

Age of initiation of gender affirming hormone therapy and mental health outcomes among transgender, non-binary, and gender diverse adults living in the U.S.

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Abstract

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Abstract

Introduction: Gender-affirming hormone therapy (GAHT) has been associated with improved psychosocial well-being among transgender, non-binary, and gender-diverse (TGD) individuals. However, limited evidence exists on how the timing of initiation influences mental health in adulthood. This study examines the associations between GAHT initiation (age and desire) with depression and gender congruence indicators, in a national sample of TGD adults who identify as transfeminine in the United States. **Methods:** We conducted a secondary analysis of data from the 2022–2024 Transgender Women’s Internet Survey and Testing (TWIST) study. Participants were grouped by GAHT experience: (1) initiated before 18, (2) initiated at ≥ 18 , (3) never initiated but desired, and (4) never initiated nor desired. Depression was measured using the PHQ-9 (cutoff ≥ 10). Gender identity–appearance alignment and comfort with how others perceive their gender were measured via self-report. Modified Poisson regression with robust

standard errors was used to estimate prevalence ratios (PRs), adjusting for sociodemographic covariates. **Results:** Among 5,178 adult respondents, 286 (5.5%) initiated GAHT in adolescence, 3,844 (74.2%) in adulthood, 841 (16.2%) desired but never accessed GAHT, and 207 (4.1%) neither initiated nor desired GAHT. The prevalence of moderate to severe depression among the four groups was 47.5%, 48.9%, 62.1%, and 56.0%, respectively. Alignment between gender identity and appearance, as well as comfort with how others perceive their gender, were highly prevalent among individuals who initiated GAHT during adolescence (69.9% and 57.9%, respectively), but less prevalent among those who desired but never accessed GAHT (22.3% and 15.7%). In adjusted models, all three comparison groups had significantly higher prevalence of depression and lower prevalence of gender congruence indicators than adolescent initiators ($p < 0.05$ for all comparisons). Notably, participants who desired but did not access GAHT demonstrated the greatest disparities in depression (adjusted PR = 1.45, 95% CI = 1.24, 1.69), appearance–identity alignment (adjusted PR = 0.32, 95% CI = 0.27, 0.38) and comfort with how others perceive their gender (adjusted PR = 0.28, 95% CI = 0.23, 0.34) when compared to those who initiated GAHT in adolescence. **Discussion:** Initiation of GAHT at any age was linked to more favorable outcomes; however, starting during adolescence appeared to confer additional mental health and gender congruence benefits. In comparison to early initiators, individuals who desired but never initiated it experienced the most pronounced psychosocial challenges. These findings highlight the importance of supporting timely access to GAHT—particularly for youth—and advancing affirming clinical and policy strategies to promote the well-being of TGD individuals.

Introduction

Transgender youth and adults experience disproportionately high levels of poor mental health, depression, and related challenges. According to the 2023 National Youth Risk Behavior Survey, among the approximately 3.3% of U.S. high school students who identify as transgender, 40% reported experiencing bullying, 26% reported attempting suicide, and 64.9% reported poor mental health—substantially higher rates than those observed among their cisgender peers.¹ Moreover, numerous studies report that approximately half of gender-diverse youth experience moderate to severe depression.^{2–4} These concerns extend to transgender adults. A recent report from the 2023 U.S. Transgender Survey found that 44% of transgender adults reported serious psychological distress in the past month, an increase from 39% in 2016.⁵ Further evidence indicates that transgender adults experience a disproportionately higher prevalence of depression and anxiety, compared to their cisgender counterparts.^{4,6–9}

