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# Understanding the experience of adolescent depression:

## Qualitative studies with adolescents from Porto Alegre, Brazil

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*“I believe in the power and mystery of naming things. Language has the capacity to transform our cells, rearrange our learned patterns of behavior, and redirect our thinking. I believe in naming what’s right in front of us because that is often what is most invisible.”*

*(Eve Ensler)*

# ABSTRACT

Adolescence is a time of physical and psychosocial change, as well as a period of intense growth, learning, adaptation, and development. Nonetheless, the current conceptualization of depression in adolescence pays limited attention to important differences that might occur in terms of the manifestation of the disorder in this specific developmental stage. In this sense, the idea of understanding how adolescents experience depression arises as part of a broader scope to understand psychopathology, highlighting the need for exploring the complexities and subtleties of mental health disorders. Therefore, this dissertation has as main objective to contribute to the understanding of the experience of adolescent depression using qualitative methods. Two studies are here presented. The first aimed to understand adolescents' and other stakeholders' conceptualizations of depression, focusing on their accounts of how depression changed the lives of adolescents. This approach had as a goal to include different voices and points of view, aiming to gather a comprehensive understanding of the contextual factors of the environments of adolescents who suffered from depression. The second study explores adolescents' initial reactions after receiving a clinical diagnosis of Major Depressive Disorder. In this sense, we queried adolescents to explore the subjective experience of receiving the diagnosis, but also how this affects the contextualization of past experiences in light of this new diagnosis. Overarchingly, these studies present the vital role of interpersonal relationships in adolescent depression, recognizing the importance of impaired social functioning in depression. Finally, this dissertation contributes to addressing gaps in the contemporary literature about adolescent depression. It presents information on an understudied sample - Brazilian adolescents - and adds to a modest body of literature that uses qualitative methodologies as a powerful tool for building in-depth interpretations regarding how one interprets, understands, and shares their experiences.

**Keywords:** Adolescence. Major Depressive Disorder. Qualitative Research.

# RESUMO

A adolescência é um período de mudança física e psicossocial, além de um período de intenso crescimento, aprendizado e desenvolvimento. Entretanto, a conceitualização atual de depressão na adolescência dá pouca atenção às diferenças importantes que podem ocorrer em termos da manifestação do transtorno nesse estágio específico do desenvolvimento. Nesse sentido, a ideia de compreender como os adolescentes vivenciam a depressão surge como parte de um escopo mais amplo de compreensão da psicopatologia, destacando a necessidade de explorar as complexidades e sutilezas da vivência dos transtornos mentais. Portanto, esta dissertação tem como objetivo principal contribuir para a compreensão da vivência da depressão em adolescentes por meio de métodos qualitativos. Dois estudos são aqui apresentados. O primeiro teve como objetivo compreender as conceitualizações de depressão de adolescentes e outras partes interessadas, com foco em seus relatos de como a depressão mudou a vida dos adolescentes. Essa abordagem teve como objetivo incluir diferentes vozes e pontos de vista, visando reunir uma compreensão abrangente dos fatores contextuais dos ambientes de adolescentes com depressão. O segundo estudo explora as reações iniciais dos adolescentes após receberem um diagnóstico clínico de Transtorno Depressivo Maior. Nesse sentido, buscamos explorar a experiência subjetiva de receber o diagnóstico, mas também como isso afeta a contextualização de experiências passadas à luz desse novo diagnóstico. De maneira geral, esses estudos apresentam o papel vital das relações interpessoais na depressão na adolescência, reconhecendo a importância de prejuízos no funcionamento social na depressão. Por fim, esta dissertação aborda lacunas na literatura contemporânea sobre depressão na adolescência, apresentando informações sobre uma amostra pouco estudada - adolescentes brasileiros. Dessa forma, soma-se a um modesto corpo de literatura que utiliza metodologias qualitativas como ferramenta para construir interpretações aprofundadas sobre como adolescentes interpretam, compreendem e compartilham suas experiências.

**Palavras-chave:** Adolescência. Transtorno Depressivo Maior. Pesquisa Qualitativa.

# ABBREVIATIONS

| | |
|---|---|
| DSM | *Diagnostic Statistical Manual* |
| FGD | *Focus Group Discussions* |
| FA | *Framework Analysis* |
| HIC | *High Income Countries* |
| HiTOP | *Hierarchical Taxonomy of Psychopathology* |
| ICD | *International Classification of Diseases* |
| IDEA-RiSCO | *Identifying Depression Early in Adolescence Stratified Risk Cohort* |
| IPT | *Interpersonal Psychotherapy* |
| KII | *Key Informant Interviews* |
| K-SADS-PL | *Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version* |
| LMIC | *Low- and Middle-Income Countries* |
| MDD | *Major Depressive Disorder* |
| RDoc | *Research Domain Criteria Initiative* |
| WEIRD | *Western, Educated, Industrialized, Rich and Democratic societies* |

# SUMMARY

# 1 INTRODUCTION

When starting a research project, one of the first steps in scientific inquiry is to understand the phenomenon one wants to study. What is depression? One adolescent once said to me that he felt his depression was like a water jar with a leak - never full, always draining. The multiple meanings of depression - and questions surrounding its nature, and multiple senses - may be the most important to this work, since *"speech never has one single meaning, nor the word one single-use"* (1).

In this sense, the term *depression* can be understood, for instance, as a feeling or a clinical syndrome (2). Taken as a feeling, the term is frequently used as a synonym for sadness or low mood. As a clinical syndrome, it can be defined as "a serious medical condition in which a person feels very sad, hopeless, and unimportant and often is unable to live in a normal way" (3). Under this medical definition, depression has been predominantly used as a categorical concept: according to the Diagnostic Statistical Manual (DSM), fifth edition, *depressive disorder* is "the presence of sad, empty or irritable mood, accompanied by somatic and cognitive alterations that significantly impair the individual's ability to function" (4). According to the DSM, for a diagnosis of Major Depressive Disorder (MDD), five symptoms out of nine must be present for at least 2 weeks. These symptoms include a range of somatic, behavioral, cognitive, and affective indexes, and one of them needs to be either depressed/irritable mood or diminished interest or pleasure (4).

The International Classification of Diseases (ICD), in turn, also proposes that depression is characterized by “depressive mood (e.g., sad, irritable, empty) or loss of pleasure accompanied by other cognitive, behavioral, or neurovegetative symptoms that significantly affect the individual’s ability to function” (5). Most of its listed signs and symptoms are similar to the ones listed on DSM-5, with one additional criterion: hopelessness, a symptom in which one has negative expectations about the occurrence of valued outcomes, without perceiving the possibility of changing the likelihood of occurrence of these outcomes (6).

