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Brain Magnetic resonance imaging (MRI) findings in adolescents with gender incongruence and gender dysphoria and non-binary identifying adolescents: a scoping review protocol

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ADMINISTRATIVE INFORMATION

Support - LB: supported by DFG, Germany.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - There are no conflicts of interest. **Acknowledgement:** L.B is supported by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – 493624047 (Clinician Scientist CareerS Münster).

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 19 November 2023 and was last updated on 19 November 2023.

INTRODUCTION

Review question / Objective Q1: For adolescent transgender individuals assigned female at birth (AFAB) (before any hormonal treatment), are there any significant brain MRI findings in comparison to adolescents without psychiatric diseases (cis-gender female or male)? Q2: For adolescent transgender individuals assigned male at birth (AMAB) (before any hormonal treatment), are there any significant brain MRI findings in comparison to adolescents without psychiatric diseases (cisgender female or male)? Q3: For adolescent non-binary identifying individuals, are there any significant brain MRI findings in comparison to adolescents without psychiatric diseases (cisgender female or male)? Q4: For adolescent transgender individuals assigned female at birth (AFAB), adolescent transgender individuals assigned male at birth

(AMAB) and non-binary identifying individuals, are there longitudinal study designs after beginning with hormonal treatment and/or pubertal blockers? Q5: For adolescent transgender individuals assigned female at birth (AFAB), adolescent transgender individuals assigned male at birth (AMAB) and non-binary identifying individuals, are there significant MRI findings after hormonal treatment (and or pubertal blocker) vs. before hormonal treatment/pubertal blocker?

Background In adolescence, gender incongruence (GI) in adolescents is a relevant condition in which the gender identity of a person does not correspond with the birth-assigned sex. Individuals with gender dysphoria (GD) can show a distressing and significant burden. Especially neurobiological correlates of gender dysphoria and transition are poorly understood.

Rationale The aim of this review is to present an overview about the current state of the literature regarding MRI brain findings in adolescents <22 years of age with GD/GI also including non-binary identifying adolescents. Additionally, neurobiological processes after hormonal interventions (pubertal blocker and/or cross sex hormones) are focused.

METHODS

Strategy of data synthesis PubMed® and MEDLINE® will be used as sources. A pre-defined search strategy will be used. Only English-language paper will be included. There is no restriction regarding the publication date.

The Search strategy will be pre-defined. For example, the search strategy for pubmed ® is defined as following: ("gender dysphoria" OR "gender incongruence" OR "gender identity" OR "non-binary" OR "transsexualism" or "transgender") AND ("MRI" OR "magnetic resonance imaging" OR "imaging" OR "Brain" or "fmri" or "DTI") AND ("adolescents" OR "youth" OR "adolescent").

Eligibility criteria Inclusion criteria:

Any MRI study design (Human research paper) except single case reports.

- Adolescents (13-21 years)
- Female to male transgender individuals (FTM), assigned female at birth (AFAB)
- or
- Male to Female transgender individuals (MTF), assigned male at birth (AMAB)
- or
- Non- binary identifying individuals

Exclusion criteria:

Adults (>21 Years).

Source of evidence screening and selection

Two reviewers will review the titles and abstracts found by the given search strategy. Level of full text review will ensure correct exclusion/inclusion when any discrepancies come up. Reviewer 1 will extract data from each article (full text) and a Reviewer 2 will check any information. Reviewers will extract information on eligibility criteria, study characteristics (e.g. study design, follow-up), population characteristics (AFAB, AMAB) Non-binary, comorbid psychiatric conditions, mean age and number of participants), intervention characteristics (type, dose, duration of hormonal treatment/ pubertal blocker), outcome measures, results of each outcome.

Data management PubMed® and MEDLINE® will be used as sources. A pre-defined search

strategy will be used. Only English-language paper will be included. There is no restriction regarding the publication date. The data is extracted from the original articles into a summary table, which is created in Excel ® . The parameters to be extracted from the studies (e.g. study design, follow-up), population characteristics (AFAB, AMAB, non-binary, comorbid psychiatric disorders, average age and number of participants), intervention characteristics (type, dose, duration of hormone treatment/puberty blocker), outcome measures, results of the individual outcomes are defined beforehand. Extraction of the information will be double-checked by reviewer 2.

Reporting results / Analysis of the evidence We will present a set of detailed evidence tables. Statistical significance (will be set at a two-sided alpha of 0.05). Additionally, all studies will be summarized qualitatively.

Presentation of the results Results will be presented in a detailed table which clearly compares the results. In addition to the results, details of the study designs will also be presented in the table. Results for Female to male transgender individuals (FTM); Male to Female transgender individuals (MTF), assigned male at birth (AMAB) and Non- binary identifying individuals are presented separately.

Language restriction English.

Country(ies) involved Germany (Department for Child and Adolescent Psychiatry, Psychosomatics and Psychotherapy, University of Muenster, Germany).

Keywords Gender dysphoria; Gender incongruence; Gender identity; Non-binary; Transgender; MRI; Magnetic resonance imaging; Imaging; Brain; Fmri; DTI; Adolescents; Youth; adolescent.

Dissemination plans Publication is planned as a scoping review after completion in a suitable journal.

Contributions of each author

Author 1 - Linda Bonnekoh - (as the review is not started, Contributions are described as planned.)

Author 1:

- extraction of the data, reviewing
- manuscript writing.

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Author 2 - Angela Rölvér - (as the review is not started, Contributions are described as planned.)

- Double checks information, data extraction, reviewing.

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Author 3 - Ida Wessing - (as the review is not started, Contributions are described as planned.)

- manuscript writing.

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Author 4 - Navid Schürmeyer - (as the review is not started, Contributions are described as planned.)

- manuscript writing

- conception.

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Author 5 - Susanne Meinert - (as the review is not started, Contributions are described as planned.)

- manuscript writing with focus on MRI results.

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Author 6 - Udo Dannlowski - (as the review is not started, Contributions are described as planned.)

- conception, study design

-manuscript editing.

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Author 7 - Georg Romer - (as the review is not started, Contributions are described as planned.)

-conception, study design

- manuscript editing.

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