The heightened mental health burden experienced by transgender youth and adults are rooted in a combination of individual experiences and broader societal and structural factors. Gender minority stress refers to the ongoing strain experienced by transgender individuals due to widespread societal stigma and discrimination.¹⁰ This stress arises from external sources, such as verbal and physical abuse, family and social exclusion, and institutionalized transphobia,^{10–12} as well as internal sources, including internalized transphobia and fear of rejection.¹⁰ Additionally, gender dysphoria—distress linked to the mismatch between an individual’s gender identity and their assigned sex at birth¹³—can cause profound emotional suffering when present.¹⁴ Gender dysphoria involves discomfort not only with one’s body but also with how others perceive and interact with them in everyday life.¹⁵ This discomfort becomes more pronounced under the weight of societal pressures and systemic barriers that limit access to necessary care. These

barriers—such as restrictive healthcare policies, a lack of trained providers, and financial constraints^{12,16,17}—are further compounded by intersectionality, where systemic marginalization based on multiple, intersecting identities, including race, ethnicity, and socioeconomic status, contributes to the unique adversities faced by transgender individuals.^{1,12,18,19} Emerging evidence also suggests that these combined stressors may disproportionately affect transfeminine individuals, underscoring the need for targeted protections and support tailored to their specific experiences.²⁰

Cohort studies of initiating gender-affirming hormone therapy (GAHT) during adolescence on mental health outcomes have consistently found improvements in depression symptoms, reductions in body dissatisfaction, and enhanced overall well-being.^{2,21–23} Additionally, appearance congruence has been linked to increased positive affect and life satisfaction, alongside reductions in anxiety and suicidal ideation.^{2,21–24} However, these studies often lack a comparison group of adolescents who did not receive GAHT and have relatively short follow-up periods (averaging 12 months). Furthermore, evidence directly comparing individuals who initiated GAHT during adolescence with those who began treatment in adulthood remains limited. Initiating GAHT earlier may confer physical advantages by intervening before the completion of puberty, potentially preventing the development of secondary sex characteristics that are incongruent with a young person’s gender identity.¹⁴ Adolescents who begin treatment during this critical period may also experience more immediate relief from gender dysphoria compared to those who start later in life, which can contribute to more favorable long-term mental health outcomes by supporting social integration, emotional development, and resilience during formative years.^{13,15,25}

Initiating GAHT during adolescence is currently a contentious issue in the United States. Since 2021, 27 states have passed bans to restrict GAHT access for transgender adolescents as of June 2025.^{26–29} These legislative actions stand in direct opposition to the guidance of medical organizations including the American Psychiatric Association, the World Professional Association for Transgender Health, and the Endocrine Society which support gender-affirming care as medically necessary for transgender youth.^{14,30,31} The growing number of restrictions highlights the urgent need for more robust data to inform evidence-based policy and protect the well-being of transgender youth. This study examined associations between the age of GAHT initiation and depression, gender identity and appearance alignment, and comfort with others' perception of gender identity based on appearance among transgender, non-binary, and gender-diverse adults assigned male at birth in the United States (hereafter referred to as TGD).

Methods

Study population

We conducted a secondary analysis of data from the 2022-2023 and 2023-2024 cycles of the Transgender Women's Internet Survey and Testing (TWIST) study,³² an annual, cross-sectional online survey that assesses sexual and behavioral health among TGD individuals assigned male at birth in the United States.

The sample utilized for this study was recruited in two phases, the first from June 23, 2022, to July 30, 2023, and the second from December 16, 2023, to May 31, 2024. Eligibility criteria for the survey included being at least 15 years old, residing in the United States, providing a zip code, reporting male sex at birth, identifying as transfeminine (woman or transgender woman),

and reporting ever having a history of oral, anal, or vaginal intercourse. Convenience sampling was employed through paid advertisements on various digital platforms, including social media and smartphone applications. Detailed data collection protocols are described elsewhere.³² For this analysis, we restricted the sample to participants aged 18 years or older to specifically examine mental health outcomes among adults.

Measures

Age of initiation of GAHT and status

Participants were classified into four mutually exclusive exposure categories based on responses to three self-reported questions regarding whether they ever used GAHT, age of initiation (if ever used), and whether they desire to use GAHT (if never used): (1) initiated GAHT in adolescence: individuals who had ever used hormones and reported starting hormone use before age 18; (2) initiated GAHT in adulthood (≥ 18 years old): individuals who had ever used and reported starting hormone use at age 18 or older; (3) never initiated GAHT but expressed a desire to do so: individuals who had never used hormones but reported wanting to initiate GAHT; and (4) never initiated GAHT and did not express a desire to do so: individuals who had never used hormones and reported no desire to initiate GAHT.