In the case of children and adolescents, these diagnostic criteria remain almost the same. However, irritable mood can substitute depressed mood as a cardinal symptom. Depression often starts during late adolescence and early adulthood (7), and irritability often co-occurs with low mood in youth with depression (8). Nonetheless, it is important to notice that all other criteria stay the same, even though, especially in adolescence, there is a co-occurrence of developmental tasks, and contextual events, that complexify how depression manifests itself in this age group (9).

Definitions are powerful, and the development of the criteria we now know as pertaining to depression follows a long tradition of scholars who have theorized about the categorization of mental disorders (10). While early categorizations lacked consensus and emphasized individual differences rather than commonalities in illnesses (11), it was only by the adoption of diagnostic operationalized criteria - i.e., a set of signs and symptoms designed to accurately identify as many people with the condition as possible (12) - that psychiatry was able to develop a standardized system of measurement (13).

The shift to a symptom-based model happened mostly through a novel approach concerned with the long need for increased validity and reliability of diagnoses (8). By eschewing the focus on the etiology of mental disorders, the descriptive and empirical definitions of the diagnoses made advances in different fields possible, enabling psychiatric epidemiology and reproducible research to flourish (11,13). While the roots of this movement can be traced to the beginning of the 20th century, finding resonance and weight with the work of Feighner and colleagues (14), the third edition of DSM, published in 1980 (DSM-III) (15), consolidated this paradigmatic change (11).

DSM-III formalized the introduction of standard procedures for diagnosing mental disorders, relying on specific criteria and thresholds for diagnoses (16). This paradigm shift was mostly driven by the need for operational criteria that were descriptive, explicit, and rule-driven, so assessments could be done reliably (17). More than addressing the reliability issue within psychiatry, the settlement of diagnostic criteria for mental disorders answered important questions that long threatened the area, such as the lack of progress in research, lack of estimates on national and worldwide prevalence of mental disorders, as well as the lack of standards for guiding treatment recommendations (17).

The adoption of this model of psychiatric classification diminished variations in prevalence estimates, facilitated the diagnostic processes, and provided a common language for the field (18). Nonetheless, this categorical understanding of mental health may not be as clear-cut as initially thought. The adoption of diagnoses based on the number of symptoms and level of impairment creates problems such as large heterogeneity between individuals diagnosed with the same condition, common co-occurrence among mental disorders (comorbidity), and creates a gap between patients who meet the threshold and those who do not, complicating research design, and clinical decision-making (19).

Some initiatives designed to address these issues gained attention in the last few years. Among them, the National Institute of Mental Health's Research Domain Criteria Initiative (RDoC) (20) and the Hierarchical Taxonomy of Psychopathology (HiTOP) (19) are approaches that aim to develop a framework for mental disorders in a dimensional fashion including information "from genomics and circuits to behavior and self-report" (20). These approaches are innovative but still rely on pre-specified measures as primary sources of information.

The settlement of diagnostic criteria was essential to define what we know today as depression, but at the same time, we should not limit our understanding of this complex phenomenon solely to these operational measurements. Experiencing a mental health disorder is certainly more than a set of symptoms, as it includes reflection of these experiences and the creation of meaningful units that become part of a system of contextually related experiences (21,22).

Therefore, there is a need for understanding the experience of mental illnesses in their full range. For that, qualitative research may be one of the most resourceful tools available for exploring the complexity and subtleties of mental health disorders. First, because it provides an inventive, open process that reflects on the given – whether the fact that we are here, now; or the fact that we interpret sensory experiences in different manners –, and enables the contextualization of the phenomenon of interest (23). Therefore, "qualitative methods [...] enhance understanding of the context of events, as well as the events themselves" (24). Qualitative research focuses on experiences, attitudes, and behaviors (25), drawing from different techniques to examine the complexities and subtleties of experience (26).

In this sense, the qualitative approach is flexible enough to accommodate the unknowns of the exploration of the experience of mental health disorders. Data used in qualitative research is often collected in relation to subjects who have directly or indirectly experienced the phenomena under interest. Methods for data collection can include, for instance, individual interviews or focus groups. This relational aspect of qualitative methods puts the researcher in charge of understanding and interpreting different accounts, often guided by their own set of experiences and beliefs (27,28). Data analysis is often iterative, enabling new discoveries and concepts to emerge and be contrasted with previous literature. This overall reflexivity and creativity are one of the most thriving aspects of qualitative research, which is often self-conscious (29): it discloses the obvious (and the complexity) of working with the beyond of the given word, allowing the exploration of subjectivity and the emergence of new information.

In this work, the qualitative exploration of adolescent depression is in focus. For quite some time, adolescence has been understood as a developmental stage that would shape adult futures. The focus on the here-and-now of young people's experience, however, presents a different view of adolescents' identities, focusing on its "agentive, flexible, and ever-changing" aspect (30). Far from defining this hallmark stage of life, the idea of adolescence as a period of life marked by an agentive value seems adequate to summarize the current understandings in the field. Adolescence is a time of physical and psychosocial change (31), as well as a period of intense growth, learning, adaptation, and development (32). This makes this period very intense and often marked by experimentation and risk-taking. The chronological borders of adolescence, however, are less clear, depending on both individual development and cultural norms (31). Adolescence is deeply affected by biological, psychological, and social forces (38), and, therefore, there are several discussions on the exact ages of beginning and end of adolescence. Accounting for both biological growth and major social role transitions, we subscribe to an expanded proposition of adolescence spanning from 10 to 24 years of age (33).

Understanding the multiple processes that happen during this period creates the ever-changing pattern of adolescence. This makes adolescence one of the most interesting developmental life-stages, and adolescents can be powerful agents of personal change and community development (33). This stage may be prime for interventions that aim at the promotion of wellbeing and prevention of mental health problems. However, the development of effective, context-sensitive, and actionable changes is conditioned by the need for a greater understanding of this age group. There are large knowledge gaps around this stage of development, and incorrect assumptions or stereotypes may hinder research and the implementation of results (34). Therefore, adolescents can be considered experts in their own experiences and the best-positioned stakeholders to inform on the problems, experiences, and challenges of today's youth, especially in sensitive topics such as mental health (35).

In this sense, there is a need for further acknowledgment of the importance of listening to the voices of youth on topics that are highly relevant to this age group. Among those, adolescent depression is one of the areas in which there is a need for further listening to adolescents themselves. The conceptualization of depression in adolescents, as it is proposed by current diagnostic criteria, pays limited attention to important differences that might occur in terms of the manifestation of the disorder in this specific developmental stage (36). Taking into account that depression is a disorder that often starts in late adolescence/early adulthood and can have a chronic life course (37,38), it is vital to listen to the experiences of adolescents and learn from them. It is only by doing so that we can tailor the mainstream discourse on adolescent depression, creating ways of further understanding it in a more context-sensitive manner.

