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REVIEW

Assessing the Prevalence Rates of Internalizing Symptomatology Among Multiracial Adolescents in the United States: A Systematic Review

Mike Henson-García[1] · Sitara M. Weerakoon[2,3,4] · Chavonn Duncan[3] · Taylor Choe[3] · Ijeoma Opara[3] · Kimberly A. Baker[1] · Kymberle L. Sterling[1,5] · Sarah E. Messiah[4]

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Abstract

This systematic review aimed to investigate the prevalence of internalizing symptomatology among Multiracial adolescents in the United States and to report on the methods utilized to measure Multiracial race and internalizing symptoms. A comprehensive search was conducted in Ovid MEDLINE, Embase, APA PsycInfo, and Web of Science Core Collection. The search was confined to peer-reviewed studies reporting the prevalence of any internalizing symptom among Multiracial adolescents between 10 and 24 years in the United States. Study selection, data abstraction, and quality assessments were managed by four team members. Between 2000 and 2023, nine studies provided prevalence estimates and used various methods to measure Multiracial race and internalizing symptoms. Prevalence estimates displayed considerable variability depending on symptom examined and measurement method utilized. For all internalizing symptomatology, estimates ranged between 7.5 and 55.2%; for depressive symptomatology, estimates ranged between 12.8 and 51.0%. No information on the prevalence of anxiety symptoms alone were provided. This review represents a pioneering attempt to report the prevalence of internalizing symptomatology among Multiracial adolescents in the United States, revealing significant gaps in current knowledge and methodological inconsistencies in the field. There exists a need for more comprehensive epidemiological research with this growing population.

Keywords Multiracial · Mixed race · Internalizing symptomology · Adolescent mental health · Health disparities · Health equity · Systematic review · Prevalence

Introduction

Multiracial and mixed-race individuals, or those who have biological parents from different or mixed racial backgrounds [1], face distinct challenges in society. For example, mixed-race people have been reported to have worse mental health outcomes when compared to monoracial individuals [2, 3] and racial discrimination [4] as well as identity-related struggles [5] have been identified as contributing factors to this mental health disparity. There is wide variation in the way Multiracial individuals self-identify in terms of their ethnoracial identity, and empirical research suggests that identity related to this social position tends to shift and fluctuate across the life course [6]. Furthermore, scholars have suggested that Multiracial individuals experience unique forms of racial discrimination including *monoracism* [7] and *identity incongruent discrimination* [4, 5]. These unique challenges experienced by mixed-race individuals

✉ Mike Henson-García
mike.garcia@uth.tmc.edu

1 Department of Health Promotion and Behavioral Sciences, University of Texas Houston Health Science Center School of Public Health, Houston, TX, US

2 Yale University School of Medicine, New Haven, CT, US

3 Department of Social and Behavioral Sciences, Yale University School of Public Health, New Haven, CT, US

4 Center for Pediatric Population Health, University of Texas Houston Health Science Center School of Public Health, Dallas, TX, US

5 Department of Health Behavior, Society, and Policy, Rutgers School of Public Health, Piscataway, NJ 08854, US

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have been hypothesized to contribute to heightened levels of stress among this often overlook ethnoracial group in the United States (US) [3, 8] which, in turn, may lead to elevated mental health problems among this population.

Internalizing symptomatology – a range of subclinical, inner-directed mental health symptoms and problems, often a result of internalized psychological distress, including depression, anxiety, and somatic complaints [9–11] – has previously been shown to be heightened for Multiracial youth. For example, a study utilizing a nationally representative cohort of youth revealed that Biracial adolescents reported significantly greater levels of depression and somatic symptoms compared to monoracial white adolescents [12]. Moreover, another analysis found that Multiracial youth exhibited higher levels of depression and anxiety symptoms compared to their monoracial peers [3]. Related to anxiety symptomatology, Fisher and colleagues (2014) found that Multiracial youth reported higher mean scores for anxiety compared to African American youth. More recent data examining changes in depression and anxiety symptoms before and after the COVID-19 pandemic found significant increases in levels of both symptoms among Multiracial/Biracial adolescents globally [13].

Unfortunately, Multiracial people as a distinct ethnoracial group have been historically underrepresented in public health research, prompting scholars to advocate for greater inclusivity and intentionality in studying their experiences [1, 14]. While there have been previous reviews conducted to assess the scope and magnitude of racial and ethnic disparities in internalizing symptomatology among adolescent populations [15], these efforts have largely failed to provide information on the prevalence of these mental health symptoms specifically for Multiracial and mixed-race youth. Furthermore, these reviews have not been conducted in a systematic fashion and have encompassed studies published before 2010. In other words, there has not been a comprehensive attempt made to gauge the prevalence of internalizing symptomatology among Multiracial youth in the US for over a decade. Given the limitations of previous review endeavors coupled with recent reports highlighting a substantial surge in the Multiracial population within the US over the past decade—a remarkable 276% increase, as per the 2020 US Census Bureau data [16]—there exists a pressing and crucial need for an up-to-date assessment of the extent to which internalizing symptoms affect Multiracial adolescents across the US.

