

Research Article

Exploration of Biological and Social Determinants of Mental Health Among Adults Living in the United Kingdom

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Abstract

Aim: This study investigates the interplay between biological, genetic, and socioeconomic determinants of mental health, focusing on their combined impact on adult mental health outcomes in the United Kingdom. It explores the roles of genetic predisposition, biological aging, social determinants, and adverse childhood experiences in shaping mental health conditions such as schizophrenia, depression, and anxiety. **Methodology:** A systematic review was conducted using a Population, Intervention, Outcome framework. After applying strict inclusion and exclusion criteria, nine studies were selected. These studies were critically appraised using the Critical Appraisal Skills Programme Checklist and analysed for key themes. **Results:** Mental health outcomes are shaped by a complex interplay of genetic susceptibility, biological aging, socioeconomic inequalities, adverse childhood experiences, and social connectivity. Schizophrenia, depression, and cognitive decline are closely linked to genetic predisposition and aging processes, while structural disadvantages, early life trauma, and social isolation significantly heighten vulnerability, particularly among marginalised populations. **Strengths and Limitations:** This study employs a rigorous systematic review methodology with a comprehensive search strategy and a targeted adult demography in the United Kingdom, ensuring relevance and reliability; however, limitations include potential publication bias, a restricted time frame, subjectivity in study selection, and challenges in translating findings into clinical practice. **Recommendations:** A multidisciplinary approach integrating public mental health awareness, socioeconomic interventions, research innovation, and improved access to mental health services is essential for reducing disparities, enhancing early detection, and ensuring holistic, inclusive mental health care across diverse populations. **Conclusion:** Mental health outcomes result from a complex interplay of genetic predisposition, biological processes, and socioeconomic conditions. A holistic, interdisciplinary approach integrating healthcare, policy, and community support is essential for reducing disparities and improving mental health outcomes across the United Kingdom.

Keywords

Mental Health, Genetic Predisposition, Biological Aging, Social Determinants, Adverse Childhood Experiences (ACEs), Schizophrenia, Depression, Social Isolation, United Kingdom Mental Health Policy

1. Introduction

Mental health denotes a condition of psychological wellness that stimulates individuals to manage stress, recognise their abilities, learn effectively, work productively, and contribute to their

surroundings [1]. Furthermore, mental wellbeing encompasses the ability to build and maintain meaningful relationships, adapt to change, and regulate emotions, all of which support

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individual and communal decision-making and social engagement [2]. The above mentioned indicate that mental health is characterised by individuals' perceptions and emotions regarding themselves and their lives, influencing their coping mechanisms and management throughout challenges [3].

While mental health affects individuals across the lifespan, adulthood presents unique challenges influenced by life transitions, societal roles, and biological vulnerabilities [4]. Over the course of life, individual, cultural, and structural stability factors, in conjunction with biological and psychological variables such as emotional competencies, substance dependence, and hereditary traits, can either safeguard or jeopardise mental health, consequently impacting one's position on the spectrum of mental health [5]. Therefore, it is crucial to recognise that emotional and physical wellness are interconnected rather than autonomous [6]. Likewise, all mental health concerns must be assessed within a cultural and chronological framework, as should the societal constructs of childhood and adolescence [7]. The quality of an individual psychological wellness is influenced by distinct experiences and factors, familial interrelationships and circumstances, as well as the wider community in which they dwell particularly as they navigate the transition to later life stages [8].

Biological variables affecting psychological wellness include genetic susceptibility, neurochemical imbalances, and structural defects in the cerebral cortex [9]. The above variables may play a significant role in the development of mental health disorders such as anxiety, depression, and schizophrenia [10]. Genes are segments of genetic material that provide the instructions essential for constructing and sustaining the body, influencing different factors, including physical traits and vulnerability to diseases, such as mental disorders and psychiatric ailments [11]. Genetic factors substantially impact mental wellness by influencing brain activity, stress response, and the propensity for developing mental disorders [12]. Nevertheless, biological vulnerabilities alone cannot entirely clarify the mental health issues faced by individuals [13]. The socioeconomic drivers of health, such as socio-economic position, healthcare access, education, and interpersonal relationships, profoundly affect mental health outcomes [14]. [15] indicate that the interplay between social and biological variables frequently intensifies mental health issues.

The societal factors of mental state include socioeconomic elements experienced throughout life, such as money, employment, education, food security, dwellings, companionship, disparities, early hardship, and environment [23]. These variables profoundly influence psychological well-being outcomes and contribute to inequities both within and among groups [17]. Marginalised groups disproportionately experience mental illness, resulting in diminished life expectancy [18] and reduced quality of life [19]. Additionally, the intersection of economic instability, global conflicts, and racial bias further widens mental health disparities by exacerbating job insecurity, income inequality, and restricted access to essential resources such as housing, education, and food [20].

1.1. Rationale for the Study

Mental health is progressively acknowledged as indispensable aspect of global health, and its integration within the United Nations Sustainable Development Goals (SDGs) marks a significant advancement [21]. For the first time, global leaders have acknowledged that promoting mental health, alongside preventing and treating substance abuse, is integral to achieving positive societal outcomes [22]. The increasing recognition of global mental health challenges is underscored by the fact that approximately 1 billion people live with a mental health disorder, incurring substantial personal, societal, and economic costs, with lost productivity from depression and anxiety alone amounting to around US\$1 trillion annually [13]. Approximately 14% of individuals over the age of 60 experience a disorder worldwide [14]. The consistent rise in the population within this age demographic leads to a corresponding increase in the overall percentage of individuals experiencing mental illness [12].

The COVID-19 pandemic has intensified pre-existing mental health challenges in the United Kingdom [16]. Measures such as lockdowns, social estrangement, and recessions have notably worsened mental health issues, particularly among vulnerable populations, including adults [11]. In the United Kingdom, it is anticipated that 25% of individuals will experience a psychological condition each year, with 16.7% experiencing depressive or anxiety disorders in any given week [2]. Furthermore, around 551,000 individuals in Britain are affected by more severe mental health conditions, such as psychosis and bipolar disorder [7].

Diverse age demographics encounter specific mental health stressors, with adults, the elderly, and individuals in midlife each facing different pressures [18]. The aged demographic is susceptible to mental health issues, including dementia and depression, frequently intensified by social isolation and age-related physiological alterations [22]. Consequently, these individuals in the United Kingdom have significant obstacles to obtaining mental health care, exacerbated by isolation from society, economic uncertainty, and health-related concerns [20]. The disproportionate impact on vulnerable populations, including those from low socio-economic backgrounds and marginalized groups, emphasises the necessity for tailored mental health interventions.

1.2. Research Problem Statement

Notwithstanding considerable advancements in tackling mental health issues in the United Kingdom, substantial deficiencies persist in comprehending the interplay between biological and societal components that influence mental health outcomes [4]. Furthermore, the biological factors influencing the developmental processes that connect institutional and social variables to mental health have been predominantly underestimated until recently [15]. Moreover, despite the escalating global prevalence of mental health disorders, less than 2% of national health budgets are designated for mental health

services globally [16], and mental health is frequently regarded by policymakers and politicians as a low-priority concern [17]. A recent audit of mental health commitments indicated that, although a greater number of individuals are utilising psychological services compared to 2016, the goals of improving access and mitigating inequities remain unfulfilled [8]. The United Kingdom Social Care Green Paper and Mental Health Strategy 2017 emphasise the necessity of enhancing mental health services [22]; nevertheless, further inquiry is necessary to assess the impact of these policies on adult populations.

1.3. Aim of the Study

To investigate the interplay between psychological disorders, societal determinants, and biological or environmental factors, using evidence from contemporary research to inform strategies for integrated care, prevention, and improved mental health outcomes across adult populations in the United Kingdom.