In terms of understanding adolescent depression, qualitative methods are able to acknowledge and include young people's experiences in research. This means that depression can be understood beyond the proposed diagnostic criteria and existing tools. The use of qualitative methods allows for discourses and narratives to arise, creating a deeply contextual knowledge of depression. Moreover, qualitative studies often become an occasion when adolescents can narrate their life experiences, and possibly shed new light on questions related to the way adolescents understand and interpret depression, which can result in ideas and perspectives that were not considered previously (39).

Additionally, one important challenge to the current research on the experience of adolescent depression is that most studies are conducted in high-income countries (HICs). Most of the world's adolescents (approximately 90%) currently live in low- and middle-income countries (LMICs), , up to now only a minority of conducted research include adolescents from LMICs (40). Since we understand that experiences are deeply contextual - and that context seems to play a more important role in adolescent depression (41), it is vital to address this knowledge gap in research.

Therefore, it is important to explore the experiences and perceptions of adolescent depression in a qualitative fashion, enabling us to understand whether our current definitions and models of the disorder include representations of the adolescents' experiences. It is only by understanding the current studies on the range of experiences that are related to adolescent depression from the adolescents' views, and expanding our knowledge to other cultures, that we can create paths to culturally sensitive, effective interventions that can tackle this important issue in youth mental health across the globe.

## 1.1 THE PRESENT WORK

In the present dissertation, two studies are proposed. They are complementary approaches that aim to explore the experience of adolescent depression. All of them aim to answer gaps in the literature: we explore experiences, perceptions, and processes related to depression, and to receive a diagnosis of depression among Brazilian adolescents. To our knowledge, this is a novel approach to the question in the country and addresses the underrepresentation of adolescents from LMICs in research.

In these studies, a pragmatist paradigm was undertaken, aligned with the view that reality is both socially constructed and based on one's own experiences of the world (42). This paradigm subscribes to the phenomenological standpoint, and analyses were guided by the researchers' assumptions of mental health and illness as an experience that happens both at individual and at societal levels, following an ecological systems perspective that aims to understand reality from a broader perspective that includes person, process, and context.

Methodologically, Framework Analysis (FA) (43) guided data collection and analyses in the presented studies. The research projects here showcased benefits from FA's more structured and straightforward approach to data management, classification, and analyses, and gains are related to greater rigor in the analytical process and credibility in the findings (45,46). FA has a thematic approach that generates in-depth descriptions that attempt to highlight the nature of the phenomena under investigation (44). Nonetheless, FA is not necessarily aligned with any epistemological, philosophical, or theoretical approaches, being a method that adapts to other approaches in qualitative research (44). It is, foremost, a flexible and structured approach to data management and data analysis (47). FA is a method that provides the dynamic and systematic development of a comprehensive analytical structure that is deeply grounded in the data that allows for intra-case and between-cases analyses (43).

The first study presented here is entitled “Social isolation as a core feature of adolescent depression: A qualitative study in Porto Alegre, Brazil”. It presents an exploration of the perspectives of different stakeholders regarding the experiences of adolescent depression in Porto Alegre, Brazil. To that, 54 key-informant interviews and two focus groups discussions were conducted, and data were analyzed guided by the adolescents’ narratives. The study aimed to understand adolescents’ and other stakeholders’ conceptualizations of depression, focusing on their accounts of how depression changed the lives of adolescents. These broad approaches aimed to include different voices and points of view, aiming to gather a comprehensive understanding of the environment of adolescents who suffered from depression. This study was published in the International Journal of Qualitative Studies on Health and Well-being.

The second study is entitled “The Experience of Receiving a Diagnosis of Depression in Adolescence: A Pilot Qualitative Study in Brazil”. This article aimed to explore adolescents’ initial reactions after receiving a clinical diagnosis of Major Depressive Disorder in the context of a neurobiological study of depression in Brazil, the Identifying Depression Early in Adolescence Risk Stratified Cohort (IDEA-RiSCo) (48). In this study, eight Brazilian adolescents were interviewed twice, in interviews designed to explore the subjective experience of receiving the diagnosis, as well as the impacts of depression and of receiving this information on their lives. This study was published in the journal Clinical Child Psychology and Psychiatry.

Finally, the implications, challenges, and future opportunities of using qualitative methodology in the youth mental health field are discussed.

# 2 OBJECTIVES

*General objective*

To contribute to the understanding of the experience of adolescent depression using qualitative methods.

*Specific objectives*

a. Understand the perspectives of relevant stakeholders, including adolescents, regarding the experiences of depression using qualitative interviewing and data analysis in a sample in Porto Alegre, Brazil – Article #1.
b. Understand how adolescents enrolled in a neurobiological study of depression in Brazil tackle and aspire meaning to receiving a diagnosis of Major Depressive Disorder – Article #2.

# 3 HYPOTHESES

The role of hypotheses in qualitative research has been largely discussed and contested. While some scholars believe that using terms such as hypothesis and variables in qualitative research is too imitative of quantitative methods and less aligned with the assumptions in qualitative work (49), others argue that the process of understanding and predicting the expected outcomes of research is part of qualitative data analysis (50). Nonetheless, the fixation of strict hypotheses in qualitative research is less common. This practice has much to do with the idea that qualitative research has historically been considered as a way of generating hypotheses from data.

For the present work, no strict, topic-specific hypotheses were generated before data collection and analysis. However, it is important to delineate that observation and interpretation – both central to research practice – are often shaped and influenced by prior theoretical and practical knowledge. This set of personal assumptions has evolved and shaped the analysis of all data collected and the construction of themes of the present dissertation, guiding the research and, at the same time, being tested by it.

Therefore, the present section will disclose assumptions – both theoretical and personal – that guided data collection and analysis:

1. First, adolescence is a unique developmental period, and the process through which adolescents attribute meaning to their experiences and mental health is different from how adults do it.
2. Depression in adolescence manifests itself differently than in adults, but there is still a knowledge gap on the topic.
3. A qualitative exploration of the experiences of adolescents is a well-suited manner of exploring the particularities on how they perceive and attribute meaning to depression.
4. Contextual and cultural aspects have a great role in adolescence and are an integral part of the experience of depression during this period.
5. Systematic exploration and comparison of the experiences of adolescent depression in different cultures can help us understand commonalities that could indicate pathways to better prevention and treatment of adolescent depression across the globe.

6. Further research and exploration of the experiences of depression of different groups of adolescents are still needed.

# 4 ETHICAL CONSIDERATIONS

This dissertation stands on a challenging intersection within research ethics: subjects are both under the legal age of consent and frequently with lived experience of mental health problems since there are discussions on the vulnerability of these individuals and their ability to give informed consent to participate in research (51–53). Consequently, adolescents and people with lived experience are often seen as silent partners in mental health research (54), and several studies have focused on possible adverse effects – notably distress – of participating in research (55).