The Development and Impact of Internalizing Symptomatology in Adolescence

Adolescence is widely acknowledged as a critical stage in human development, holding significant cultural significance and representing a major transitional period in the life span of an individual. Some scholars have suggested that individuals become more susceptible to certain psychopathologies during this period of time including those conditions and disorders marked by high rates of internalizing symptoms [10]. For instance, a previous review taking a broad exploration of anxiety symptomatology in adolescence reported that "adolescence appears to be the most vulnerable time for the development of significant symptoms of all or almost all of the anxiety disorders" [17]. Other research has indicated that the risk of major depressive episode (MDE) is relatively low during childhood but significantly increases during adolescence. Although it is suggested that depressive symptoms in adolescence may have a relatively short duration, scholars suggest a higher likelihood of recurrence in the period of adolescence [18]. The manifestation of internalizing symptoms during the adolescent period carries with it substantial burdens and implications for those affected. Internalizing symptoms reported in adolescence have been associated with a plethora of negative outcomes including bullying involvement (i.e., victimization and perpetration), poor family functioning, low levels of well-being, alcohol use disorders, tobacco use and nicotine dependence, and externalizing behaviors [19–23] among others.

Conceptualizing, Measuring, and Operationalizing Multiracial Race

Throughout history, society has provided several different terms, definitions, and conceptualizations related to the experience of maintaining multiple races. *Biracial, Multiracial,* and *mixed race* are all commonly used terms in the field of psychology to describe individuals who occupy more than two racial positions in society, and each of these terms have precise definitions and meanings [1]. The concept of having multiple racial identities has historically been met by widespread discrimination and stigmatization in the US, exemplified by the increased prominence and legal establishment of the "one-drop rule" during the late twentieth century [24]. Under this racist legal code, if an individual had even a single Black relative, they would be categorized as racially Black regardless of any other biological or familial ties to individuals of non-Black races and, ultimately, hold less power socially, economically, and politically. Attempts to prevent and erase Multiracial

people from American society are also evident in the anti-miscegenation laws that were enacted frequently in the US during the 1960s, which effectively made it illegal for individuals of different races to marry or "mix together" [25]. Recently, some scholars have argued that American sociologists have historically failed to consider the societal significance of the Multiracial identity during the 1980s and 1990s and attribute this oversight to deeply entrenched monoracist norms (i.e., societal beliefs that prioritize and uphold the idea of a single, dominant racial category and disregard the experiences and identities of individuals belonging to multiple racial backgrounds) that permeated the social and institutional fabric of the US during this time [26]. Scholars have raised concerns about the tendency within the field of epidemiology to frequently reclassify and consolidate Multiracial individuals into an overarching "Other" category during analytic procedures [27]. Altogether, Multiracial race has been largely invisible throughout American history; it is therefore crucial to address and rectify these historical patterns to fully comprehend the racialized experiences and their effects on various health and well-being outcomes for Multiracial individuals.

Defining the precise boundaries of the Multiracial population in the US is a complex task due to the diverse range of measurement approaches employed by researchers to identify individuals of multiple racial backgrounds. For instance, in 2000, for the first time ever, the US Census Bureau allowed individuals to select more than one singular race acknowledging the existence of a separate Multiracial race within society. This method of measuring race, in which individuals are reclassified as "Multiracial" or "mixed race" when they select more than one singular race, has been an approach maintained by the US Census Bureau over the last two decades [27]. The Pew Research Center has also undertaken research to estimate the size of the Multiracial population and have employed diverse measurement paradigms in their efforts. Utilizing a sample of over 20,000 adults living in the US, the research group revealed that a combined 6.9% of respondents could be classified as Multiracial depending on the measurement approach. Specifically, 1.4% of the sample were *self-identified* as Multiracial whereas 2.9% were classified as Multiracial based on parental race and an additional 2.6% were considered Multiracial on the basis of their grandparents' race [28]. Moreover, some studies have relied *solely* on the parent's race to classify individuals as Multiracial [29, 30]. Additionally, it is common for researchers who study the mixed race population to differentiate between two approaches in the measurement of race: *racial identification* versus *racial categorization*. Racial identification pertains to the recognition and classification of an individual's race based on the perceptions of others; on the other hand, racial categorization involves the act of an individual autonomously and deliberately choosing a particular racial group when faced with a range of options [6, 27]. The collective variability observed in the definitions, conceptualizations, measures, and operationalizations employed in studies with Multiracial people holds notable implications for public health research with this vulnerable population.