1.4. Objectives of the Study

- 1) Analyse the influence of genetic, biological, and environmental risk factors, including Adverse Childhood Experiences (ACEs) and socioeconomic conditions, on mental health disorders such as schizophrenia, anxiety, depression, and dementia.
- 2) Examine how social determinants like employment, loneliness, and aging influence mental health outcomes, with a focus on gender and demographic differences.
- 3) Recommend integrated care strategies that address both social and biological determinants to enhance mental health impacts and mitigate disparities.

1.5. Research Questions

- 1) How do social determinants and biological factor influence mental health outcomes in adults, particularly in relation to depression, anxiety, and cognitive deterioration?
- 2) What is the combined impact of biological and social variables on the mental health of older adults, and how can interventions address these?
- 3) What are the interactions between biological changes in aging and social factors in shaping the mental health of older adults?

1.6. Justification of the Study

The incidence of mental disorders is steadily escalating globally, including the United Kingdom [20]. Mental diseases significantly reduce quality of life and incapacitate affected individuals, while also resulting in considerable economic and healthcare costs [21]. The anticipated economic burden of mental illness in England was projected at £300 billion in 2022, nearly double the NHS budget, partly due to substantial

reductions in worker productivity and tax revenues stemming from economic inactivity [22]. In 2022, the incidence of depression and stress among adults was significantly elevated, with 51% and 19% of the population, correspondingly, reporting these symptoms [23]. In Great Britain, around 875,000 individuals aged 18 and older reported feeling employment-related anxiety, depression, or stress between 2022 and 2023, denoting the second-highest documented level since 2008.

The National Service Framework for Mental Health [15] was a foundational policy aimed at enhancing mental health care through cohesive and effective service delivery [6]. The Mental Health Act [7] established a legal framework for treating and safeguarding individuals with severe conditions, particularly those requiring compulsory care [16]. The No Health Without Mental Health [19] strategy reinforced parity between psychological and physical well-being, advocating early intervention, recovery, and stigma reduction [20].

More recently, the Five Year Forward View for Mental Health [21] set strategic goals for expanding service access and integrating psychological and physical well-being [22]. The NHS Long Term Plan [23] prioritises community-oriented psychological care, crisis service expansion, and early intervention for at-risk groups [14]. Workplace-focused initiatives like Thriving at Work [5] address mental health in employment by reducing stigma and strengthening support for employees [21].

This research aims to explore the biological and social factors that affect mental health among adults in the United Kingdom, thereby offering significant insights into the fundamental determinants of mental health outcomes. This will guide public health initiatives aimed at fostering equality, resilience, and social cohesion, while also tackling the urgent requirement for enhanced prevention and management approaches for mental health challenges [7].

This study ensures to enhance the existing knowledge base by pinpointing the fundamental causes of mental health disparities, assessing the effectiveness of current policies, and suggesting novel approaches to alleviate the considerable economic, social, and healthcare challenges linked to mental illnesses.

2. Literature Review

This section reviews the social and biological determinants models of mental health, exploring their combined impact on well-being. It highlights key influences, identifies research gaps, and examines their implications for policy and practice.

2.1. Overview

Psychiatry has encountered renewed demands for the incorporation of phenomenology to improve comprehension of the causality, evaluation, and treatment of neurological conditions [18], notwithstanding the extensive implementation of the bi-

opsychosocial model, which highlights the interaction of societal, biological, circumstantial, and psychological influences in mental health concerns [23].

Research frequently emphasises specific determinants, including genetic risk factors, population subgroups, or individual characteristics, while neglecting the wider context [20]. Therefore, an integrated approach that incorporates key biological, psychological, and social determinants, alongside themes like the life cycle framework, is essential for developing tailored, person-centred strategies. This study aims to explore the role of biological and social factors in mental health among adults in the United Kingdom, highlighting the importance of the biopsychosocial model.

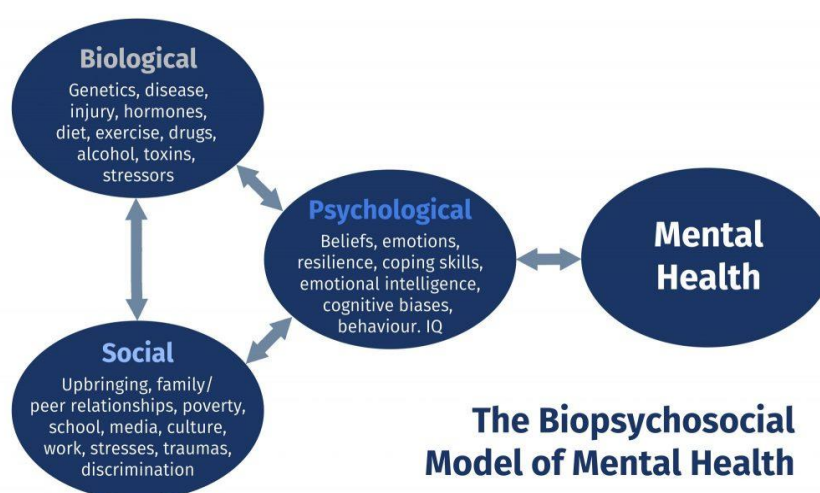


Figure 1. Biopsychosocial Model of Mental Health [13].

2.3. Biological Determinants

Biological factors, encompassing genetic traits and physiological structures passed down from parents, significantly influence mental health [14]. Age serves as a crucial biological factor, increasing the risk of cognitive deterioration, depression, and a variety of mental health disorders, stemming from physiological changes that reduce efficiency and lead to an array of illnesses [15].

In addition to aging, gender differences in biological markers have also been observed in mental health disorders [5]. Women with depression show significantly higher levels of neurotrophic, inflammatory, and serotonergic markers compared to men, indicating distinct biological responses to mental health conditions [5]. These outcomes indicate that biological sex may influence susceptibility to depression and the way psychological disorders manifest in adulthood.

The present study seeks to address these shortcomings by investigating the interplay between aging markers, inflammation, and genetic factors in shaping mental health outcomes in adults. By integrating these biological processes, the research

2.2. Biopsychosocial Model

The biopsychosocial approach provides an extensive framework for comprehending adult mental wellness, incorporating social, psychological, and biological elements to enhance diagnostic and therapeutic strategies [21]. The biopsychosocial framework incorporates various factors influencing mental well-being, such as genes, infections, physical traumatic events, diets, steroids, and environmental pollutants [22]. This complexity underscores the necessity for enhanced enquiries to comprehensively understand how these factors interconnect and influence mental health across adult demographics.

seeks to provide an exhaustive comprehension of their collective impact on mental well-being and inform personalized mental health interventions.

2.4. Socioecological Determinates

The development of psychological condition is influenced by a multifaceted interaction of personal and environmental elements across different socio-ecological tiers [22]. The socio-ecological paradigm for emotional well-being posits that an individual's wellness is influenced not solely by personal traits and psychological elements but also by their interpersonal relationships, community dynamics, and the wider societal framework [22]. Liu et al. [6] propose that environmental factors considerably impact the psychological implications for young adults, functioning across multiple tiers and within diverse environments.

Hence, it is proposed that environmental factors, especially those at the family and individual levels, play a crucial role in determining mental health outcomes, while social and community influences are also significant contributors to the overall well-being of young adults. Comprehending these socio-

ecological dynamics is crucial for formulating interventions

designed to enhance mental health, particularly among adults.