Depression

Depressive symptoms were assessed using the 9-item Patient Health Questionnaire (PHQ-9). Each item is evaluated on a scale from 0 to 3, reflecting how often respondents have encountered the nine primary symptoms of major depression within the last two weeks, as outlined in the

Diagnostic and Statistical Manual (DSM).³³ A total score of 10 or greater was used as a cutoff to indicate moderate to severe depression.³⁴

Gender identity-appearance alignment and comfort with how others perceive their gender

Participants were asked how much they agreed with the two statements, "*My outward appearance represents my gender identity*" and "*I am generally comfortable with how others perceive my gender identity when they look at me*", on a 5-point Likert scale from "Strongly Disagree" to "Strongly Agree". Respondents' answers were dichotomized as Strongly Agree or Agree vs. Neither, Disagree, Strongly Disagree; responses of "I do not know" and "I prefer not to answer" were treated as missing.

Statistical analyses

We examined associations between the age of initiation of GAHT and the three above mentioned outcomes by estimating unadjusted and adjusted prevalence ratios (PR) using separate modified Poisson regression with robust standard errors. Initiation during adolescence served as the reference category. Adjusted models controlled for age, race/ethnicity, income, highest educational level, insurance type, and U.S. region based on existing literature demonstrating that sociodemographic variables influence both access to gender-affirming care and mental health outcomes among TGD populations.³⁵ Racial and ethnic minority TGD individuals often face barriers to early hormone initiation due to systemic discrimination and reduced healthcare access, while also experiencing higher rates of depressive symptoms due to intersecting forms of marginalization.^{18,22} Similarly, income, education, and insurance status have been linked to

disparities in both timing of healthcare utilization and mental health.³⁵ Regional disparities in healthcare infrastructure and policy further impact both access to GAHT and mental health outcomes.¹²

Two-sided p-values less than 0.05 were considered statistically significant. Analyses were performed using R version 4.4.3.

Ethical considerations

The TWIST study was conducted in compliance with federal regulations governing the protection of human subjects and was reviewed and approved by Emory University's Institutional Review Board. This secondary analysis of de-identified data was considered not to be human subjects research by the University of Washington Human Subjects Division.

Results

A total of 5,574 participants completed the TWIST survey, 3,623 in 2022 and 1,951 in 2023–24, of whom 5,178 (92.9%) were aged 18 or older and included in the analysis (Table 1). Among these 5,178, 286 (5.5%) initiated GAHT before age 18, 3,844 (74.2%) initiated at age 18 or older, 841 (16.2%) desired GAHT but never initiated it, and 207 (4.1%) neither initiated nor desired GAHT. On average, participants who initiated GAHT before age 18 were the youngest (mean = 21.8 years, SD = 6.3), followed by those who desired but never initiated GAHT (mean = 26.3 years, SD = 9.4). Participants who initiated GAHT later or did not desire GAHT were the oldest (mean = 30.9 years, SD = 10.3, and mean = 30.4 years, SD = 9.0, respectively). Most

participants (>85%) in all groups identified as transfeminine with smaller proportions identifying as female and non-binary. White participants were the largest racial/ethnic group followed by Latinx participants in all categories except among those who never desired GAHT, among whom a plurality (45.9%) identified as Black followed by White (39.1%). Income was similar among groups, except a higher proportion of individuals who never desired GAHT reported lower incomes. Private insurance was common across all groups but less frequent among those who never desired GAHT (40.9%), who more often relied on public-only coverage (46.3%). Regional representation was diverse, with the Southern US most prominent among those who did not initiate GAHT and the US West among those who did.

