0.044*	0.014*	0.067	0.047*	0.012*	0.030*	0.315	0.504

SSEI indicates Social Self-Esteem Inventory, higher scores indicate greater self-esteem; BDI, higher scores indicate greater depression; PWB, psychological well-being; TCOS, taking care of oneself, higher scores indicate greater QoL; GAF, higher scores indicate greater functioning. U°, univariate analysis; M°°, multivariate analysis (beta standardized beta coefficient: beta represents the change of the standard deviation in QoL score resulting from a change of one standard deviation in the independent variable).

[a]Spearman's correlation coefficient, *p*: *p*-value Spearman's test.

[b]Mean ± standard deviation, *p*: *p*-value Mann-Whitney's *U*-test.

*$p < 0.05$.

percent received hormonal therapy. Characteristics of the sample are detailed in Table 1, according to the hormonal therapy status. The results of the univariate and the multivariate analysis are presented in Table 2. After adjusting for age, gender identity, educational level, partnership status, children at home, and sexual orientation, hormonal therapy was an independent factor in greater self-esteem, less severe depression symptoms, and higher psychological-like dimensions of QoL (psychological well-being and taking care of oneself of the SQUALA). No relationship was found between hormonal therapy and global functioning.

DISCUSSION

To our knowledge, this is the first study to report a relationship between hormonal therapy and psychological-like outcomes among transsexuals during the 12-month period of hormonal therapy for the global sex reassignment procedure and taking account of potential confounding factors. In agreement with our hypothesis and previous studies, these results suggest that transsexuals undergoing hormonal therapy in the period preceding surgery reported better self-esteem, lower prevalence of depression, and greater QoL mental scores. Our findings are consistent with previous publications reporting the positive effect of cross-sex hormone treatment on psychological aspects. In particular, a recent study reported a positive effect of cross-sex hormone treatment on social distress, anxiety, and depression in Spanish transsexuals attending a gender identity unit that has adopted the standards of care guidelines of the WPATH (Gomez-Gil et al., 2012). However, although this study reported data from a larger sample of 187 subjects, the group "under hormone treatment" was heterogeneous, including transsexuals without any or with at least one sex reassignment surgery, and the results did not take into account controlled variables. Our approach is complementary, focusing on transsexuals without sex reassignment surgery.

Similarly, the positive role of cross-sex hormones during the period of hormonal therapy during the global sex reassignment procedure has been suggested to affect other psychological aspects, as such self-esteem (Dubois, 2012) and QoL (Gorin-Lazard et al., 2012).

Several explanations of the positive effects of hormonal therapy on "psychological" aspects can be proposed. First, by inducing external physical modifications, hormonal therapy produces a change in gender role, better self-confidence, greater comfort with others, and better social skills, and it reinforces gender affirmation with better social recognition (Newfield et al., 2006). Second, as previously described, hormones may exert direct positive or negative effects on mood (Miles et al., 2006; Van Goozen et al., 1995).

Strengths and Limitations

1. This report considered only transsexual people enrolled in regular hormone treatments and did not examine data on subjects outside organized care systems. Access to care for transsexuals seems to be easier in France because of its free health system. The extrapolation of the results should consider these particularities. In particular, there is a debate on the depathologization of transgender identities. A major social paradigm shift is now occurring in which increasing numbers of people reject the pathologization of gender variance. Research is leading to new diagnostic nomenclatures and new terms in both the *DSM* (APA) and the ICD (World Health Organization; WPATH, 2012). In the same way, "Stop Trans Pathologization Campaign 2012" (campaign for the depathologization of transgender identities) advocates to remove the categories of "gender identity disorders" from the main diagnosis manuals. These results should be reinterpreted using these new views.
2. The sample size was small, and moderate associations may have been missed because of low statistical power. Nevertheless, it can be assumed that a majority of individuals with gender identity disorders living in this geographic area had access to one of the three participating centers.
3. Dosage, molecule nature, length of treatment, and administration modalities of hormonal therapy were not considered in our analyses. Future studies should integrate these parameters to more precisely examine the role of hormones in the life of transsexuals.
4. Prospective studies provide more valid information than do cross-sectional studies and are necessary to more accurately determine the impact of hormonal therapy among these populations.
5. This study did not allow determining the impact of hormonal therapy on sexual desire because data were not collected for this outcome. Previous studies have shown that hormonal therapy may have positive or negative effects on the sexual functioning of patients undergoing this treatment (Klein and Gorzalka, 2009; Kronawitter et al., 2009). Further research is required to understand fully the effects of varying types and dosages of cross-sex hormone therapies and particular sex reassignment surgery techniques on sexual functioning.