These concerns often stem from harmful past experiences in research and, therefore, are valid areas of reflection. There are several fine lines within this topic: to what extent do participants understand procedures and objectives of research – which are often complex -, and can assess risks and benefits of participation? Does knowing they can abstain from participation or withdraw consent mean that participants use this right during their participation? How do power dynamics affect this process? Are all people with mental disorders vulnerable? Are adolescents capable of informed consent?

These questions are complex, and often only partially answered by legislation. Therefore, considerations are necessary to locate the understandings that guided the present research.

First, the idea of vulnerability should not be used as a way of excluding certain populations from research without further questioning (53). Vulnerability can manifest itself in different ways, and this should not be something that hinders or excludes certain participants, but something to be accounted for during the design and implementation of research. Rather than a universal rule, research ethics should have space for a case-by-case approach that involves both participants and researchers in a relational assessment of capacity and vulnerability (52).

In the case of adolescent participation, this calls for including adolescents in the decision-making process – rather than just seeking parental consent, for example – as a way of leveling power differentials and giving adolescents a greater voice. It is important, therefore, to acknowledge their ability to consent to processes that are regarding themselves. This is corroborated by research that has shown that adolescents of 15 and 16 years already comprehend research in a similar way to adults (56), and 14-years-olds do not differ from adults in their ability to consent (57). In this sense, it seems like the matter of adolescent participation is rather related to how research is explained to them and how safe they feel during this process (51), once again highlighting the relational aspect of the decision to take part in the research.

Yet, there is another nuance to these questions that should be considered within mental health research: it requires a high level of self-disclosure that is often linked to the relational nature of the data being collected. This is even more important within qualitative research, and adolescents often express that it is emotional and hard to remember past events and talk about their feelings during the research (48). While some adolescents report feeling anxious, upset. or worried in this process (51), most studies highlight the positive impacts of participating: especially in qualitative research, participants often highlight the sense of being heard and having their experiences valued as a positive aspect of participating (54). This overall opportunity for narrating feelings and experiences that are often emotional is an important aspect of qualitative research not only for the researcher but for the participant as well.

Therefore, ethical considerations on the studies presented here that involved adolescent participation included several measures. First, the studies were approved by the Hospital de Clínicas Ethics Committee (CAAE: 03220818.0.0000.5327). All adolescent participants included in the study provided written assent or consent (as the legal age for consent, according to the country's legislation, is 18 years, underage participants provided assent) as conditional to their participation in research, regardless of parental consent. All participants were given all information needed for the decision, including a step-by-step explanation of data management, analysis, and reporting, as well as the researchers' intended goals with the research.

Another important aspect often mentioned by adolescents is regarding data privacy. To ensure the protection of confidentiality and full anonymization of the data, any identifiable details given by participants during their interviews were omitted in the interview transcripts. Participants were also assigned codes to protect their identities.

Since these studies were conducted along with a larger research, adolescents included had been previously screened for intense and/or acute suffering, and those who were diagnosed with depression were referred to care within the Brazilian health system. Finally, one important aspect to be mentioned is the researcher’s responsibility in taking care of the information that is shared with them, since the primary material for research is lived experience (54). In this sense, all narratives and accounts were analyzed carefully and thoroughly.

# 5 FIRST STUDY, PUBLISHED IN THE INTERNATIONAL JOURNAL OF QUALITATIVE STUDIES ON HEALTH AND WELL-BEING

## Social isolation as a core feature of adolescent depression: A qualitative study in Porto Alegre, Brazil

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## Abstract

**Purpose:** The goal of this study was to explore the perspectives of different stakeholders regarding the experiences of adolescent depression in Porto Alegre, Brazil.

**Methods:** We conducted 54 key-informant interviews with adolescents, parents, social workers, health workers, educators, and policy makers and two focus group discussions with 5 adolescents and 6 parents. Data were analyzed using a framework approach and guided by the adolescents' personal narratives, with adult stakeholders' views supplementing these perspectives.

**Results:** Four main themes emerged, creating a relational model of adolescent depression that highlights isolation as a central component of the experience. In relation to the self, the experience of depression led to a feeling of detachment from others resulting from the sensation that usual interactions did not have the same meaning as before. This disruption of interactions is perceived as self-isolation and is described in relation to coping mechanisms.

**Conclusion:** These findings shed light on important aspects of the identification and management of adolescent depression in Brazil. Since social interaction was a core component of the descriptions and experiences of depression, we speculate that promising interventions are those that could enhance the promotion of a supportive environment and interpersonal relationships.

**Keywords**

Depression, Social Isolation, Qualitative Research, Adolescence, Brazil

**Word count:** 7,134

## 1. Introduction

Understanding the experience of depression in adolescence — a crucial developmental period — is essential to address this burdensome psychiatric disorder affecting a large number of youth worldwide (Thapar et al., 2012). A large proportion of first episodes of depression occur during adolescence (Kessler et al., 2007) in parallel with intense processes of emotional maturation that are shaped by social context (Osher et al., 2020). Context, including stressors, availability of social resources, and cultural interpretations, is central to when, by whom, and how depression is experienced during adolescence.

Studies have shown that context manifests itself in interpersonal and community processes (Osher et al., 2020). Therefore, the experience of depression can be assumed to be highly specific to the context in which it is produced. Likewise, the current conceptualization of adolescent depression as presenting core symptoms similar to those observed in adults may mean that important features of depression that are unique to adolescence are missed and need to be further explored (Midgley et al., 2015; Orchard et al., 2017). Therefore, investigations oriented to expand our knowledge about the way adolescents experience and/or perceive this mental health disorder and identify which domains are relevant to clinical practice from the perspective of the adolescent who experiences depression, of parents, and other stakeholders (Chevance et al., 2020) may yield important contributions to improve diagnostic practices and interventions.

Qualitative approaches that integrate developmental aspects, contextual factors, and stakeholders' perceptions about depression (Farmer, 2002) have been advantageously used to address this gap in the literature. Most such studies, however, have been conducted in Western, Educated, Industrialized, Rich and Democratic (WEIRD) societies (Blakemore, 2019; Henrich et al., 2010). Given the importance of context to both the development and the onset of depression in adolescence, understanding how adolescent depression is experienced and perceived in other cultural environments is therefore necessary and desirable.

Similarly to what is the case in many other Western cultures, in Brazil most individuals are encouraged to develop self-reliance (Chen et al., 2004). Nevertheless, they also hold group-oriented attitudes toward family members and peers, reflecting important non-WEIRD influences on cultural values (Van Horn & Marques, 2000). Therefore, the present study was designed to qualitatively explore the experience and perceptions of adolescent depression in the city of Porto Alegre, Brazil, with the aim of contributing to the modest body of literature focusing on the experience of adolescent depression (Dundon, 2006) and expanding this to a non-WEIRD context.