Depression

The highest prevalence of major depression was observed among participants who desired but never accessed GAHT (62.1%), followed by those who never desired it (56.0%). Participants who initiated GAHT had the lowest prevalence—48.9% for those who initiated in adulthood and 47.5% for those who initiated during adolescence (Table 2). In unadjusted analyses, only those who desired but never accessed GAHT had significantly higher prevalence of major depression compared to adolescent initiators (PR = 1.31, 95% CI: 1.14–1.50, $p = 0.001$). In adjusted analyses, all three groups had significantly higher prevalences of depression compared to those who initiated GAHT during adolescence ($p < 0.05$ for all; Table 2).

Gender identity-appearance alignment and comfort with how others perceive their gender

Alignment between gender identity and outward appearance was most common among those who initiated GAHT (69.9% during adolescence, 66.0% during adulthood) followed by those who never desired it (46.3%) and lowest among participants who desired but never accessed GAHT (22.3%) (Table 3). Comfort with how others perceive their gender followed a similar pattern: it was highest among adolescent initiators (57.9%), followed by those who never desired GAHT (46.9%), adult initiators (43.5%), and those who desired but never accessed GAHT (15.7%). In unadjusted analysis, appearance–identity alignment did not differ significantly between adult and adolescent initiators ($PR = 0.94$, $95\%CI = 0.87, 1.02$, $p = 0.15$). However, after adjustment, adult initiators showed a significantly lower prevalence of alignment compared to those who initiated GAHT during adolescence ($aPR = 0.89$, $95\%CI = 0.81, 0.97$, $p < 0.05$). Adult initiators also reported lower comfort with how others perceive their gender compared to those who initiated GAHT during adolescence, in both unadjusted and adjusted analyses ($p < 0.001$ for both). Participants who never initiated GAHT—regardless of whether they desired it—had significantly lower prevalence of appearance–identity alignment and comfort with how others perceive their gender, compared to adolescent initiators ($p < 0.05$ for all comparisons) in adjusted and unadjusted analyses (Table 3).

Discussion

A growing body of research has established that TGD individuals face disproportionately high rates of psychological distress, shaped by chronic exposure to discrimination, transphobia, and systemic exclusion.^{1,5,10,36} Against the backdrop of escalating political efforts to restrict access to GAHT for youth,^{13,28} it is increasingly urgent to understand how the timing and availability of GAHT affect long-term mental health outcomes. In this large, cross-sectional analysis of TGD

individuals assigned male at birth in the United States, the prevalence of depression was high across all groups. After adjusting for age and other sociodemographic differences, adolescent initiators had significantly lower prevalence of depression than all other groups. These findings align with prior studies indicating that initiation of GAHT during adolescence is associated with reductions in depressive symptoms, anxiety, and suicidal ideation.^{2,21–24,37} Notably, a prior study directly comparing early versus adult initiation of GAHT found that those who accessed treatment during adolescence had lower odds of adverse mental health outcomes.¹³ The high burden of depression among TGD individuals and the potential protective effect of GAHT initiation during adolescence reinforce the need to increase early access to gender-affirming care. We also found that alignment between outward appearance and gender identity and comfort with how others perceive one's gender were highest among those who initiated GAHT during adolescence. These findings are consistent with prior research indicating that individuals without access to GAHT—particularly those who desire but have not received it—report the lowest levels of gender congruence.^{22,24} This convergence underscores the central role of timely GAHT initiation in supporting both gender affirmation and psychosocial well-being.

Research that includes TGD participants who never initiated GAHT and disaggregates them based on their desire for treatment is essential for shaping clinical and policy discussions, as their experiences can inform more inclusive, and person-centered approaches to gender-related care. Individuals who desired but never accessed GAHT reported worse mental health outcomes than those who never desired it. This may in part reflect the psychological burden of unmet treatment needs.^{2,13} The differences observed between these groups may also be partially explained by the documented variation in mental health outcomes between individuals who experience gender dysphoria and those who do not,^{38,39} underscoring the diversity of experiences within the TGD

