Contents lists available at ScienceDirect

European Psychiatry

Review

Systematic review and meta-analysis of prevalence studies in transsexualism

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ARTICLE INFO

ABSTRACT

Background: Over the last 50 years, several studies have provided estimates of the prevalence of transsexualism. The variation in reported prevalence is considerable and may be explained by factors such as the methodology and diagnostic classification used and the year and country in which the studies took place. Taking these into consideration, this study aimed to critically and systematically review the available literature measuring the prevalence of transsexualism as well as performing a meta-analysis using the available data.
Methods: Databases were systematically searched and 1473 possible studies were identified. After initial scrutiny of the article titles and removal of those not relevant, 250 studies were selected for further appraisal. Of these, 211 were excluded after reading the abstracts and a further 18 after reading the full article. This resulted in 21 studies on which to perform a systematic review, with only 12 having sufficient data for meta-analysis. The primary data of the epidemiological studies were extracted as raw numbers. An aggregate effect size, weighted by sample size, was computed to provide an overall effect size across the studies. Risk ratios and 95% confidence intervals (CIs) were calculated. The relative weighted contribution of each study was also assessed.
Results: The overall meta-analytical prevalence for transsexualism was 4.6 in 100,000 individuals; 6.8 for trans women and 2.6 for trans men. Time analysis found an increase in reported prevalence over the last 50 years.
Conclusions: The overall prevalence of transsexualism reported in the literature is increasing. However, it is still very low and is mainly based on individuals attending clinical services and so does not provide an overall picture of prevalence in the general population. However, this study should be considered as a starting point and the field would benefit from more rigorous epidemiological studies acknowledging current changes in the classification system and including different locations worldwide.

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1. Introduction

Transsexualism, as defined by the International Classification of Disease (ICD-10) [63] and the previous editions of the Diagnostic and Statistical Manual of Mental Disorders [3,4], describes individuals who experience discomfort or distress caused by the discrepancy between their gender identity and the sex they were assigned at birth. When this distress is sufficiently intense, individuals wish to transition from one point on a notional gender scale to another – most commonly from a man to a woman (people known as trans women) or from a woman to a man (people known as trans men) [1,64]. The diagnosis of transsexualism according to the ICD-10 [63] is currently under revision. It is proposed that the new edition of the ICD (ICD-11) will include a new diagnostic term and will also include individuals who do not fit into the gender binary category [21], as is the case in the DSM-5 [7].

To estimate the prevalence of trans individuals is relevant for health service development and policymaking, although this can

be complex due to several factors. Some of those factors relate to the complexity of undertaking general prevalence studies, i.e. the fact that diagnoses change over the years or that results differ depending on the period of time used to collect data. For example, point prevalence is a measure of the proportion of people in a given population at an exact time point, such as a particular date, which is in contrast to period prevalence that measures the proportion of people in a given population over a specific time period, for example several years [26].

Other factors that also add to the complexity of undertaking epidemiological studies relate to the subject studied; in this case the number of transsexual individuals in the community. For example, the terminology and classification systems used have varied over the years, and authors have used some of this terminology inconsistently, for example, gender identity disorder, gender dysphoria, or transsexualism.

Nevertheless, it is reassuring (in relation to performing this meta-analysis) to find that there are many epidemiological studies that have used the term "transsexualism" and which have followed the ICD or DSM diagnostic criteria (1–3, 7, 9–11) or the definition developed by Benjamin in 1966 [10], which requires all of the following:

- a sense of belonging to the opposite sex, of having been born into the wrong sex, or being one of nature's extant errors;
- a sense of estrangement from one's own body: all indications of sex differentiation are considered as afflictions and repugnant;
- a strong desire to resemble physically the opposite sex via therapy, including surgery;
- a desire to be accepted by the community as belonging to the opposite sex.