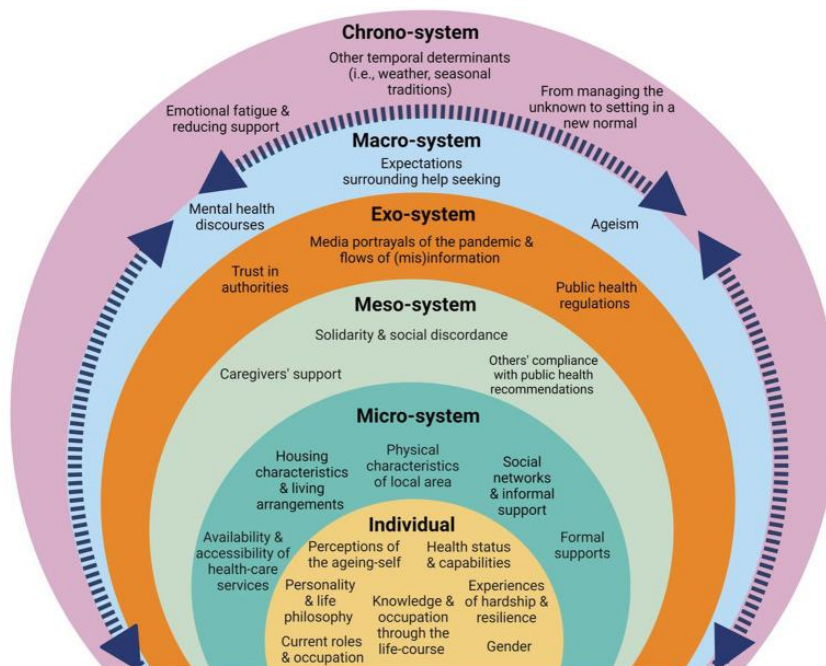


Figure 2. Socioecological Determinates of Mental Health [21].

2.5. Social Determinates

The likelihood of developing any mental health condition is fundamentally connected to life circumstances [22]. Allen et al. [23] utilised a multilevel life-course framework, emphasising the influence of social determinants from prenatal stages to old age, as well as community and national contexts, on disadvantaged populations. They observed accumulated stress and deteriorating physical function as mediators in the relationship between these determinants and mental disorders. [1] Allen, J., Balfour, R., Bell, R., & Marmot, M. [4]. Social determinants of mental health. *International Review of Psychiatry*, 26(4), 392–407.

Additionally, community-level factors, including urbanisation and neighbourhood security, exert an influence on mental health outcomes, with research depicting that there are elevated rates of mental health disorders in rural areas in comparison to urban settings [5]. Elements such as population size and social security have been demonstrated to affect mental health, with individuals residing in unsecured neighbourhoods or areas of a high density of people indicating elevated levels of depression. [1] Robinson, E., Oakes, J. M., & Capistrant, B. D. [7]. Rural-urban differences in depression prevalence: A national study. *Journal of Rural Mental Health*, 41(3), 189–199. [2] Cain, A., Wallace, R., & Hayes, S. [4]. Neighbourhood safety, social cohesion and depression: A multilevel analysis. *Social Psychiatry and Psychiatric Epidemiology*, 52(8), 941–950.

This review emphasizes the intricate relationships between psychological, biological, and social factors in mental health. While research has focused on individual determinants, there is a lack of comprehensive studies examining their combined effects. Further investigation is needed to understand how social and biological factors influence mental health over time, which could inform more effective, holistic interventions.

3. Research Framework

The study will utilise the Population/Problem/Patient; Intervention/Issue; Outcome (PIO) framework, as illustrated in Table 1, to formulate the research question. The PIO approach is acknowledged for its methodical implementation in evidence-based practice, aiding in the development of precise and targeted research questions for literature review, thus mitigating difficulties in locating pertinent resources and executing an effective evidence search [19]. Furthermore, an effectively formulated research question includes detailed elements concerning the population, intervention, and anticipated outcomes [10]. By employing the PIO framework, the study can accurately identify and clarify the key concepts required for developing a strong search strategy and gathering evidence [11].

In accordance with the above justification, this study adopts a research question aligned with the PIO framework, facilitating a thorough investigation of how biological and social determinants impact mental health outcomes among adults in the United Kingdom. Bergus et al. [22] emphasised that enquiries

characterised by well-defined intervention and outcome parameters are more likely to yield successful answers. Consequently, the implementation of the PIO framework guarantees that the research question remains concentrated and pertinent to clinical practice, facilitating the search for relevant evidence and directing the overall research methodology.

Table 1. *Pio framework of the study.*

Population	Adults living in the United Kingdom
Intervention	Exploration of biological and social determinants of mental health
Outcome	Psychology outcomes such as the prevalence and severity of conditions like anxiety, depression, and other mental health disorders

3.1. Research Approach

The systematic review methodology offers a thorough, clear, and replicable framework for investigating the biological and social determinants of mental health in the United Kingdom [13]. The systematic review facilitates a thorough identification and synthesis of pertinent literature, providing more profound insights compared to individual studies [14]. Consequently, it is instrumental in comprehending the effects of social and biological factors.

This study employs the PICO framework to improve the selection of studies, elevate critical assessment, and guarantee systematic synthesis of data [22]. Through the preservation of methodological precision [16], this approach enhances evidence-based practice and guides the formulation of mental health policy [17].

3.2. Research Strategy

The methodology utilised for the systematic review involves executing a literature search process that is essential to scientific inquiry and considerably contributes to evidence-based practice, where decisions are guided by the most trustworthy evidence accessible [15].

The primary aim of conducting a literature search in this study is to gather data for the development of guidelines based on evidence, which represents a crucial step in the research methodology and supports academic assessment [18]. Moreover, A thorough literature review helps formulate the research question, identify gaps, and shape the methodology by addressing confounding factors and constraints [10]. Furthermore, the review guarantees that the research complies with stringent methodological standards by conducting a comprehensive analysis of pertinent evidence [11]. This review focusses on the process of literature searching, with particular attention to the development of search strategies typically utilised in systematic reviews [22].

The search strategy incorporated the following key terms:

"Mental health" OR "Psychological health" AND "Hereditary" OR "Biological" AND "Social" OR "Environmental" AND "Adults" OR "Elderly" AND "United Kingdom."

3.3. Eligibility Criteria

3.3.1. Inclusion Criteria

The criteria for inclusion establish the basis for identifying studies deemed pertinent for a systematic review [13]. The criteria consider various aspects, including the study's relevance to the research question, its design, the target population, language, time frame, and geographic location [10]. The review specifically aimed to identify studies that focused on adults residing in the United Kingdom, published in English, and conducted within the last decade, spanning from 2015 to 2025.

A preliminary search of the study yielded 42,039 articles, which were subsequently refined by implementing a 10-year publication filter [15], resulting in a narrowed total of 32,415 articles. The application of language restrictions (English) subsequently diminished the total to 32,190. Subsequently, age group filters were implemented, narrowing the selection to studies that focused on adult or elderly populations, resulting in a total of 5,442 studies. The application of geographic filters to focus on studies from the United Kingdom further narrowed the total to 3,567. After conducting a comprehensive examination of the titles, 77 papers were chosen for abstract analysis, resulting in the selection of 30 studies for an in-depth review. Following the application of stringent inclusion criteria, nine studies were identified as the most pertinent for this investigation, thereby guaranteeing that the chosen literature was of superior quality and closely aligned with the research objectives.

3.3.2. Exclusion Criteria

The exclusion criteria play a vital role in preserving the integrity of a systematic review by eliminating studies that fail to meet the necessary standards or relevance [17]. Factors including insufficient reporting, unrelated population, or publication beyond the specified time frame [20] were excluded from the study [22]. Additionally, studies conducted in languages other than English are omitted because of possible difficulties in maintaining uniform quality and interpretation [15]. This process further aids in recognising research gaps, highlighting areas where further studies or evidence might be required [10].