population regarding their transition goals.^{14,30} In addition, one-third of those who desired GAHT identified as nonbinary, compared to 13% among those who did not, highlighting how gender identity beyond binary categorizations may impact access to GAHT. Nonbinary individuals may pursue individualized or less standardized transition goals that are often poorly supported by existing healthcare infrastructure.⁴⁰ Consequently, access disparities may not simply reflect logistical barriers but also a mismatch between nonbinary needs and the services offered. Individuals who never desired GAHT had a distinct sociodemographic profile. They tended to be older, were more likely to be employed, and more frequently identified as Black compared to other groups in the sample, and despite higher employment rates, they were overrepresented among those earning less than \$40,000 annually and had lower educational attainment relative to their age. This suggests that sociodemographic factors may shape not only access to GAHT but also interest or willingness to pursue medical transition. Prior studies have indicated that intersecting dimensions of marginalization, particularly race and socioeconomic status, influence both access to and perceptions of gender affirming care.^{5,18,35} In addition, this group had the second-highest comfort in how others perceived their gender and were comparable to those who initiated GAHT in adulthood in the adjusted model, despite more pronounced disparities in depression and in the alignment between gender identity and appearance. This pattern highlights that social comfort may depend on more than medical transition alone, including factors like self-acceptance, coping strategies, and resilience.⁴¹ It underscores the need to explore non-medical pathways to gender congruence and the distinct roles of internalized and societal transphobia in shaping gender congruence indicators.^{10,41}

Strengths and Limitations

Our study has several limitations. First, its cross-sectional design restricts our ability to establish causality. Although significant associations were identified, the temporal sequence of these relationships remains uncertain. The PHQ-9 assesses depressive symptoms over the preceding two weeks, yet depression is often a chronic condition that may have started before GAHT initiation or even influenced the decision to begin treatment. Because we were unable to determine when symptoms began relative to GAHT initiation, the possibility of reverse causation cannot be ruled out. Longitudinal studies are needed to clarify causal relationships and assess the lasting effects of GAHT timing on mental health. All data were self-reported, introducing the potential for recall and social desirability biases. Additionally, the sample was drawn exclusively from online recruitment, which may overrepresent TGD individuals with internet access and greater engagement in digital platforms and social media focused on the LGBTIQ+ community. As a result, the generalizability of our findings may be limited. We also lacked data on several important covariates that could confound the observed associations. Notably, factors such as social support and family acceptance—both of which have been consistently linked to GAHT access and improved mental health^{11,13,35,39,42,43} were not included in our models. Other unmeasured influences, such as stigma and experiences of discrimination, may also play a role in shaping mental health outcomes and should be addressed in future research. Finally, although we draw from a large national sample within the United States, it may not fully capture the entire spectrum of gender-diverse experiences, especially those beyond Western identity frameworks. Concepts of gender, transition, and medical affirmation vary greatly across cultures, and many non-Western gender identities and practices remain underrepresented in research.⁴⁴ This limitation highlights the ongoing need for culturally sensitive and globally inclusive research methodologies that respect and incorporate diverse gender expressions and healthcare needs.

Despite these limitations, by centering within-group comparisons among TGD individuals, this study challenges dominant cis-normative frameworks and contributes to a decolonizing approach in transgender health research.

Conclusion

In this large cross-sectional study of TGD individuals in the U.S., initiation of GAHT in adolescence was associated with lower prevalence of depression and greater gender congruence. Those who desired but never accessed GAHT faced the greatest psychosocial challenges, underscoring the importance of timely and equitable access to gender-affirming care. These findings carry significant political relevance amid ongoing legislative efforts to restrict access to GAHT for youth.