The Current Study

This systematic review aims to comprehensively identify and summarize epidemiological studies conducted between January 2000 and January 2023 that have examined the prevalence of internalizing symptomatology among Multiracial adolescents in the US. The study has several specific objectives: (1) to detail key characteristics of relevant studies, including the methods used to measure and operationalize Multiracial race in adolescent samples; (2) to summarize the various measurement and operationalization approaches used for internalizing symptoms; and (3) to provide updated prevalence estimates of internalizing symptomatology among Multiracial adolescents aged 10 to 24 residing in the US. Through this systematic review, we aim to offer a comprehensive understanding of the existing literature and shed light on the distribution and extent of this mental health burden among Multiracial adolescents in the US.

Methods

Eligibility Criteria

The review was limited to those quantitative, empirical, and peer-reviewed studies that report an estimate of any internalizing symptom among Multiracial adolescents. Here, a broad definition of adolescence was adopted, spanning from 10 to 24 years, considering evidence suggesting fluctuations in Multiracial identity across the life course [31, 32]. Therefore, studies that included Multiracial people older than 24 years old and younger than 10 years old were excluded from review. Furthermore, studies that examined outcomes that could not be classified as an internalizing symptom – like those constructs directly related to the self-concept (i.e., self-esteem, self-efficacy), psychological adjustment, and externalizing symptoms and disorders – were excluded from the analysis. Additional downstream behavioral consequences of internalizing disorders (e.g., suicidal behaviors) were also excluded from assessment [33]. Studies conducted outside the US were

not included due to the confounding impact of sociopolitical environment on, both, the development of racial identity and internalizing symptoms [34–36]. Finally, to ensure our procedure was robust, we also referenced the bibliographies of the included studies. Studies conducted prior to 2000 were excluded due to the US Census adding an option for selecting more than one race in this year; thus, we limited our date range from January 1, 2000, to the end of data collection which occurred on January 31, 2023.

Information Sources and Search Strategy

In January 2023, the electronic databases Ovid MEDLINE, Embase, APA PsycInfo, and Web of Science Core Collection were searched by MHG and SMW to identify relevant studies for inclusion in this systematic review. To ensure a comprehensive and focused search strategy, the development of the search query was a collaborative effort involving a public health librarian and content experts in the fields of epidemiology, adolescent health, and health psychology. The development of our search queries incorporated three overarching concepts: "Multiracial or mixed race," "internalizing symptoms," and "adolescence". To ensure a robust search was performed, a combination of natural language terms, with truncation, and Medical Subject Headings (MeSH) were utilized allowing for a thorough exploration of relevant literature. By incorporating a variety of search techniques, including both specific terminology and broader truncation, the search aimed to capture a wide range of articles related to the topic of interest. An example of one search query employed in this review is illustrated in Table 1 and all remaining queries can be found in **Appendix A** for purposes of replication.

Study Selection and Data Collection

Study selection, data collection, and quality assessments were managed in Covidence by four members on the study team (CD, TC, MHG, and SMW). The initial screening phase involved the independent assessment of titles and abstracts by CD and TC to ascertain the suitability of studies for inclusion based on predetermined eligibility criteria. The inter-rater percent agreement between coders was 0.93, and Cohen's kappa coefficient was 0.12. Any discrepancies were resolved through consensus between MHG and SMW. Subsequently, the full texts of eligible studies identified during the screening phase were reviewed by MHG and SMW. The bibliographies of these resulting studies were also reviewed to ensure all studies that met the eligibility criteria were included in the review. Ultimately, this process culminated in the final selection of studies that met the criteria for inclusion in the present systematic review. After study selection, MHG and SMW performed data abstraction to extract pertinent information from each article. This included recording the authors' information, study design, sample size, recruitment strategies, sample characteristics, measurement of race, types of internalizing symptoms assessed, measurement instruments utilized in outcome assessment, and related prevalence estimates.

Risk of Bias Assessment

The included studies were subjected to a risk of bias assessment, considering various factors such as study design, age distribution, definitions of independent and dependent variables, outcomes related to internalizing symptomatology, and overall study quality. To assess the risk of bias and study quality, the guidelines provided by the Joanna Briggs Institute Prevalence Critical Appraisal Tool [37] were employed. This tool consists of a 9-item checklist that evaluates aspects such as appropriateness of the sampling frame, adequacy of sample size, description of study subjects and setting, identification of the outcome, appropriateness of the statistical analysis, and adequacy of response rate. The assessment of study quality was conducted independently by MHG and SMW. In cases where there were discrepancies in their evaluations, discussions were held to resolve disagreements and reach a consensus. This rigorous process ensured that the assessment of study quality was comprehensive and objective, enhancing the overall reliability and validity of the systematic review.