3.3.3. Data Extraction

The research followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Flow Chart (PRISMA) guidelines, thereby improving the transparency and rigorousness of systematic reviews [1]. The PRISMA flow diagram served to illustrate the various stages of the review process, encompassing record identification, screening,

inclusion, exclusion, and the rationale for exclusions to enhance both the reproducibility and transparency of the review process [22].

3.3.4. Ethical Consideration

Research ethics guarantees credibility, accountability, and respect for those who participate in studies, while fostering appropriate data management, utilisation of resources, and forthright publication of findings to safeguard individual and society welfare [13]. Maintaining ethical standards is essential

in conversations regarding psychological health and the social and biological ramifications of research, especially considering swift technological progress and heightened public scrutiny in areas such as biological sciences, genealogy, and artificial intelligence [14]. Informed permission guarantees that participants willingly partake in research with comprehensive understanding of its aims, risks, and advantages, while secrecy protects their personal data [15]. Furthermore, the tenets of non-maleficence and beneficence necessitate that researchers reduce damage and enhance benefits, thereby cultivating trust and ethical integrity [16].

3.4. Preferred Reporting Items for Systematic Reviews and Meta-analyses Flow Chart (PRISMA) of the Study

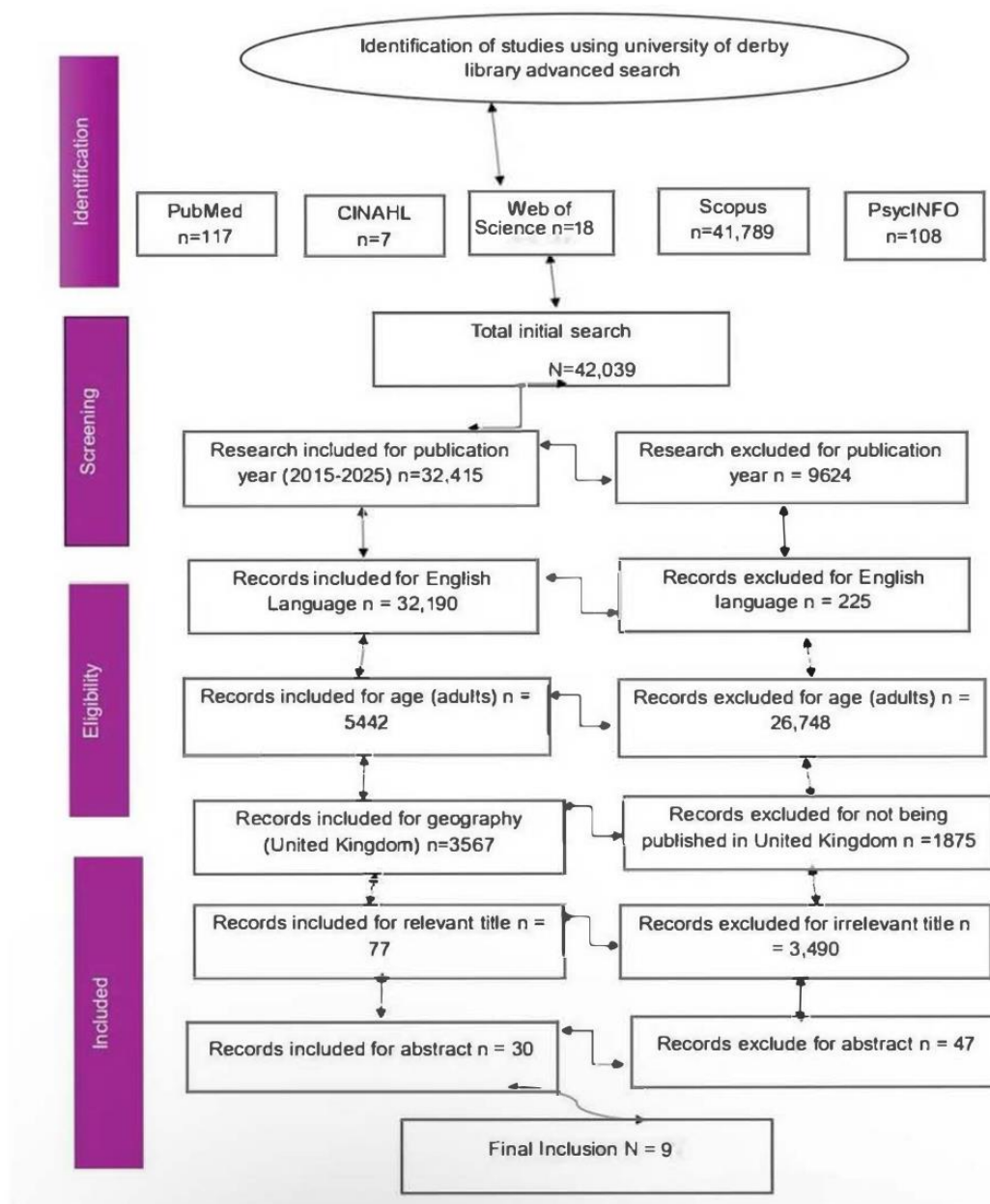


Figure 3. Prisma flow chart of the selected study.

3.5. Characteristics of the Selected Papers

NO	NAME OF AUTHOR AND YEAR	DEMOGRAPHICAL SIZE	OBJECTIVES	STUDY DESIGN	LOCATION	RESULT
1	(Mulugeta <i>et al.</i> , 2023)	337,484 unrelated white British participants from the UK Biobank.	To investigate the causal relationships between schizophrenia genetic risk scores (GRS) and various disease outcomes using Mendelian randomisation and phenome-wide association studies (PheWAS) in the UK Biobank cohort.	Retrospective cohort study	United Kingdom	The study identified significant associations between schizophrenia GRS and multiple disease outcomes, including diabetes and cardiovascular disorders, providing insights into potential causal pathways.
2	(Gao <i>et al.</i> , 2023)	424,299 participants from the UK Biobank cohort,	To explore the link between advanced biological aging and depression/anxiety to improve risk assessment and identify intervention targets.	Longitudinal cohort study	United Kingdom	Advanced biological aging was linked to a higher risk of baseline and incident depression/anxiety, with PhenoAge showing stronger associations, and individuals with high genetic risk and advanced biological aging were 2.5 times more likely to develop these conditions.
3	(Potter, Bridger and Drewelies, 2024)	The population size for the study is 2022 participants, with a mean age of 55 years (range: 33-84 years).	To explore the influence of adverse childhood experience on daily health and well-being dynamics among middle-aged and older adults.	Longitudinal cohort study	United Kingdom	Higher ACEs were linked to diminished positive affect, elevated negative affect, and heightened emotional reactivity to daily health challenges.
4	(McAneney <i>et al.</i> , 2015)	Stratified random sample of 1,209 adults from East Belfast.	To examine the associations between individual factors	cross-sectional study	United Kingdom	The study found that factors like age, relationship status, self-rated

			and neighbourhood social environment with mental health and mental well-being, comparing these relationships across different levels of neighbourhood deprivation.			health, and neighbourhood satisfaction explain a significant portion of differences in people's mental health and well-being
5	(Giannelis <i>et al.</i> , 2020)	502,682 participants from the UK Biobank	The aim is to explore the association between family status (e.g., having children, being in a relationship) and the risk of depression, as well as to investigate potential causal links using genetic data through Mendelian Randomization (MR).	Prospective Cohort Study Design	United Kingdom	Individuals without close familial ties had a higher risk of depression, with genetic predispositions partially influencing this association.
6	(Pascalidis and Bathelt, 2024)	The final sample size of the study consisted of 962 participants after excluding 56 participants based on attention-check failure.	To investigate the associations between loneliness, social anxiety, and depression through network psychometric analysis and identify influential factors within these constructs.	Cross-Sectional Observational Study with Psychometric Analysis	United Kingdom	The study found that loneliness, social anxiety, and depression were strongly related to factors such as age, mental health diagnoses, and self-reported levels of social connectedness.
7	(Echegut, Shoham and Mukadam, 2022)	413,545 participants	To examine the relationship between loneliness and all-cause dementia	prospective cohort study	United Kingdom	Loneliness significantly increased the odds of developing dementia, with a small mediating effect of unhealthy