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Tables

Table 1. Characteristics of 5,178 participants, TWIST 2022 and 2023-24 cycles, stratified by age of initiation of gender affirming hormone therapy (GAHT)

	Initiated GAHT <18	Initiated GAHT ≥ 18	Never initiated- desired	Never initiated-no desire
N (%)	286 (5.5)	3844 (74.2)	841(16.2)	207 (4.1)
Age (Mean (SD))	21.78 (6.30)	30.85 (10.32)	26.26 (9.37)	30.43 (9.02)
Gender identity[†]				
Female	134 (46.8)	1957 (50.9)	267 (31.8)	24 (11.6)
Male	1 (0.3)	14 (0.4)	24 (2.9)	8 (3.9)
Non-binary	50 (17.5)	819 (21.3)	242 (28.8)	26 (12.6)
Transfeminine	251 (87.7)	3456 (89.9)	808 (96.1)	191 (92.3)
Transmasculine	1 (0.3)	4 (0.1)	0 (0.0)	0 (0.0)
Some other gender	4 (1.4)	107 (2.8)	26 (3.1)	3 (1.4)
Race/ethnicity^{††}				
American Indian/Alaska Native	6 (2.1)	96 (2.5)	28 (3.3)	2 (1.0)
Asian/Native Hawaiian/Other P.I.	14 (4.9)	179 (4.7)	47 (5.6)	13 (6.3)
Black	29 (10.1)	152 (4.0)	45 (5.4)	95 (45.9)
Hispanic/Latino/Spanish	49 (17.1)	348 (9.1)	78 (9.3)	15 (7.2)
Middle Eastern/North African	6 (2.1)	49 (1.3)	9 (1.1)	1 (0.5)
Other/ Unknown	2 (0.6)	77 (2.0)	20 (2.3)	0 (0.0)
White Only	180 (62.9)	2943 (76.6)	614 (73.0)	81 (39.1)
Highest educational level				
≤ High School	144 (50.9)	738 (19.2)	322 (38.5)	114 (55.1)
Some College/Technical Degree	114 (40.3)	1488 (38.7)	335 (40.1)	41 (19.8)
College or more	25.8 (8.8)	1615 (42.0)	179 (21.4)	52 (25.1)
Currently enrolled in school				
No	127 (44.6)	2950 (76.9)	515 (61.4)	171 (83.0)
Yes	156 (54.7)	868 (22.6)	321 (38.2)	33 (16.0)
Refuse/Don't know	2 (0.7)	16 (0.4)	3 (0.4)	2 (1.0)

Employment status^{†††}				
Employed	178 (62.4)	2938 (76.6)	576 (68.6)	184 (89.4)
Not employed	100 (35.1)	793 (22.0)	250 (29.8)	21 (10.2)
Refused/Don't know	8 (2.8)	62 (1.6)	15 (1.8)	2 (0.5)
Annual household income				
\$0–19,999	50 (21.6)	626 (17.4)	108 (15.5)	13 (6.5)
\$20,000–39,999	53 (22.9)	796 (22.1)	171 (24.5)	87 (43.5)
\$40,000–74,999	46 (19.9)	987 (27.4)	154 (22.0)	39 (19.5)
\$75,000 or More	82 (35.5)	1195 (33.2)	266 (38.1)	61 (30.5)
N/A	55 (19.2)	240 (6.2)	7 (3.4)	142 (16.9)
Health insurance type				
None	16 (5.7)	301 (7.9)	107 (13.1)	6 (3.0)
Other/Multiple	30 (10.8)	271 (7.1)	67 (8.2)	20 (9.9)
Private Only	174 (62.4)	2488 (65.2)	550 (67.2)	83 (40.9)
Public Only	59 (21.1)	756 (19.8)	94 (11.5)	94 (46.3)
Food insecurity in the past 12 months				
No	178 (62.2)	2359 (61.4)	527 (62.7)	173 (83.6)
Yes	94 (32.9)	1406 (36.6)	290 (34.5)	34 (16.4)
Refused/Don't Know	14 (4.9%)	79 (2.1%)	24 (2.9%)	0 (0.0%)
Housing insecurity in the past 12 months				
No	247 (86.4)	3556 (92.5)	778 (92.5)	186 (89.9)
Yes	37 (12.9)	266 (6.9)	58 (6.9)	21 (10.1)
Refused/Don't Know	2 (0.7%)	22 (0.6%)	5 (0.6%)	0 (0.0%)
Census region				
Midwest	61 (21.3)	777 (20.2)	194 (23.1)	37 (17.9)
Northeast	52 (18.2)	662 (17.2)	140 (16.6)	37 (17.9)
South	79 (27.6)	1170 (30.4)	287 (34.1)	83 (40.1)
U.S. dependent areas	0 (0.0)	1 (0.0)	0 (0.0)	0 (0.0)
West	94 (32.9)	1234 (32.1)	220 (26.2)	50 (24.2)

GAHT: gender affirming hormone therapy; P.I.: Pacific Islander; SD: standard deviation.