Table 1 Search query for Ovid MEDLINE

1	(multiracial* or mixed race* or biracial* or "more than one race" or multiethnic* or multiple race* or racially fluid or mixed-race* or bi-racial or multiple-race* or multi-ethnic* or mixed ethnic* or mixed race).tw,kw	14,004
2	Adolescent/ or young adult/ or (adolescen* or emerging adult* or rising adult* or teen* or young adult* or youth*).tw,kw	2,811,298
3	mental health/ or mental disorders/ or exp anxiety disorders/ or depressive disorder/ or anxiety/ or depression/ or ("mental health" or "mentally ill" or "mental illness" or "psychiatric disorder*" or "psychiatric illness*" or "mental disorder*" or "mental disease*" or anxiet* or anxious* or depress* or "emotional disturbance*" or GAD-2 or GAD-7 or Internaliz* or melanchol* or nervous* or "Patient Health Questionnaire" or PHQ-9 or PHQ-2 or sad or sadness or unhapp*).tw,kw	1,466,950
4	1 and 2 and 3	529
5	limit 4 to english language	525

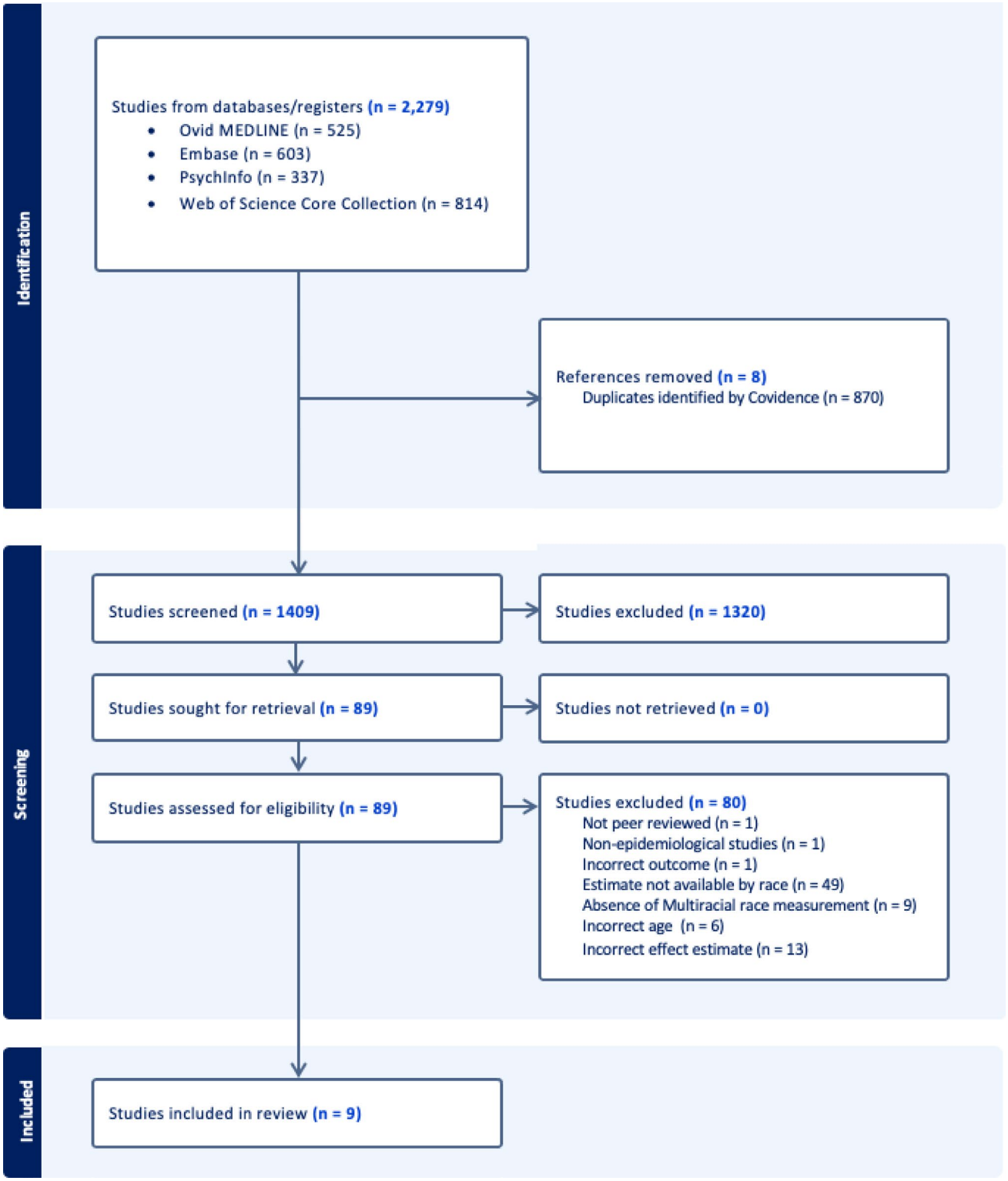

Fig. 1 PRISMA flow chart

Results

Initially, 2,279 records were identified (Fig. 1). Once duplicates were removed (n = 870), 1,409 records remained. Of those that remained, 1,320 were excluded due to non-eligible titles or abstracts, or otherwise deemed not relevant.

Eighty-nine records were screened for age of study sample, study region, outcome variable definition, and research questions; in total, nine studies were compiled and included in this systematic review. Overall, one study received "No" on four out of nine items [38], one study received "No" on two out of nine items [39], three studies received "No" on one out of nine items [29, 40, 45], and the remaining three studies received "Yes" on all nine items [41–43]. Specific results of the risk of bias assessment are displayed in Table 2.