CONCLUSIONS

These findings should provide pertinent information for health care providers who consider the 12-month period of hormonal therapy a crucial part of the global sex reassignment procedure. Better outcomes of an individual under hormonal therapy compared with the preceding period without hormonal therapy should be considered a "success" of hormonal therapy and a favorable element leading to sex reassignment surgery.

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REFERENCES

American Psychiatric Association (1994) *DSM-IV. Diagnostic and statistical manual of mental disorders* (4th ed). Washington, DC: American Psychiatric Association.

Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J (1961) An inventory for measuring depression. *Arch Gen Psychiatry.* 4:561–571.

Dubois LZ (2012) Associations between transition-specific stress experience, nocturnal decline in ambulatory blood pressure, and C-reactive protein levels among transgender men. *Am J Hum Biol*. 24:52–61.

Gauthier J, Samson P, Turbide D, Lawson JS (1981) Adaptation française du Social Self-Esteem Inventory [The French version of the Social Self-Esteem Inventory]. *Can J Behav Sci*. 13:218–225.

Gomez-Gil E, Canizares S, Torres A, de la Torre F, Halperin I, Salamero M (2009) Androgen treatment effects on memory in female-to-male transsexuals. *Psychoneuroendocrinology.* 34:110–117.

Gomez-Gil E, Zubiaurre-Elorza L, Esteva I, Guillamon A, Godas T, Cruz Almaraz M, Halperin I, Salamero M (2012) Hormone-treated transsexuals report less social distress, anxiety and depression. *Psychoneuroendocrinology.* 37: 662–670.

Gorin-Lazard A, Baumstarck K, Boyer L, Maquigneau A, Gebleux S, Penochet JC, Pringuey D, Albarel F, Morange I, Loundou A, Berbis J, Auquier P, Lancon C, Bonierbale M (2012) Is hormonal therapy associated with better quality of life in transsexuals? A cross-sectional study. *J Sex Med*. 9:531–541.

Hall RC (1995) Global Assessment of Functioning. A modified scale. *Psychosomatics*. 36:267–275.

HAS (2009) *Situation actuelle et perspectives d'évolution de la prise en charge médicale du transsexualisme en France* (pp 123). Paris: Haute Autorité de Santé.

Hembree WC, Cohen-Kettenis P, Delemarre-van de Waal HA, Gooren LJ, Meyer WJ III, Spack NP, Tangpricha V, Montori VM (2009) Endocrine treatment of transsexual persons: An Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab*. 94:3132–3154.

Hilsenroth MJ, Ackerman SJ, Blagys MD, Baumann BD, Baity MR, Smith SR, Price JL, Smith CL, Heindselman TL, Mount MK, Holdwick DJ Jr (2000) Reliability and validity of *DSM-IV* axis V. *Am J Psychiatry.* 157:1858–1863.

Klein C, Gorzalka BB (2009) Sexual functioning in transsexuals following hormone therapy and genital surgery: A review. *J Sex Med*. 6:2922–2939; quiz 2940–2941.

Kronawitter D, Gooren LJ, Zollver H, Oppelt PG, Beckmann MW, Dittrich R, Mueller A (2009) Effects of transdermal testosterone or oral dydrogesterone on hypoactive sexual desire disorder in transsexual women: Results of a pilot study. *Eur J Endocrinol* 161:363–368.

Meyer W, Bockting W, Cohen-Kettenis P, Coleman E, DiCeglie D, Devor H (2001) The Harry Benjamin International Gender Dysphoria Association's standards of care for gender identity disorders. 6th version. *Int J Transgenderism*. 5:1.

Miles C, Green R, Hines M (2006) Estrogen treatment effects on cognition, memory and mood in male-to-female transsexuals. *Horm Behav.* 50:708–717.

Nadalet L, Kohl FS, Pringuey D, Berthier F (2005) Validation of a subjective quality of life questionnaire (S.QUA.LA) in schizophrenia. *Schizophr Res*. 76:73–81.

Newfield E, Hart S, Dibble S, Kohler L (2006) Female-to-male transgender quality of life. *Qual Life Res*. 15:1447–1457.

Slabbekoorn D, van Goozen SH, Megens J, Gooren LJ, Cohen-Kettenis PT (1999) Activating effects of cross-sex hormones on cognitive functioning: A study of short-term and long-term hormone effects in transsexuals. *Psychoneuroendocrinology.* 24:423–447.

Van Goozen SH, Cohen-Kettenis PT, Gooren LJ, Frijda NH, Van de Poll NE (1995) Gender differences in behaviour: Activating effects of cross-sex hormones. *Psychoneuroendocrinology* 20:343–363.

World Professional Association for Transgender Health (2012) *Standards of care for the health of transsexual, transgender, and gender nonconforming people. 7th Version*. Retrieved from http://www.wpath.org/uploaded_files/140/files/IJT%20SOC,%20V7.pdf. Accessed on March 10, 2013.