						lifestyles and hypertension.
8	(Johns <i>et al.</i> , 2025)	39,955 participants from the UK Biobank dataset, aged 40–69 years.	To investigate the association between depression scores and cortical brain volumes, accounting for sociodemographic and socioeconomic factors.	Cross-sectional study	United Kingdom	Higher depression scores were significantly associated with reduced cortical volume in specific brain regions, with the precentral gyrus showing the strongest association after adjusting for education and income.
9	(McClelland, Evans and O'Connor, 2022)	The study included 582 adults aged 18 to 70, with a mean age of 26.96 years, predominantly female (73.39%).	The study aimed to investigate the relationship between different forms of loneliness and self-injurious thoughts and behaviors, focusing on the mediating role of depression and the moderating role of loneliness	Quantitative, cross-sectional survey study	United Kingdom	The results showed significant associations between loneliness, depression, and suicidal ideation, with depression mediating the relationship between loneliness and suicidal thoughts, but no evidence of loneliness moderating defeat and entrapment.

Figure 4. Characteristics of the selected studies.

3.6. Biological Factors: Genetic and Aging Influences on Mental Health

Biological factors, such as genetic predisposition [17] and biological aging [18], play a crucial role in the advancement of psychological disorders. The two reviewed studies have provided significant insights into these factors: Mulugeta, Suppiah, and Hyppönen [19] examined the genetic risks associated with schizophrenia and their correlation with other health conditions, while Gao et al. [10] investigated the role of accelerated biological aging in increasing the risk of depression and anxiety.

Mulugeta, Suppiah, and Hyppönen [11] focused on the genetic risk factors associated with schizophrenia, exploring how these genetic factors correlate with other health conditions. Using PheWAS and Mendelian randomisation analysis, their study found significant associations between schizophrenia and conditions such as diabetes mellitus (OR = 1.30, 95% CI: 1.20–1.42, $p = 1.8 \times 10^{-4}$), cardiovascular diseases (OR = 1.18, 95% CI: 1.10–1.28, $p = 2.2 \times 10^{-3}$), and psychological conditions (OR = 1.45, 95% CI: 1.30–1.61, $p = 7.5 \times 10^{-5}$). The Mendelian randomisation analysis confirmed a causal relationship, particularly concerning mental health disorders (OR = 1.50, 95% CI: 1.30–1.70, $p = 8.2 \times 10^{-5}$).

Gao et al. [12] investigated how biological aging, distinct from chronological age, influences the advancement of anxiety and depression in adults. Gao et al. [13] research demonstrated that accelerated biological aging is significantly linked to higher risks of both depression ($\beta = 0.15$, $p = 0.02$) and anxiety ($\beta = 0.18$, $p = 0.03$) in midlife and older adults. These findings emphasize the relevance of considering biological age alongside chronological age when assessing mental health risks in older populations. Together, these studies illustrate how both genetic factors and biological aging facilitate the advancement of mental health issues.

4. Discussion and Overview

4.1. Socioeconomic and Social Determinants of Mental Health

The study by John et al. [14] explores the interplay between depression, brain structure, and socioeconomics. Revealing that elevated depression scores were correlated with diminished cortical volume in 34.78% of brain regions, including the precentral gyrus, postcentral gyrus, and angular gyrus. However, when socioeconomic determinants including educational attainment and economic status were introduced into the model, these relationships persisted only in the precentral gyrus ($b = 43.96$, $p < 0.001$). Gender differences were notable: for females, the association remained significant in the precentral gyrus, while for males, the precentral gyrus and frontal pole exhibited persistent associations. This study highlights

the moderating role of socioeconomic status, emphasizing how education and income can influence the relationship between brain structure and depression.

The study by McAneney et al. [15] examined the role of social capital, employment, and community settings in mental health outcomes across varying levels of neighborhood deprivation. Social capital emerged as the strongest predictor of mental health ($\beta = 0.45$, $p < 0.01$), with higher levels correlating with improved mental health outcomes. Employment ($\beta = 0.28$, $p = 0.02$) and age ($\beta = 0.18$, $p = 0.02$) also played significant roles, while marital status showed no significant impact ($\beta = 0.08$, $p = 0.17$). The study explained 43% of the variance in mental health ($R^2 = 0.43$) and confirmed the importance of fostering strong social networks and economic stability to improve psychological well-being, particularly in deprived areas.

The study by Giannelis et al. [16] investigated the interplay between family structure, cohabitation status, and lifetime depression. The findings indicated that individuals not cohabiting with a partner had higher odds of severe (OR = 1.29, $p = 0.002$) and current depression (OR = 1.34, $p = 0.002$). Parenthood, particularly having multiple children, was linked to heightened probabilities of lifetime depressive disorders, accompanied by an adjusted odds ratio of 1.36 (95% CI: 1.14–1.62) for those with three children. Sensitivity and Mendelian randomization analyses supported the correlation between a higher number of children and increased depression risk (OR = 1.98, $p = 0.005$). Although cohabitation appeared to reduce depression risk, this association was not statistically significant (OR = 0.77, $p = 0.498$). These studies emphasize the impact of social factors like socioeconomic status, social capital, employment, and family dynamics on mental health.

4.2. Impact of Adverse Childhood Experiences (Aces) on Emotional and Physical Health

The study by Potter, Bridger, and Drewelies [17] examines how adverse childhood experiences (ACEs) influence emotional and physical health in adulthood. Higher ACE scores are associated with more negative emotions (NA: $\beta = 0.15$, $p < 0.01$) and lower positive emotions (PA: $\beta = -0.12$, $p < 0.05$). ACE components like parental divorce, emotional neglect, and financial distress were found to significantly affect both PA and NA. Specifically, parental divorce increased NA ($\beta = 0.18$, $p < 0.05$) and decreased PA ($\beta = -0.14$, $p < 0.05$), while emotional neglect had stronger effects on both (NA: $\beta = 0.22$, $p < 0.01$; PA: $\beta = -0.20$, $p < 0.05$). ACEs were also linked to physical symptoms ($\beta = 0.20$, $p < 0.01$), with older adults reporting lower PA ($\beta = -0.10$, $p < 0.05$) and higher NA ($\beta = 0.12$, $p < 0.05$). Chronic conditions and poor self-reported health were associated with increased physical symptoms ($\beta = 0.18$, $p < 0.01$) and NA ($\beta = 0.20$, $p < 0.01$). These findings highlight the long-lasting effects of ACEs on emotional and physical health, emphasizing the need for targeted interventions to ad-

dress these impacts, especially those related to parental divorce, emotional neglect, and financial distress.

4.3. The Role of Social Connectivity and Mental Health

The study by Pascalidis and Bathelt [18] investigated the prevalence of loneliness, social anxiety, and depression across different demographics. The results showed that a significant portion of participants reported high levels of loneliness (60.91%). Social anxiety and depression scores were also elevated in individuals with mental health diagnoses. Notably, men had higher loneliness scores than women (mean for males = 48.8, $p = 0.02$), and younger individuals exhibited elevated scores across the board ($p < 0.001$). The study underscored the need for interventions tailored to specific groups, including those with mental health diagnoses to reduce the adverse impact of social isolation.