Summary of Studies

The available information on the prevalence of internalizing symptoms among Multiracial adolescents is derived from a diverse group of studies that encompass various research questions and employ a plethora of measurement approaches. Altogether, nine studies provided prevalence estimates across a span of 14 years with the earliest study published in 2008 and the most recent study (at the time of this review) published in 2022. Cox et al. [38] aimed to explore depressive symptoms among adolescent mothers in the US and explore associations with their caretaking ability, authors found that increased depressive symptoms were associated with decreased caretaking ability. Lau et al., [29] aimed to describe health disparities in medical, oral, and access to care status among US adolescents. Subica and Wu [45] aimed to describe the prevalence of mental health status, suicidality, and substance use among Native Hawaiian and other Pacific Islander (NHPI) youth, American Indian/Alaskan Native (AIAN) youth, and youth who identified as both (Multiracial). Garcia et al. [40] aimed to assess whether Multiracial high school youth were at greater risk of poor mental health conditions than their monoracial counterparts. Zhang et al. [39] aimed to examine racial/ethnic health disparities in youth depression prevalence (among other aims) with a nationally representative data set. Fox and Hanes [41] aimed to estimate mental health services need and use among US adolescents and assess associations with key demographics (among other characteristics). Jones et al. [44] aimed to assess US high school students' mental health during the COVID-19 pandemic. Mpofu et al. [42] aimed to assess mental health status and perceived racism among US high school students during the COVID-19 pandemic. Park et al. [43] aimed to explore race/ethnicity and mental health related outcomes among US high school students.

Study Characteristics

Table 3 summarizes the major findings from the systematic review. All studies were cross-sectional and employed survey methodology in the assessment of race/ethnicity and internalizing symptoms. Five studies utilized school-based samples [42–44, 45], three studies used community-based sample [29, 39, 41], and one study used a clinic-based sample [38]. Geographic information for study subjects was available for seven studies – six utilizing nationally representative samples [29, 39, 41, 42, 44, 45] and two using State-based samples, specifically in Alaska [40] and Colorado [43]. Two studies utilized data from the nationally representative CDC Youth Risk Behavior Surveillance System [29, 45], two studies utilized data from the Substance Abuse and Mental Health Services Administration (SAMHSA) National Survey of Drug Use and Mental Health (NSDUH) [39, 41], and two studies utilized data from the CDC Adolescent Behaviors and Experiences Survey (ABES). The sample sizes varied among the included studies, with the smallest study reporting 168 adolescents and the largest study reporting 184,494 adolescents.

Measurement of Multiracial Race in Reviewed Studies

Regarding the identification and categorization of individuals as Multiracial, the vast majority of studies reviewed took a categorization approach by allowing respondents to self-report their race as Multiracial. One study determined race solely by a caregiver report of their child's race/ethnicity [38], adolescents self-reported their own race/ethnicity in the remaining 8 studies [29, 39–45]. All studies captured race/ethnicity via survey methodology and there was immense variation in the racial/ethnic categories provided to participants. For instance, the survey employed in Cox et al. [38] provided a "Biracial" category for respondents to select whereas the surveys in Lau et al. [29], Subica and Wu [45], Garcia et al. [40], and Park et al. [43] (n = 4 studies) provided respondents the opportunity to select more than one race. In these latter studies, authors later aggregated respondents who selected more than one race into a "Multiracial" group—representing an identification approach. Surveys in remaining three studies [41, 42], and [39] provided respondents with a "Multiracial" option to choose and allowed the adolescents to self-report their race. The proportion of Multiracial adolescents among samples where a categorization approach occurred ranged from 2.5 to 54.6%.

Measurement of Internalizing Symptomatology in Reviewed Studies

Among the studies included in this systematic review, three studies utilized psychometrically validated instruments for assessing internalizing symptoms. Specifically, one study employed the Center for Epidemiological Studies Depression Scale (CES-D) to assess symptoms of depression and the other two studies utilized the World Health Organization's Composite International Diagnostic Interview–Short Form. In contrast, the remaining 6 studies

Table 2 Risk of bias assessment* results for all included studies

Study	Was the sample frame appropriate to address the target population?	Were study participants sampled in an appropriate way?	Was the sample size adequate?	Were the study subjects and the setting described in detail?	Was the data analysis conducted with sufficient coverage of the identified sample?	Were valid methods used for the identification of the condition?	Was the condition measured in a standard, reliable way for all participants?	Was there appropriate statistical analysis?	Was the response rate adequate, and if not, was the low response rate managed appropriately?
Cox et al [38]	Yes	No	No	No	Yes	Yes	Yes	Yes	No
Fox and Hanes [41]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Garcia et al [40]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Jones et al [44]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lau, et al [29]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Mpofu et al [42]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Park et al [43]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subica and Wu [45]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Zhang, et al [39]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No

*Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Chapter 5: Systematic reviews of prevalence and incidence. In: Aromataris E, Munn Z (Editors). JBI Manual for Evidence Synthesis. JBI, 2020

Table 3 Summary of studies included in review

Citation	Methodology				Measurment		Prevalence estimates		
Authors	Study design	N	Recruitment	Sample characteristics	Multiracial Race	Outcomes	Depressive symptoms	Anxiety symptoms	Internalizing symptoms (combined)
Cox et al., [38]	Cross sectional	168	Clinic-based survey Pooled data from 2002 to 2005: Period prevalence	- Special population: Adolescent mothers - Mean age = 17.6 yo - Gender proportion = 100% women - Race = 13% Multiracial	- Self-report - Separate "Biracial" category	Depression symptoms (past week) measured by the *CES-DC*	36.5%	–	–
Lau et al., [29]	Cross sectional	48,742	Community-based survey (NCHS) Data from January 2003 to July 2004: Period prevalence	- Special population: None - Range age = 10 to 17 yo - Gender range by race = 48.5% to 56.8% male - Race = 3.3% Multiracial	- Parent report - Select all and combine	Depression or anxiety problems by doctor (ever) measured by a single item	–	–	7.5%
Subica and Wu [45]	Cross sectional	184,494	School-based survey (YRBS) Pooled data from 1991 to 2013: Period prevalence	- Special population: None - Range age = 12 to 17 yo - Gender range = 44.15% to 53.77% female - Race = 2.5% Multiracial	- Self-report - Select all and recombine	Feelings of sadness or hopelessness (past two-weeks) measured by a single item	35.6%	–	–
Garcia et al., [40]	Cross sectional	3,225	School-based survey (YRBS) Pooled data from 2009 to 2013: Period prevalence	- Special population: Anchorage subsample of YRBS - Range grade level = 9^{th} to 12^{th} grade - Gender proportion = 50.1% female - Race = 20.2% Multiracial	- Self-report - Separate "Multiracial" category - Select all and recombine	Feelings sadness or hopelessness (past year) measured by a single item	38.0%	–	–
Zhang et al., [39]	Cross sectional	114,250	Community-based survey (NSDUH) Pooled data from 2010 to 2016	- Population: Depressed youth - Range age = 12 to 17 - Gender proportion = 51.0% male - Race = 4.9% Multiracial	- Self-report - Separate "Multiracial" category	Major depressive episode (MDE) (past year) measured by *Composite International Diagnostic Interview–Short Form*	12.8%	–	–

Table 3 (continued)

Citation	Methodology				Measurment		Prevalence estimates		
Authors	Study design	N	Recruitment	Sample characteristics	Multiracial Race	Outcomes	Depressive symptoms	Anxiety symptoms	Internalizing symptoms (combined)
Fox and Hanes [41]	Cross sectional	13,397	Community-based survey (NSDUH) Pooled data from 2010 to 2016	- Population: Youth with MDE - Range age = 12 to 17 - Gender proportion = 51.2% male - Race = 5.6% Multiracial	- Self-report - Separate "Multiracial" category	Major depressive episode (MDE) (past year) measured by *Composite International Diagnostic Interview–Short Form*	15.8%	–	–
Jones et al. [44]	Cross sectional	7,705	School-based survey (Adolescent Behaviors and Experiences Survey) Data from January to June 2021: Period prevalence	- Special population: High school adolescents during COVID-19 pandemic - Range grade level = 9^{th} to 12^{th} - Gender proportion = 50.4% female; 49.6% male - Race = 5.8%	- Self-report - Separate "Multiracial" category	Feelings of extreme sadness or hopelessness (past year) measured by a single item Poor mental health (depression, anxiety, stress) during COVID-19 pandemic measured by single item	51.0%	–	40.0%
Mpofu et al. [42]	Cross sectional	2,743	School-based survey (Adolescent Behaviors and Experiences Survey) Data from January to June 2021: Period prevalence	- Population: Subsample who experienced racism during lifetime - Range grade level = 9^{th} to 12^{th} - Gender proportion = 36.5% female; 34.6% male - Race = 8.9%*	- Self-report - Separate "Multiracial" category	Poor mental health (depression, anxiety, stress) during COVID-19 pandemic measured by single item	–	–	55.2%
Park et al., [43]	Cross sectional	7,095	School-based survey (2015 Healthy Kids Colorado Survey) Data from 2015: Period prevalence	- Population: Youth attending high schools in Colorado - Mean age = 14.7 - Gender proportion = 47.1% male; 52.0% female - Race = 12.2% Multiracial	- Self-report - Select all and recombine	Feelings of sadness or hopelessness (past year) measured by single item	37.2%	–	-

* = These estimates were calculated by the study team from the proportion the authors provided

Abbreviations: CES-DC = Center for Epidemiological Studies Depression Scale for Children short version

relied on single-item measures that inquired about feelings of sadness or hopelessness as their outcome assessment tool. Furthermore, symptoms were measured across a variety of timelines: three studies asked respondents to report their current depression or anxiety problems (past 30 days [29], past week [38], and past two-weeks [45]), two studies asked respondents to report their past-year symptoms, and one study asked to report about lifetime symptoms [29]. Mpofu et al. [42] was unique in that it asked adolescents to report their internalizing symptoms from January to June 2021.