## 2. Materials and Methods

### *2.1. Study Setting*

Porto Alegre, where the present study was performed, is the southernmost state capital of Brazil – the most populous country in Latin America, with an estimated 212 million inhabitants of whom 51 million (close to 25%) are between 10 and 24 years of age (PAHO, 2017). A similar population distribution is found in the city of Porto Alegre, with 325,000/1.5 million population aged 10 to 24 years (IBGE, [s.d.]).

Despite many challenges, public education and health care are constitutional rights in Brazil. Thus, public state schools account for about 78% of all schools in the country (Ministério da Educação, 2018), and while almost one third of adolescents either struggle to complete or have dropped out of school (IBGE, 2018), literacy and access to school have increased over the years, with school enrolment reaching up to 88% of adolescents. In terms of health care, the universal Unified Health System (SUS) also faces many implementation barriers (Castro et al., 2019); importantly, access of children and adolescents to mental health services via the SUS is complicated by the scarcity of services dedicated this age group (Paula et al., 2014; Kieling & Belfer, 2012), and private health insurance, while available, does not cover mental health services. The same challenges are faced by Porto Alegre, despite its relatively high Human Development Index (0.805) (PNUD et al., 2013) – a statistic combining indices of longevity, access to education and income *per capita*, with higher scores indicating to a good human development in general – and the fact that it compares favorably to other cities in the country (Brazil's overall HDI in 2013 was 0.753 (PNUD, 2013)).

### *2.2. Study design and sampling*

The present study was designed following the Framework Method (Gale et al., 2013) to explore the experience of adolescent depression at the individual level through key informant interviews (KII) and focus group discussions (FGD). This study was developed as part of the Identifying Depression Early in Adolescence (IDEA) consortium (Kieling et al., 2019), which includes a qualitative component, a protocol described in detail elsewhere (Wahid et al., 2020).

Sample size was determined *a priori* based on studies suggesting that approximately 6-12 interviews are sufficient to reach code saturation in a homogeneous group (Guest et al., 2006). Based on that assumption, we conducted 54 key-informant interviews with participants including health workers in the public and private sectors (n = 12, 11 females), educators (n = 12, 10 females), social workers (n = 12, 11 females), policymakers (n = 6, 2 females), parents of adolescents with depression (n = 6, 4 females), and adolescents with lived experience of depression (n = 6, 4 females).

Two FGDs were also conducted, one with adolescents (n = 5, two females - out of seven who had been invited; two adolescents were unable to attend the discussion, one due to a last-minute family emergency and another due to schedule conflicts) and another with parents (n = 6, 5 females). Adolescents were between 14 and 17 years of age (mean age = 15.3 years) and all attended public state schools in the city of Porto Alegre. Eight adolescents reported lived experience of depression (all adolescents participating in the KIIs and two from the FDG). All the adolescents included (11) had a mental health-related history of service use – however, clinical diagnosis confirmation was not ascertained prior to their inclusion in the study.

Health care workers, educators, social workers, and policy makers were sampled by convenience, drawing from the researchers' professional network, and were chosen if they had previous experience working with adolescents. Most of those who agreed to participate had met the researchers and were familiar with their ongoing research. They were also asked to suggest other professionals in their network that could take part in the interviews. Parents and adolescents were recruited from a group involved in a research project on adolescent depression (Kieling et al., 2021).

### *2.3. Data collection*

Development of the KII and FGD guides were informed by Engel's biopsychosocial risk factors approach (Engel, 1977), and Kleinman's explanatory model framework of mental illness (Kleinman, 1980). The guides were developed by the research team and reviewed by two senior researchers (CK and BK). Six pilot interviews were conducted and subsequently the guides were adjusted for cultural and contextual aspects.

The primary areas explored in both KII and FGDs were the experience of adolescence, the experience of adolescent depression, and adolescent coping strategies in response to stressors and depression. We also queried respondents about which stakeholders would be best positioned to identify depression early in adolescence. Societal perspectives surrounding adolescence and adolescent depression were also explored.

#### *2.3.1. Key-Informant Interviews*

One-on-one semi-structured interviews were conducted in Brazilian Portuguese. In Portuguese, the term "depressão" was used to refer to "depression," which represents both a commonly understood term in the general public as well as a clinical diagnostic term used by practitioners for clinical diagnoses of depression.

KIIs were conducted with health care workers, educators, social workers, and policy makers. They were interviewed at Hospital de Clínicas de Porto Alegre or other locations depending on convenience (e.g., private practices) by AV, SB, or TM. Four interviews were also carried out by a fourth researcher, LT, a female psychologist with a PhD and experience in mental health research. The duration of KIIs ranged from 40 to 90 minutes.

### *2.3.2. Focus Group Discussions*

Both FGDs were conducted at Hospital de Clínicas de Porto Alegre simultaneously, but in separate rooms. The adolescent FGD was conducted by AV and TM, and the FGD with parents was conducted by SB and CB. All researchers involved with data collection are women with a background in mental health research (at the time of the study, AV was pursuing a master's degree, and CB was pursuing a PhD, while TM and SB were postdoctoral research associates). All researchers were trained in qualitative methodology with a focus on data collection with adolescents and were supervised by two senior researchers, a child and adolescent psychiatrist with experience in research on adolescent depression (CK), and a psychiatrist and anthropologist with experience in global mental health research (BK). After KIIs and FGDs, all interviewers completed debriefing forms that were later used to inform coding. Analysis was guided by the researchers' assumptions of depression as an experience that happens both at individual and at societal levels, following an ecological systems perspective that aims to understand reality from a broader perspective that includes person, process, and context. FGDs lasted 90 minutes. All were audio-recorded and later transcribed in Brazilian Portuguese. In preparing the manuscript for publication, the original quotes were translated into English. For original quotes in Brazilian Portuguese, see Appendix A.

## ***2.4. Data analysis***

A deductive theory-informed codebook was initially created, which was later modified to include inductive codes and categories. The final codebook was used to code the full dataset using NVivo version 12 (Richards, 1999). Two researchers (AV and SB) coded the data in Portuguese. We considered an inter-rater reliability of 0.7 (Cohen's Kappa) among the coders as an indication of reasonable agreement (McHugh, 2012). We used the constant comparison approach during coding – newly coded sections were compared to previously coded data to ensure the integrity of codes across the dataset (Glaser & Strauss, 1967). At this point, the debriefing forms were also taken into account, providing information about the context of the interview and the interviewers' assumptions about the topic.