Similarly, Echegut, Shoham, and Mukadam [19] highlighted the role of loneliness in the progression of dementia, demonstrating that loneliness was a significant predictor of dementia risk ($HR = 1.5$, $p = 0.02$). For those aged 65 and older, the association was even stronger ($HR = 1.8$, $p = 0.01$). Depressive symptoms were found to partially mediate this relationship ($p = 0.04$), suggesting that the interplay between social exclusion and psychological disorders may elevate the risk of cognitive impairment.

In a study focused on loneliness and self-injurious behaviour, McClelland, Evans, and O'Connor [10] found that loneliness, particularly family and social loneliness, strongly correlated with suicidal ideation ($r = 0.54$, $p < 0.001$). Loneliness was also a significant predictor of suicidal thoughts ($\beta = 0.53$, $p < 0.001$), with depression playing a mediating role in this relationship. These findings emphasize the vital role of social connectedness in mental health and the importance of addressing loneliness as part of suicide prevention efforts.

These studies highlight how social connectivity affects mental health, with loneliness, social anxiety, and depression often exacerbating each other. Interventions should address these social factors, especially for vulnerable groups like younger individuals, men, and those with pre-existing conditions.

4.4. Theme One: Biological Factors: Genetic and Aging Influences on Mental Health

The research conducted by Mulugeta et al. [21] and Gao et al. [12] offers essential insights into the molecular foundations of mental health, specifically concerning schizophrenia. Mulugeta et al. [13] emphasise the interrelation of genetic risk factors for schizophrenia and their consequences for overall health outcomes. They reveal substantial correlations between schizophrenia and other comorbidities, including diabetes mellitus, cardiovascular illnesses, and psychosocial disorders.

Schizophrenia is recognised as a highly heritable disorder,

with heritability estimates between 65% and 80% [14]. The genetic framework of schizophrenia is complex, comprising rare risk alleles with minimal individual impact estimates [15]. Genome-wide association analyses have found around 20 prevalent risk alleles strongly linked to schizophrenia [16]. Owen [17] emphasises that these alleles collectively enhance the overall genetic susceptibility to schizophrenia, further illustrating the disorder's non-Mendelian and polygenic characteristics.

Antidepressants have been demonstrated to decrease elevated levels of cytokines [18]. Oxidative stress has been proposed to initiate an interconnection between the immunological and central nervous systems inside the human body, which may affect emotional wellbeing [19]. The overproduction of reactive oxygen species (ROS) can result in cell destruction and modifications of macromolecule biosynthesis, which are subsequently linked to the emergence of ageing phenotypes [10].

4.5. Theme Two Socioeconomic and Social Determinants of Mental Health

According to the reviewed study by John et al. [11], McAneney et al. [12] and Giannelis et al. [13], mental health conditions are shaped by biological, psychological, socioeconomic, and environmental factors, with structural inequalities and stressors intertwining with personal circumstances to determine the prevalence and impact of depression.

John et al. [14] emphasize how variations in brain structure are not only determined biologically but also affected by external factors like socioeconomic conditions and gender disparities. These findings suggest that managing mental health outcomes requires a focus not only on individual-level interventions but also on systemic factors that contribute to inequalities in access to healthcare and therapy.

Research has critically examined the importance of social capital in mental health, with McAneney et al. [15] asserting that in disadvantaged regions, robust social networks and economic stability operate as protective factors against adverse mental health outcomes. This corresponds with Giannelis et al. [16], indicating that the familial environment is a crucial factor influencing mental health. Their research indicates that those without a partner or residing in households with more than one child are at a greater risk of depression. Their findings emphasise that it is not solely the existence or absence of a spouse or children, but the quality of such interactions that impacts mental health outcomes.

4.6. THREE: Impact of Adverse Childhood Experiences (Aces) on Emotional and Physical Health

The research conducted by Potter, Bridger, and Drewelies [17] emphasises the enduring impact of Adverse Childhood Experiences (ACEs) on emotional and physical health in

adulthood. Individuals with elevated ACE scores have heightened negative emotions (NA) and diminished positive emotions (PA), with divorce from parents and neglect of emotions exerting a substantial influence, particularly emotional neglect, which amplifies NA and reduces PA. ACEs were correlated with an increase in physical symptoms, suggesting that early trauma impacts psychological and physical well-being, with these effects exacerbating over time. This underscores the necessity for interventions that simultaneously target emotional and physical health in persons with elevated ACE scores.

The life pathway perspective is a critical theoretical framework for understanding how childhood adversities shape health outcomes across the lifespan [16]. Early experiences of adversity can lead to cumulative damage over time, which may manifest in poorer health outcomes in adulthood [13]. This process can also be understood through the concept of biological embedding, where early adversities become ingrained in the body during sensitive developmental periods, affecting health trajectories throughout life [20].

The study highlights the lasting effects of ACEs on physical and emotional health through biological and psychological mechanisms. Early interventions during critical developmental periods are crucial to mitigating long-term impacts. Future research should focus on minimizing the negative health consequences of early adversities.

4.7. Theme Four the Role of Social Connectivity and Mental Health

Social connectedness is essential for mental health throughout life, with loneliness and isolation shown as major determinants for multiple negative consequences [14]. The analyzed research emphasizes that these factors disproportionately affect older persons, exacerbating their susceptibility to psychological and cognitive issues.

Pascalidis and Bathelt [12] established a high correlation between loneliness, depression and anxiety, especially in persons with pre-existing mental health disorders. The study

identified a higher prevalence of loneliness among men and younger adults; nonetheless, its importance for older adults is unambiguous. Echehut, Shoham, and Mukadam [13] similarly discovered loneliness as a predictor of dementia, especially among elderly persons. Depressive symptoms mediated the correlation between solitude and dementia risk, indicating that early interventions addressing loneliness and depression may alleviate cognitive impairment in this demographic.

Similarly, solitude has been correlated with elevated levels of pro-inflammatory indicators in the body, including C-reactive protein and prolonged inflammation is associated to various psychological conditions such as dementia, depression, and anxiety [22]. Inflammation embodies the body's inherent reaction to physical trauma, such as a laceration or similar injury. This biological response serves to safeguard against infection while also facilitating the healing process [20]. From an approach of evolution, it is logical that inflammation rises during periods of mental fatigue, as stress frequently coincides with physical injury [23]. While modern cognitive and social stressors, including loneliness, may not directly result in physical harm, they do initiate the activation of the hypothalamic-pituitary-adrenal (HPA) axis and the motor nervous system [19]. The persistent over-activation of these processes may lead to immune instability, manifesting as chronic low-grade inflammation [21]. The previously mentioned condition has been linked with various adverse health outcomes, including cardiopulmonary disease [20], Alzheimer's disease, and cancer [15], among others. The phenomena in question highlight the Evolutionary Theory of Loneliness as posited by Cacioppo and Cacioppo [22], which suggests that immune dysregulation induced by stress accounts for the relationship between loneliness and inflammation.

The study highlights the impact of social isolation and loneliness on mental health in old age, linking them to depression, dementia, and suicidal ideation. Early, tailored interventions promoting social engagement, emotional support, and physical activity can enhance cognitive health and overall well-being.