Prevalence Estimates

The findings from the systematic review of studies indicate a wide range of prevalence estimates for internalizing symptoms among Multiracial adolescents in the US. The prevalence varied depending on the specific type of symptom examined. For studies that measured "all internalizing symptoms", prevalence estimates ranged from as low as 7.5% [29] to as high as 55.2% [42] for Multiracial adolescents in the US. For studies that provided any estimate related to the prevalence of depressive symptomatology in this population, estimates ranged from 12.8 [39] to 51.0% [44]. When depressive symptomatology is examined by studies employing a single item assessment, the prevalence range was narrower compared to the overall prevalence range—ranging from 35.6 [45] to 51.0% [44]. When depressive symptomatology is examined as MDE, the estimate range was also narrower and more specific, ranging from 12.8 [39] to 15.8% [41]. Finally, in the single study that measured depressive symptoms using the CES-DC, the prevalence of depressive symptoms was 36.5% [38]. Surprisingly, no studies included in this review provided a prevalence estimate of anxiety symptoms alone for Multiracial adolescents. The two studies that did account for anxiety symptoms at all measured it in combination with depressive symptoms as a broader internalizing symptoms construct [29, 42] as previously mentioned. Due to the severe heterogeneity in depressive symptomatology measurement, a meta-analysis of estimates was not performed.

Discussion

The results from the present systematic review effort appear to illuminate significant gaps in information regarding the prevalence of internalizing symptoms specifically among Multiracial adolescents residing in the US. To date, only nine studies published over the past two decades have provided prevalence estimates for these mental health symptoms within this rapidly growing ethnoracial community. Overwhelmingly, these studies report on the prevalence of depressive symptomatology among Multiracial adolescents in the US. However, a noteworthy, and concerning finding was the complete absence of a prevalence estimate for anxiety symptomatology among this population.

The specificity of prevalence estimates to depression symptomatology among the reviewed studies is a noteworthy finding given the tendency for these symptoms to co-occur. A subset of the reviewed studies did broadly assess the prevalence of internalizing symptomatology by measuring both depressive and anxiety symptoms together. However, these studies did not further disaggregate their findings to provide distinct prevalence estimates for depression and anxiety as separate facets of internalizing symptomatology. As previously mentioned, some research has suggested that mean scores in anxiety outcomes are more elevated in Multiracial adolescents compared to their monoracial counterparts, but these results provide information on the *severity* rather than the *burden* of the symptoms occurring in these groups [3]. The specific absence of anxiety prevalence data may stem from generally limited mental health research among Multiracial adolescent populations as well as this review's emphasis on anxiety *symptoms* rather than anxiety *syndromes* and *disorders*. Ultimately, the existence of this gap in knowledge emphasizes the urgent necessity for more updated epidemiological research into the prevalence of anxiety symptomatology expressed by Multiracial adolescents across the US.

Regarding the measurement of Multiracial race, it is crucial for scholars in the field to actively work towards establishing standardized guidelines to guide the empirical treatment of individuals as mixed or Multiracial in epidemiological investigations. The reviewed studies highlight significant variation in the approaches employed to measure the Multiracial population. Scholars have previously argued that relying solely on a self-identification approach to account for Multiracial race captures only a subset of the population and does not represent the entire Multiracial population [46]. This approach, where Multiracial identification is determined by considering "the population that could identify as members of the group based on their ancestry", relies on a consideration of the racial classification of an individual's parents or grandparents. While this approach may be analytically useful, it may unintentionally reinforce the idea that race is biologically determined as opposed to a socially constructed concept. Furthermore, this "count-everybody-in approach" raises a significant concern regarding the handling of individuals with unknown ancestry, including adopted individuals or individuals with a single parent, as well as those who might navigate a mixed ethnoracial identity despite having monoracial or monoethnic parents, as exemplified by some Chicané individuals. Moreover, the operationalization of Hispanic/Latiné as a panethnicity, separate from the concept of race, may further disregard a particular subset of mixed-race individuals who identify themselves as racially mixed but may be categorized

monoracially by researchers under the paradigm that Hispanic/Latiné panethnicity is not a race (i.e., Afrolatiné people). The implementation of standardized guidelines in the measurement of Multiracial race is a step in the right direction for providing meta-analyzed prevalence estimates of various health outcomes for this population—a vital aspect in the examination of health disparities in the population as well as the provision of pertinent information to important stakeholders and decision-makers. However, prior to establishing such guidelines for measuring the Multiracial population, it is critical for researchers from various disciplines to collaborate to achieve consensus on an approach that is not only precise but also grounded in equity. This consideration ensures that the resulting data truly reflects the experiences and realities of this diverse population, promoting fairness and inclusivity in research, practice, and policymaking.