Inductive codes and themes were introduced as these were identified, until the data produced no new codes or themes, suggesting theoretical saturation (Strauss & Corbin, 1990). Afterwards, code queries were executed in NVivo and stratified by adolescents and other stakeholders, and code summaries were written to capture adolescent and stakeholder perspectives. Finally, we constructed framework indices with code summaries stratified by stakeholder type to allow comparison across diverse narratives. A pragmatist paradigm was undertaken, aligned with the view that reality is both constructed socially and based on one's own experiences of the world (Onwuebuzie, Johnson, & Collins, 2009). For the present study, we focused primarily on codes that were oriented to capture the experience of depression: Signs & Symptoms of Depression, Depression vs. Other Experiences, Impacts of Depression, and Coping Strategies. The complete framework used for analysis and stratified by respondents can is provided in Appendix B. Lastly, a relational model was created by refining the codes and the generation of an overarching theory that connected the identified relationships across categories and themes. All stages of analysis and reporting were executed according to the Consolidated Criteria for Reporting Qualitative Research (Tong et al., 2007) [Appendix C].

### *2.5. Ethics*

Ethical approval was obtained from the Hospital de Clínicas de Porto Alegre Ethics Committee (CAAE: 03220818.0.0000.5327). All procedures performed in this study followed the ethical standards of the institution. All participants included in the study provided written assent/consent. To ensure the protection of confidentiality and full anonymization of the data, any identifiable details given by participants during their interviews were omitted in the interview transcripts. Participants were also assigned codes to protect their identities.

## 3. Results

### *3.1. Youth Voice*

When trying to understand the adolescent experience of depression, it is important to look at it from the perspective of both the adolescent and the adults that take part in their life. Our adolescent participants vehemently expressed their need to be heard:

> *"They think [parents and school workers] we don't have problems. [...] I have problems and I have thoughts that are much more than what you think, because you [adults] have your own impressions and impose these impressions on us [adolescents]" (Adolescent 3, male, 15)*

Therefore, data analysis was guided by the adolescents' own narratives and experiences. These accounts guided our analysis and were taken as primary to orient theme generation and organization. However, stakeholders' perspectives and perceptions were also considered as complementary accounts since we are interested in the context and social interactions adolescents were involved in. We chose to disclose these perspectives whenever they offered a contrasting perspective, enriching the understanding of the reactions from the environment and social actors in the adolescents' lives. The present analysis, therefore, was guided by a subset of areas explored in both KII and FGDs that focused on the experience of adolescence, the experience of adolescent depression, and adolescent coping strategies in response to stressors and depression. This generated four main themes related to the experience of lived depression: (1) depression in relation to the self; (2) depression in relation to others; (3) isolation as the main characteristic of depression in adolescence, and (4) coping with depression.

### *3.2. Theme 1 - Depression in Relation to Self*

Adolescents interpreted their experience of depression around two main dimensions, emptiness [sentir-se vazio] and sadness [tristeza]. Feeling depressed altered their perspective on aspects of life they had previously perceived as enjoyable, which were basically centered on relationships, like being with friends and family. This way, depression was often expressed in terms of emptiness that led to a sense of wanting to be alone [ficar sozinho]. All adolescents mentioned these overwhelming sensations as one of the core components of the experience of depression:

> *"I felt empty, like I didn't want anything else. I didn't want to do anything, I didn't want to study or talk to anyone, I didn't want to be friends with anybody. I just wanted to be quiet, and be by myself." (Adolescent 6, female, 15)*

For most of the adolescents, these feelings were also accompanied by sadness, which was mentioned by eight of the 11 respondents. Both feelings seemed to be motivated by the loss of interest and ability to focus on activities that once were enjoyable:

> *"You feel empty, not happy anymore, with no desire to do things you liked before. I like to read, to watch TV shows, but sometimes I don't feel like doing these things, I have no will. Then, if it is something recurrent, I see that there's something wrong, I may be depressed." (Adolescent 8, female, 15)*

This loss of interest and will to live were mentioned in association with suicidal thoughts, another commonly described feature of depression in adolescents. The lack of perspective and search for quietness played an important role in the occurrence of these feelings, as described by Adolescent 6, a 15-year-old girl with depression:

> *"It's hard not to mess things up. Doing bad stuff (...) like killing yourself. It's a big, big challenge. I wanted to." (Adolescent 6, female, 15)*

### ***3.3. Theme 2 - Depression in Relation to Others***

To adolescents, interpersonal relationships are at the core of many aspects of the experience of depression. This way, the relationships with others defined many aspects of the evoked accounts of depression.

#### *3.3.1. Subtheme: Relation to Parents and Peers as Explanatory Models of Depression*

Adolescents placed interpersonal relationships problems at the core of the explanatory models for depression, especially concerning family and peer relationship issues. Adolescents mentioned that parents are very important to their emotional development, and that constant conflicts with parents jeopardize the quality of these relationships and make teens withdraw from spending time with their family. They also mentioned that when parents did not acknowledge their problems, they felt worse.

> *“They think that just being around is enough, and that we don’t need to talk about our problems. (...) They think that just because we don’t have bills to pay, we don’t have any problems.” (Adolescent 2, male, 16)*

In relation to this, they also cite the importance of bullying by peers as another central cause of depression. Being bullied because of physical appearance or sexual orientation is a difficult experience mentioned by all adolescents as an important cause for depression:

> *"I don't know if this is specific to Brazil, but bullying is one of the main causes. The person is already facing a lot, and on top of that, suffers bullying. The adolescent wants to be part of a group, and when they face bullying, they feel threatened." (Adolescent 1, female, 14)*

### *3.3.2. Subtheme: Most Symptoms go Unnoticed*

Adolescents highlighted that most of the time the people around them did not notice their sadness, especially since their self-isolation made it harder for others to reach out to them. The lack of straightforward, sensitive communication with parents and teachers was also mentioned.

> *"When there is a problem – like when I had a school attendance problem, [...] not one teacher came to me and said, "hey, is there something happening, why are you missing school?" No. The only thing I heard was 'oh, you're going to fail, your attendance is low. Oh, you never come to class.' That was the only thing I heard." (Adolescent 7, female, 17)*

Parents, in turn, expressed their concerns about the generational components of distinguishing depression from other experiences. They reported a lack of knowledge about the real scope of the adolescent's feelings and expressions, or what feelings are typical of adolescence, and how the adolescents express and live their experiences.

> *"What I'm thinking is that sadness... What do you think depression is? What is sadness? What are your conceptions of sadness? Because I, as a mother,*

> *understand that being sad is looking down, being quiet… And to him, it isn't."* *(Mother 8)*

Parents also observed that once they reached adolescence, their sons and daughters often started spending a lot of time in their rooms avoiding family moments and refusing to spend time together. It was, however, not clear to them to what extent these behaviors were related to adolescence or were indicative of suffering:

> *"I noticed that she was more closed, but I thought it was just a teenager thing, because of adolescence… But, she is getting more closed, and she always had a good relationship with me. (...) And I noticed she was sad, she was not like that. She used to be talkative, happy, always ready to help everyone. I noticed she was down, quiet, in her own world." (Mother 4)*

### *3.3.3. Subtheme: Impacts of Depression*

Depression had an important impact on the adolescent's lives.