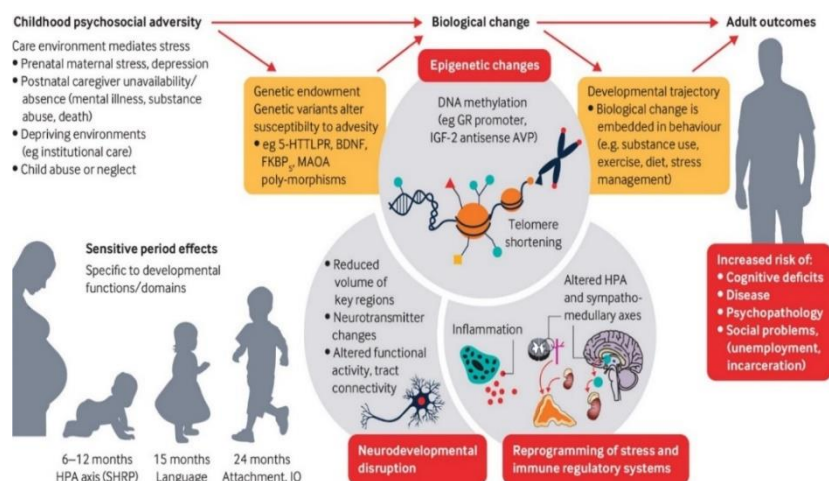


Figure 5. Interplay of Biological, Social, Epigenetic, and Psychological Determinants in Mental Health Outcomes [15].

4.8. Integrated Discussion on Genetic, Biological, and Socioeconomic Factors in Mental Health in the UNITED Kingdom

Mental health is shaped by genetic predispositions, biological mechanisms, and socioeconomic stressors, influencing the risk and severity of mental health disorders [23]. Tao et al. highlight that individual with a family history of conditions like depression, anxiety, or schizophrenia have a higher likelihood of experiencing these disorders, indicating a genetic component. However, genetic predisposition alone does not determine mental health outcomes; it interacts with biological processes, such as neurotransmitter imbalances [15], and socioeconomic conditions like stress, poverty, and trauma [6].

In the United Kingdom, policies must address the intersection of these factors. Socioeconomic deprivation amplifies mental health risks by exacerbating genetic vulnerabilities [9]. The NHS Long Term Plan [8] should evolve to integrate socioeconomic conditions alongside biological and clinical treatments. Incorporating elements like poverty, housing, and unemployment into policy frameworks would enhance support for at-risk populations [4].

Comparatively, the United States has prioritized social determinants of mental health by increasing Medicaid funding, enhancing crisis response systems like 988, and expanding transition services for psychiatric care patients [17]. Australia's National Children's Mental Health and Wellbeing Strategy [16] emphasizes early intervention, culturally inclusive support, and improved access to mental health services, particularly for First Nations communities. The United Kingdom can learn from these approaches by reinforcing policies like the NHS Long Term Plan and Suicide Prevention Strategy [12] to enhance crisis response and preventive care.

The United Kingdom's Mental Health (Discrimination) Act 2013 [23] and Suicide Prevention Strategy aim to reduce stigma and support ethnic minority and economically disadvantaged groups. These policies should further address socioeconomic inequities while considering genetic and biological factors holistically [14].

A life-course approach to mental health acknowledges that genetic vulnerabilities and socio-environmental disadvantages accumulate over time, complicating recovery. Policy frameworks should emphasize early interventions and long-term support for those facing persistent socioeconomic stressors. The NHS Long Term Plan [15] and PHE Strategy 2020-2025 [16] provide foundational interventions but must continue integrating strategies that address mental health determinants across the lifespan [17]. A proactive, integrated approach is essential to tackling the combined impact of genetic, biological, and socioeconomic factors in United Kingdom mental health policies.

5. Key Strengths and Limitations of the Study

The editorial process, as emphasized by Keserlioglu, Kilioglu, and ter Riet [18], plays a crucial role in ensuring that research articles deliver accurate, transparent, and comprehensive accounts of the studies conducted. A key component of this process is the recognition and discussion of both the limitations and strengths of research, which is essential for situating findings within the broader field [19].

Reflecting on the study's strengths and limitations demonstrates its scope and rigor while highlighting areas for improvement. This transparency enriches scholarly discourse, strengthens validity, and informs future research.

5.1. Strength

- 1) Systematic approach: The study adopts a systematic review methodology, regarded as the gold standard [18] for synthesizing evidence due to its transparency and thoroughness [21].
- 2) Comprehensive Search Strategy: One crucial strength of this study is its thorough and systematic approach to the literature search. By incorporating comprehensive databases, carefully chosen search terms, and Boolean operators, the study ensures a robust search process that captures a wide array of relevant studies [17]. A well-conducted search enhances understanding, identifies research gaps, and informs future studies, strengthening the study's depth and relevance [13].
- 3) High Relevance: The study's focus on a specific location and population ensures relevance, consistency, and reliability because it enables meaningful comparisons and systematic pattern identification [14].

5.2. Limitations

- 1) Potential Publication Bias: A constraint of this investigation is the exclusion of non-English-language studies, which may overlook valuable research and introduce language biases [17]. Studies in other languages might offer unique perspectives, and research suggests that publications in certain languages may report more positive results, potentially skewing the review's conclusions [16].
- 2) Limited Time Frame: Restricting studies to a specific time frame may exclude valuable older research that remains relevant and influential. Older studies provide foundational evidence and help avoid redundancy by acknowledging the strength of past work [17]. In systematic reviews, imposing arbitrary time limits undermines the goal of comprehensively gathering all relevant studies, as research does not lose validity over time [18].

3) Subjectivity in Study Selection: Even with clear inclusion and exclusion criteria, reviewer bias can arise due to subjectivity and human error, with personal knowledge or familiarity with the clinical area or study design potentially influencing inclusion decisions, thereby affecting the objectivity of the selection process [19].

4) Systematic Review: Despite the goal of systematic reviews to provide an objective, evidence-based synthesis [18] many fail to offer significant clinical value. It is estimated that over 90% of systematic reviews have limited clinical applicability, with some critics arguing that their proliferation contributes to research waste and a gravity train effect [18].

Implication of the study

This study provides substantial insights into the interplay between biological, genetic, and socioeconomic determinants of mental health. The findings have crucial ramifications for research, medical practice, and legislation development in the United Kingdom, underscoring the need for interdisciplinary strategies for psychotropic treatment and intervention.

1) Clinical Practice Implications

Healthcare professionals should integrate genetic risk assessments into routine mental health evaluations to facilitate early diagnosis and targeted treatment, incorporate aging-related interventions such as cognitive training [18] and physical activity programs [13] to address biological aging, and adopt a multidisciplinary approach involving mental health professionals, social workers, and primary care providers to offer holistic care that addresses both medical and socioeconomic factors.

2) Public Health and Policy Implications

Policymakers must integrate mental health considerations into broader health and social policies to address economic and social stressors, prioritise early intervention programs targeting children exposed to adverse childhood experiences (ACEs) to prevent long-term mental health complications, expand national awareness campaigns to reduce mental health stigma and encourage early help-seeking behaviours, and implement strategies for addressing socioeconomic disparities by improving access to housing, employment opportunities, and social support services.

Future Research Implications

1) Further longitudinal research is necessary to examine the causal relationships among biological ageing, genetic predisposition, and mental health outcomes, as it could identify and associate occurrences with specific conditions, while also elucidating these triggers in terms of existence, execution, and longevity. Further longitudinal research is necessary to examine the causal relationships among biological ageing, genetic predisposition, and mental health outcomes, as it could identify and associate occurrences with specific conditions, while also elucidating these triggers in terms of existence, execution, and longevity [1].

2) More research should focus on the efficacy of integrated psychological interventions that combine genetic risk assessment, biological monitoring, and socioeconomic support.

6. Recommendations

1) Health Education and Awareness

Policymakers should launch public awareness initiatives to mitigate stigma and enhance understanding of mental health conditions, particularly among ethnic minorities and socioeconomically disadvantaged populations, and integrate mental health literacy programs into school curricula and workplace policies to promote early recognition and intervention.

2) Enhancing Social and Economic Support Systems

Governments should strengthen social support networks through community engagement programs, especially targeting individuals experiencing loneliness and social isolation, and increase mental health-related financial assistance, including subsidies for therapy, medication, and housing support.