The definition of transsexualism is different in the DSM-IIIR [4]. This edition of the diagnostic criteria did not include those individuals who were not interested in undergoing sex reassignment surgery and who received the alternative diagnosis of Gender Identity Disorder of Adolescents and Adulthood, Nontranssexual Type (GIDAANT). This great variation in how transsexualism is defined in different studies (based on the diagnostic criteria used at the time that the study took place) will clearly affect the reported prevalence.

A second complexity in developing true epidemiological studies of transsexualism relates to the methods used to identify this population. For example, the country where the study takes place can influence the prevalence of individuals found, as trans people tend to live in larger cities and especially in areas, or countries, which are defined as "trans friendly" [25]. Therefore studies from specific countries may describe a high prevalence of transsexual individuals, which may not be generalizable to other countries. Thirdly, the timing of the study may also affect the findings. The fact that in some countries tolerance to trans individuals has improved over the years has allowed trans people to "come out" more easily in order to access clinical services [23,36]. This may be reflected by the fact that older studies [48] report lower prevalence than more recent ones [20]. Finally, the recruitment process used to collect epidemiological data will also influence the findings. Many studies are based on clinical populations of individuals, which, by definition, only include those who have the capacity and motivation to ask for help, but, importantly, can also access clinical services [22]. This is reflected in the large number of studies from the Netherlands [22,37] where trans services have been available for many years and where society is generally tolerant [23,36].

Therefore, as highlighted by the WPATH Standards of Care [15] and other authors' [66] efforts to formally calculate the prevalence of transsexualism present with enormous difficulties, due to the differences in cultural manifestation of gender behavior. It is because of this that researchers who have studied prevalence rates have focused on the most easily counted subgroup of gender non-conforming people – those who present for gender transition-related care at specialist gender identity clinics [66]. As a consequence, many prevalence studies published in this field have their origins in the Western world [59]. There is only one prevalence study from the Eastern world [53], which is surprising given that many countries like Thailand, India and Pakistan are known to have an apparently tolerant culture towards trans* identities, although there are many ethnographic related studies [41,42,50].

The large number of studies investigating prevalence of transsexual individuals, and reviewed in this study, provide the best available insight into the rates of transsexualism, and vary from 0.45 [59] to 23.6 [53] per 100,000 people. Although prevalence studies are welcome, such a great variation in findings leaves the reader confused. Therefore, the aim of this study was to respond to the reported variation in prevalence by critically and systematically reviewing prevalence studies in transsexualism. Where data were available, a meta-analysis of the studies was carried out which took population, diagnosis, the time period studied and gender into consideration.

2. Methods

2.1. Search strategy

This meta-analytic review adheres to the guidelines detailed in the PRISMA statement [40]. A systematic literature search, appraisal and meta-analysis was conducted using a broad range of subject headings in order to identify relevant prevalence studies in the field. The following databases were used: Web of Sciences, Medline/Pubmed, Biosis, Science Direct, and Scielo. For each database, combinations of the following search components were used: transsexual, transgender, gender dysphoria, gender identity disorder, gender non-conforming, gender variant, epidemiology, incidence, and prevalence. Studies published between 1945 and June 2014 were selected. Two researchers independently selected the studies, extracted the data, cross-checked them and resolved disagreements. Case studies or studies describing small populations of individuals which could not be proved to reflect the prevalence of a given area, region or country were excluded. Only studies describing adolescent or adult populations were included. Reference lists of relevant articles were screened for further potential studies and citation searches were conducted. Only studies describing transsexualism as per Benjamin [10], ICD [62,63] or DSM [3–7] definitions were selected. Table 1 details the criteria for search used for this review.

When the study did not describe some of the above information, whenever possible, this was calculated by the authors. For example, in some cases the mean population of the studied area was calculated. Studies were excluded where there was ambiguity in the number of individuals with a clear diagnosis or studies that primarily included individuals who were self-diagnosed or had not been diagnosed by a professional [37,55].

2.2. Procedure

Studies meeting the inclusion criteria were examined. The study collected the available information for the following outcomes of interest:

- prevalence of transsexual individuals in general per 100,000 individuals;