> *"It's like a delay. It's a delay that, liking it or not, is a moment you lose all the will to do stuff. (…) And it's not because you want to, it's just because you don't know what to do. You don't know how to deal with your friends, you don't know how to deal with your studies…You can't develop because you're going backwards…" (Adolescent 7, female, 17)*

At an interpersonal level, they reported family and peer relationship issues, as well as impacts on school performance. Being isolated from others, they felt an increased inability to deal with problems or adverse situations:

*"Everything's hard, it seems like everything makes you sink deeper." (Adolescent 4, female, 15)*

For the other stakeholders, consequences extended from milder ones, like lower grades or poor academic performance, to more severe consequences, like school dropout, self-harm, and suicide ideation/attempt.

*"There are some who don't want to go [to school]. There are some that go but end up being isolated, there are those who find other ways to express themselves too. [...] And there are others who go crazy, freak out and... Fail school again and again." (Social Worker 5, female)*

When asked about the impacts of depression, adults mentioned aggressiveness. According to them, anger often manifested in moments when the adolescent is dealing with peers in the school setting. They also mentioned irritable mood and weight gain. Another important consequence of being depressed was the stigma associated with a psychiatric diagnosis.

*"[The impact of a crisis] is really strong. For example, we get many adolescents coming from the ER. The first impact is being considered as crazy and considering themselves crazy." (Health Worker 4, female)*

### *3.4. Theme 3 - Isolation as the Main Characteristic of Depression*

Isolation, defined by the adolescents as an active pursuit to shut others out and active exclusion from spaces of social relations, was the main characteristic of depression described by adolescents. It is interesting to note that isolation seems to be the link that ties depression in relation to the self and to others: the feelings of emptiness, sadness and loss of interest lead to this active withdrawal that, in turn, influences the relational aspects of adolescent depression. One adolescent – #6, a 15-year-old girl with a long history of mental health issues, provided a clear picture about this component of adolescent depression:

> *““I want to be alone.” The first time [first depressive episode], all I could think was that I wanted to be alone, wanted to be in my own corner. All I could think about… I want to be alone.” (Adolescent 6, female, 15)*

This isolation, however, was not a source of distress for most adolescents. They mentioned this active isolation as related to the lack of desire to do things they used to enjoy. This lack of interest in everyday situations and interactions led to adolescents reporting avoidance behaviors, but also feelings of irritability and even suicidal ideation. She continued:

> *“I didn’t want anything at all: I didn’t want to do anything, I didn’t want to talk to anybody, I didn’t want to be friends with anybody anymore. (...) And you end up being mad too.” (Adolescent 6, female, 15)*

Adolescent 8, a 15-year-old girl who participated in the FGD, also testified about this active avoidance. When talking about a friend who was diagnosed with depression, she said:

> *"I have invited her to go out several times, go to my house, or even go the movies… But she always refused." (Adolescent 8, female, 15)*

The active avoidance of others and the negative feelings surrounding isolation then create a cycle the adolescents felt trapped in, as expressed by another adolescent, a 15-year-old boy:

> *"I don't know how to explain, I felt… trapped. Like there was something inside me I couldn't get rid of. Like a weight on me. And I would get really upset, and keep thinking about it" (Adolescent 3, male, 15)*

This cycle of isolation and avoidance is also expressed by the health professionals we interviewed:

> *"They don't want to hang out with their friends, and if they do, they don't see it as something nice, they just complain about what happened in the outing. Nothing is good, and it's all the time - they complain, they don't feel adequate. This is often linked to avoidance, which spirals into a bad cycle, and the adolescent doesn't even try to go out anymore." (Health Worker 3, female)*

Interestingly, they stated that this isolation is caused by beliefs that adolescents with depression have about the quality of the relationships and about themselves. The feeling of not being adequate, or even the feelings that they will not be understood by others has several impacts on the maintenance of social relationships:

> *"I think that because of depression, a person isolates themselves and thinks that there are never any solutions for their problems, and that no other person is in the same situation, that people can't understand their suffering." (Adolescent 1, female, 14)*

By cutting off their peers and parents, adolescents seemed to find solace from the feelings that arose from depression. Only one adolescent linked "being alone" with feelings of loneliness:

> *"Feeling very sad and very lonely. Having no will to live. This… I think these are the signs you are depressed." (Adolescent 4, female, 15)*

The other stakeholders – especially parents and teachers – also described the role of social isolation: to them, depression makes adolescents more susceptible to disengage from social relationships. In the school environment, teachers mentioned that adolescents did not take part in academic activities, while, at home, parents mentioned that adolescents stayed in their bedrooms all day. They also mention constant fights with friends and refusals to go out as impacts of depression.

> *"My daughter just stays in her room. We don't have direct sunlight in our apartment, just in the morning for 20 minutes, it's sad. And I tell her we have to go out, even if it's just to the supermarket, but she is always lying down, using her phone. I worry about her a lot." (Mother 2)*

### *3.5. Theme 4 - Coping with Depression*

When they felt depressed, adolescents described engaging in coping strategies focused on emotional regulation such as exercising, writing, and having positive thoughts about difficult situations.

> *"Lately, when I feel bad, I try to look more on the positive side. Then I see that it's not just that, that there are good things (…) I talk to my cousin, too, like ... It's good to let off steam." (Adolescent 5, female, 14)*

Interpersonal coping strategies, though, were frequently mentioned as the most important alternative to help deal with depressive feelings. Discussing problems with family members, like mothers, grandmothers, and cousins were an important source of support. These interactions seemed to be focused on the distraction from bad feelings and less on problem-solving. In relation to isolation, however, interpersonal coping strategies were often seen as part of a contradiction between shutting out others and avoiding relations and the need for relieving negative feelings, and recognizing the need for social support and the possibility of accessing it:

*"There are moments when it is unbearable to be around people, but there are moments when I don't want them to go away from me." (Adolescent 2, male, 16)*

Adolescents also mentioned seeking support from teachers and friends. Some adolescents opted to engage in social networking, and others mentioned seeking professional help.