3) Research and Innovation in Mental Health

Researchers should encourage collaborative studies between geneticists, neuroscientists, and social scientists to explore the multi-faceted nature of mental health conditions and invest in technology-driven solutions such as telepsychiatry and AI-based diagnostic tools to improve mental health service delivery.

7. Conclusion

Mental health outcomes are shaped by a multifaceted interaction between genetic predisposition, biological processes, and socioeconomic conditions. Genetic vulnerabilities, combined with biological aging, increase susceptibility to disorders such as schizophrenia and depression, while adverse childhood experiences and economic deprivation further compound these risks. The study underscores the need for integrated policies and interventions that combine early screening, targeted socioeconomic support, and expanded mental health services.

Future efforts should focus on bridging the gap between research and practice, ensuring that scientific advancements in genetics, biology, and social sciences translate into effective interventions. Policymakers, healthcare providers, and researchers must collaborate to devise and execute targeted strategies that prioritize prevention, early detection, and comprehensive care. Only through such integrative efforts can society achieve meaningful improvements in mental health outcomes and foster resilience among vulnerable populations.

Author Contributions

Ugochi John Paul Agbo is the sole author. The author read

and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

References

- [1] Aartsen, M. and Jylhä, M. Onset of loneliness in older adults: results of a 28 year prospective study. *European Journal of Ageing*, 8(1), pp. 31–38. <https://doi.org/10.1007/s10433-011-0175-7>
- [2] Adela-Maria Isvoranu, Epskamp, S., Waldorp, L. J. and Borsboom, D. *Network Psychometrics with R*. Routledge eBooks. Informa. <https://doi.org/10.4324/9781003111238>
- [3] Advanced Search. University Librarian. University Librarian. Available at: <https://www.universitylibrarian.com/blog/advanced-search-operators/> [Accessed 18 Jan. 2025].
- [4] Affleck, W., Carmichael, V. and Whitley, R. Men's Mental Health: Social Determinants and Implications for Services. *The Canadian Journal of Psychiatry*, [online] 63(9), pp. 581–589. <https://doi.org/10.1177/0706743718762388>
- [5] Age UK. Hidden in plain sight The unmet mental health needs of older people. Available at: https://www.ageuk.org.uk/siteassets/documents/reports-and-publications/reports-and-briefings/health--wellbeing/rb_oct16_hidden_in_plain_sight_older_peoples_mental_health.pdf
- [6] Allen, J., Balfour, R., Bell, R. and Marmot, M. Social Determinants of Mental Health. *International Review of Psychiatry*, 26(4), pp. 392–407.
- [7] Almutairi, R., Alsarraf, A., Alkandari, D., Ashkanani, H., Albazali, A., Almutairi, R., Alsarraf, A., Alkandari, D., Ashkanani, H. K. A. H. A. and Albazali, A. Dissecting Through the Literature: A Review of the Critical Appraisal Process. *Cureus*, 16(5). <https://doi.org/10.7759/cureus.59658>
- [8] Amaro, H., Garcia, S., Arnaudova, I. and Jolles, M. P. Sociocultural Environments and Health Disparities Research. *The Science of Health Disparities Research*, pp. 77–93. <https://doi.org/10.1002/9781119374855.ch5>
- [9] Amaro, H., Sanchez, M., Bautista, T. and Cox, R. Social vulnerabilities for substance use: Stressors, socially toxic environments, and discrimination and racism. *Neuropharmacology*, 188(188). <https://doi.org/10.1016/j.neuropharm.2021.108518>
- [10] Amroussia, N., Gustafsson, P. E. and Mosquera, P. A. Explaining mental health inequalities in Northern Sweden: a decomposition analysis. *Global Health Action*, 10(1), p. 1305814. <https://doi.org/10.1080/16549716.2017.1305814>
- [11] Andrade, C. Sample Size and Its Importance in Research. *Indian Journal of Psychological Medicine*, 42(1), pp. 102–103. https://doi.org/10.4103/IJPSYM.IJPSYM_504_19
- [12] Andrade, C. The inconvenient truth about convenience and purposive samples. *Indian Journal of Psychological Medicine*, 43(1), pp. 86–88. <https://doi.org/10.1177/0253717620977000>
- [13] Anvari, F., Efendić, E., Olsen, J., Arslan, R. C., Elson, M. and Schneider, I. K.. Bias in Self-Reports: An Initial Elevation Phenomenon. *Social Psychological and Personality Science*, 14(6), p. 194855062211291. <https://doi.org/10.1177/19485506221129160>
- [14] Andrade C. The inconvenient truth about convenience and purposive samples. *Indian J Psychol Med*. 2021; 43(1): 86–8. <https://doi.org/10.1177/0253717620977000>
- [15] Anvari F, Efendić E, Olsen J, Arslan RC, Elson M, Schneider IK. Bias in self-reports: an initial elevation phenomenon. *Soc Psychol Personal Sci*. 2022; 14(6): 194855062211291. <https://doi.org/10.1177/19485506221129139>
- [16] Beck, T. W. (2013). The Importance of A Priori Sample Size Estimation in Strength and Conditioning Research. *Journal of Strength and Conditioning Research*, 27(8), pp.2323–2337. <https://doi.org/10.1519/jsc.0b013e318278ee40>
- [17] Behere, A. P., Basnet, P. and Campbell, P. (2017). Effects of Family Structure on Mental Health of children: A Preliminary Study. *Indian Journal of Psychological Medicine*, [online] 39(4), pp. 457–463. <https://doi.org/10.4103/0253-7176.211767>
- [18] Biazoli, C. E., Sato, J. R. and Pluess, M. (2024). Causal relationships in longitudinal observational data: An integrative modeling approach. *Psychological Methods*. <https://doi.org/10.1037/met0000648>
- [19] Bick, J., Zhu, T., Stamoulis, C., Fox, N. A., Zeanah, C. and Nelson, C. A. (2015). Effect of Early Institutionalization and Foster Care on Long-term White Matter Development. *JAMA Pediatrics*, [online] 169(3), p.8/211. <https://doi.org/10.1001/jamapediatrics.2014.3212>
- [20] Blackburn, E. H., Epel, E. S. and Lin, J. (2015). Human telomere biology: A contributory and interactive factor in aging, disease risks, and protection. *Science*, 350(6265), pp.1193–1198. <https://doi.org/10.1126/science.aab3389>
- [21] Boddie, K. (2024). *Determining if the 10% Rule is Satisfied When Sampling is Done Without Replacement*. Available at: <https://study.com/skill/learn/determining-if-the-10-rule-is-satisfied-when-sampling-is-done-without-replacement-explanation.html>
- [22] Bodeker, G., Pecorelli, S., Choy, L., Guerra, R. and Kariipanon, K. (2020). Well-Being and Mental Wellness. *Oxford Research Encyclopedia of Global Public Health*. <https://doi.org/10.1093/acrefore/9780190632366.013.162>
- [23] Braveman, P., Egerter, S. and Williams, D.R. (2011). The Social Determinants of Health: Coming of Age. *Annual Review of Public Health*, [online] 32(1), pp. 381–398. <https://doi.org/10.1146/annurev-publhealth-031210-101218>

Biography

Ugochi John Paul Agbo is a medical doctor and public health researcher based in the United Kingdom. He obtained a Master of Science degree in Public Health with distinction and has a strong academic and professional interest in mental health, social determinants of health, and health inequalities. His research focuses on the interaction between biological, genetic, and socioeconomic factors in shaping mental health outcomes among adult populations. He is particularly interested in evidence-based policy development, preventive mental health strategies, and population-level interventions aimed at reducing disparities and improving health equity.