In addition, this review sheds light into the wide array of assessment methods chosen by researchers to measure internalizing symptom outcomes in studies that provided prevalence estimates for Multiracial adolescents. As exhibited by the findings of this review, there was substantial variation in the timing asked in symptom assessments (i.e., past-year, past-two-weeks) and limited utilization of psychometrically validated instruments for measuring internalizing symptomatology. The heterogeneity in outcome assessment observed by this review complicates the feasibility of conducting formal meta-analyses in this context for this population which should be a goal for psychiatric epidemiologists. While the CES-D was utilized in just a single study reviewed to measure depressive symptomatology, the psychometric equivalence of the instrument for Multiracial adolescents remains to be empirically established [47]. Along with the absence of prevalence estimates for anxiety symptomatology illuminated by this review effort, these gaps together point to the need for future, more intentional research endeavors to understand and address the mental health needs of the Multiracial adolescent population living in the US.

While conducting a meta-analysis of prevalence was not feasible due to limitations in the available information, the present review provides valuable insights into the prevalence of internalizing symptoms within the Multiracial community. Specifically, our findings indicate that the prevalence of depressive symptomatology, when assessed as depressive episodes, ranged from 12.8 to 15.8%. Notably, these prevalence estimates among Multiracial adolescents in this review exceed previous systematic review-based estimates for "subthreshold depression" among global adolescent samples, which have been reported to range from 5.3 to 12.0% [48]. When prevalence is measured as a history of depressed mood, the resulting range of estimates is relatively higher and wider, ranging from 35.6 to 51.0%. These estimates align closely with previous reviews that estimated the global point-prevalence of "self-reported depressive symptoms" among adolescents at 34.0% [49]. In both measurement approaches, these findings may suggest an elevated risk of depressive symptomatology among Multiracial adolescents in the US; however, further research is required to validate and gain a deeper understanding of these results.

Although the research is timely, there exist several limitations that should be noted. Firstly, the high measurement heterogeneity observed among the included studies precluded the possibility of conducting a meta-analysis, limiting the ability to provide pooled prevalence estimates. Moreover, the heterogeneity in the conceptualization, assessment, and operationalization of Multiracial race, as previously noted, may have constrained the scope of articles included in this review. However, our comprehensive search strategy utilizing diverse terminology (i.e., Biracial, Multiracial, multiple race, mixed race) likely mitigated this constraint in capturing relevant literature on Multiracial populations. Moving forward, consensus-building around the conceptualization and measurement of Multiracial race would facilitate more cohesive syntheses across studies as articulated by others in the field [1]. Additionally, this systematic review exclusively focused on peer-reviewed studies, neglecting potentially relevant information that may have been published in the grey literature. This exclusion of unpublished or non-peer-reviewed sources, such as conference abstracts or unpublished dissertations, may introduce publication bias on the reported findings. Lastly, the limited number of studies available on the topic may impact the generalizability of the findings.

Conclusions

This systematic review constitutes an attempt to examine the prevalence of internalizing symptoms among Multiracial adolescents. The study reveals considerable knowledge gaps and shortcomings in our comprehension of this challenging issue within this frequently neglected group. It is crucial for public health researchers to give this field of study immediate and prioritized attention. The review provides a crucial cornerstone, setting the stage for future methodological and epidemiological explorations into the mental health problems faced by Multiracial adolescents. As we continue to advance in this field, the findings from this review suggest that the goal of future research should be to develop a detailed and nuanced understanding of mental health disparities among Multiracial adolescents in the US to ensure health equity for this burgeoning population across the nation.

Summary

This systematic review summarized and synthesized the empirical evidence that has estimated the prevalence of internalizing symptoms among Multiracial adolescents in the United States. Despite comprising a rapidly growing segment of the youth population, this review uncovered only 9 studies over the past two decades that have examined internalizing symptoms among this group. The review revealed prevalence estimates for depressive symptomatology ranging from 12.8 to 51%, suggesting potentially elevated risk compared to national averages. However, none of the reviewed studies reported prevalence estimates specifically for anxiety symptoms, highlighting a critical gap in the literature on overall internalizing disorders among Multiracial youth. The review also found immense heterogeneity in the ways scholars conceptualize and measure Multiracial identity and mental health symptoms across studies. Ultimately, these findings underscore the need for more research focused on Multiracial adolescents to elucidate mental health disparities in this understudied population. Standardized methods for assessing Multiracial individuals within samples will enable more cohesive syntheses. This review provides a foundation to inform the design of future epidemiologic studies examining anxiety, depression, and related internalizing symptom outcomes to promote health equity for this unique racial and ethnic community.

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Data Availability Data and materials related to this systematic review can be obtained by emailing the corresponding author.

Declarations

Conflicts of interest Authors have no conflicts of interest to declare.

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