[†] These percentages may exceed 100% because individuals may have selected more than one gender identity category.

^{††} Race and ethnicity were categorized using a hierarchical approach to assign everyone to a single, mutually exclusive group. Priority was given in the following order: Black, Hispanic,

American Indian/Alaskan Native, Asian/Native Hawaiian/Other Pacific Islander, Middle Eastern/North African, other races, White only, and finally unknown or missing responses. Each participant was classified into the highest-priority category they identified with, ensuring no overlap between groups.

†††Employment status categories were consolidated as follows: employed (full-time, part-time, self-employed), not employed (including homemaker, unable to work, and retired), refuse/don't know (including refusal, unknown, and missing responses).

Table 2. Association between age of initiation of GAHT and depression.

Exposure	Prevalence (%)	PR [±]	95%CI	P-value	aPR ^{±±}	95%CI	P-value
Initiated GAHT in adolescence (ref)	47.5	ref	-	-	-	-	-
Initiated GAHT in adulthood	48.9	1.03	0.91, 1.17	0.64	1.26	1.08, 1.46	0.002
Never initiated GAHT – desired	62.1	1.31	1.14, 1.50	0.001	1.45	1.24, 1.69	<0.001
Never initiated GAHT – no desire	56.0	1.18	0.99, 1.40	0.06	1.35	1.11, 1.63	0.002

GAHT: gender affirming hormone therapy. CI: Confidence Interval. PR: unadjusted prevalence ratio. aPR: adjusted prevalence ratio.

± Bivariate modified Poisson regression model with robust standard errors.

±± Multivariable modified Poisson regression model with robust standard errors, adjusted for age (modeled as continuous in years), race/ethnicity, income, highest educational attainment, insurance type, and U.S. region (modeled as indicator variables).

Table 3. Association between age of initiation of GAHT and gender congruence indicators.

Exposure	Prevalence (%)	PR [±]	95%CI	P-value	aPR ^{±±}	95%CI	P-value
Association between age of initiation of GAHT and outward appearance–gender identity alignment							
Initiated GAHT in adolescence (ref)	69.9	ref	-	-	-	-	-
Initiated GAHT in adulthood	66.0	0.94	0.87, 1.02	0.15	0.89	0.81, 0.97	0.01
Never initiated GAHT – desired	22.3	0.32	0.27, 0.37	<0.001	0.32	0.27, 0.38	<0.001
Never initiated GAHT – no desire	46.3	0.66	0.56, 0.78	<0.001	0.64	0.54, 0.76	<0.001
Association between age of initiation of GAHT with comfort in how others perceive their gender							
Initiated GAHT in adolescence (ref)	57.9	-	-	-	-	-	-
Initiated GAHT in adulthood	43.5	0.75	0.68, 0.84	<0.001	0.67	0.59, 0.76	<0.001
Never initiated GAHT – desired	15.7	0.27	0.23, 0.33	<0.001	0.28	0.23, 0.34	<0.001
Never initiated GAHT – no desire	46.9	0.81	0.68, 0.96	0.02	0.69	0.57, 0.84	<0.001

GAHT: gender affirming hormone therapy. CI: Confidence Interval. PR: unadjusted prevalence ratio. aPR: adjusted prevalence ratio.

± Bivariate modified Poisson regression model with robust standard errors.

±± Multivariable modified Poisson regression model with robust standard errors, adjusted for age (modeled as continuous in years), race/ethnicity, income, highest educational attainment, insurance type, and U.S. region (modeled as indicator variables).