*"At the psychologist too, I took the initiative to go to the psychologist, because I felt the need to share my problems with a professional." (Adolescent 8, female, 16)*

However, they also mentioned negative coping strategies. Some participants mentioned the use of cigarettes, drinking alcohol and using drugs. These strategies, though, were less cited by adolescents. They often preferred expressing these negative coping strategies by using others as example:

*"A lot of people self-harm. Looking for some sort of relief. There are also people… Even artists, that escaped into drugs, they could not face being in pain anymore and escaped into drugs." (Adolescent 3, male, 15)*

This same distinction between positive and negative coping strategies was described by other stakeholders. Positive strategies were related to the adolescent's level of connectedness with friends, family, and other important adults in whom the adolescents could trust in, while negative strategies cited were the use of cigarettes, drinking alcohol, and using drugs. Stakeholders mentioned that severely depressed adolescents often engaged in self-cutting behaviors and suicide attempts as a way of feeling better.

Interestingly, girls were seen as better in interpersonal coping skills – they sought help more often and supported each other more. Conversely, boys were described as being more individualistic, and therefore their coping skills more often included isolating themselves.

> *“Look, the girls they are… They try to unite so they can help each other [...] They are more united. They comfort one another sometimes. There’s a positive side to it. Sometimes one girl says to another “no, you can go to my home, my mom can help you”. Girls unite themselves more, while boys are individualistic.”*
>
> *(Educator 5, female)*

Adolescence is a key period to understand this aspect of coping. The existence of a group of friends is a major feature that influences their ability to cope with situations. They seem to look for groups where they can feel safe, included and understood. Thus, almost all the strategies mentioned by the stakeholders include social interaction.

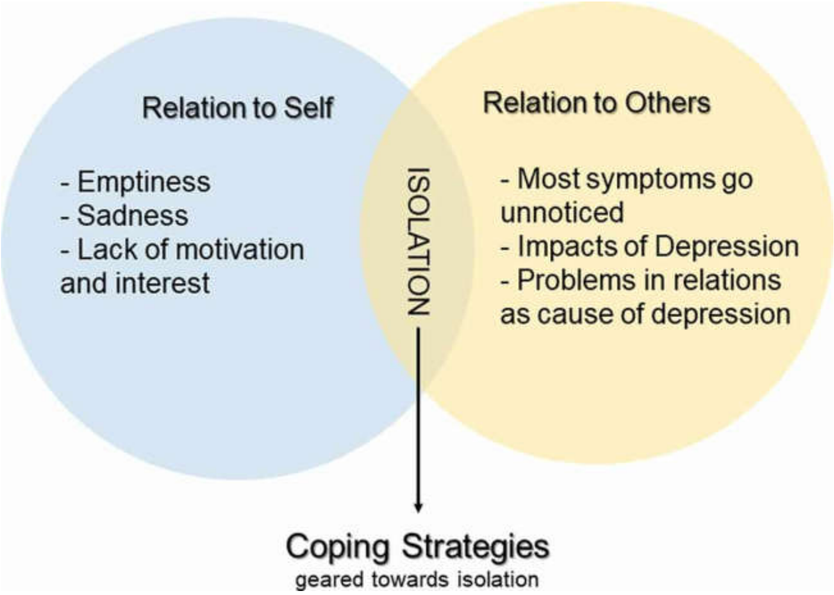
However, group strategies were described as a good strategy only when the main intention of the group was to help each other, allowing for an idea of purpose. The negative side of the group was the influence on the use of drugs or on engaging in self-harm.

> *“Positive [coping strategy] is talking, when they manage to talk about their feelings in groups, (…) but mostly in the family - and having someone that listens in the family. I think this is a very good coping strategy.” (Father 1)*

### *3.6. Relational Model of Adolescent Depression*

Based on the interviews and the generated themes, we proposed a relational model of adolescent depression informed by Brazilian adolescents (Figure 1). By combining the themes and its relations, we were able to emphasize isolation as a core component of the perceived experience of depression. Isolation is here described as an active exclusion from spaces of social relations, and this experience seems to connect depression both in relation to the self and in relation to others. This means that the model highlights the social aspects of adolescent depression as core components of the experience. Also, we highlight that Brazilian adolescents often employed coping strategies focused on emotional regulation as a way to mitigate the experience of isolation.

Figure 1. Relational model of adolescent depression



## 4. Discussion

This exploratory study provides some insights into how adolescents from a Brazilian city experience and perceived depression. Four overlapping themes emerged: (1) Depression in Relation to Self; (2) Depression in Relation to Others; (3) Isolation as the Main Characteristic of Depression in Adolescence, and (4) Coping with Depression. Following this, a relational model for adolescent depression was proposed, having isolation as a core component of the experience of adolescent depression.

When describing their personal experience with depression, sadness and feelings of emptiness were the main features described by the adolescents. These findings resonate with the narratives of adolescents from several previous studies on the topic (Farmer, 2002; Midgley et al., 2015; Weitkamp et al., 2016). Even though sadness and emptiness reflect the core symptoms of the diagnosis of depression, the perspective from which depression was narrated emphasized the importance of interpersonal relationships. This focus of the narratives and perceptions, and the words used by adolescents when doing so, highlights that the clinical jargon used to refer to symptoms does not necessarily find its way into the adolescents' discourse — e.g., the use of "loss of interest and/or enjoyability of activities" by adolescents instead of referring to the technical term "anhedonia". Across all themes, relational aspects were the overarching narrative emphasized by adolescents, being this the prism through which they interpreted their depression-related symptoms and experiences. The proposed model, then, highlights isolation – an active withdrawal from others – as a core component of the experience of adolescent depression in Brazil. Qualitative research among adolescents with depression in other LMICs has also highlighted the domain of interpersonal relationships (Rose-Clark et al., 2021).

We could speculate that, in relation to the self, the experience of depression led to a feeling of detachment from others, described as resulting from the sensation that usual interactions did not have the same meaning as before. The consequent active avoidance of family and friends was the option which, in turn, placed adolescents in an isolated position. This sense of isolation – that could be understood as a means of ‘self-isolation’ (Midgley et al., 2015) was not seen by adolescents as a symptom, but rather as a way of resolving or avoiding the problems that arose from the experience of disrupted relationships caused by depression.

This dynamic, therefore, places isolation at the center stage of the adolescent’s relation to the self and to others, and was described as a trap which kept them in a cycle that was hard to break, since approaching someone to talk about how they felt was a major challenge. This withdrawal extended to family and friends, and was interpreted by these stakeholders as a conscious avoidance on the part of the adolescent. Adolescents, in turn, did not seem conscious that this distance was also self-imposed, and described their feelings in a more passive way, with strong ties to the feelings of imprisonment – they felt trapped in this self-isolation. The interpersonal coping strategies most cited by adolescents seemed to corroborate that this perceived isolation worked as a self-imposed one: they were able to access meaningful relations as a way of promoting emotional relief in different moments of distress.

This is in accordance with the centrality of the idea of the fracturing of the social connectedness with family and friends. It is worth noting that while social norms encourage strong relations with parents and friends, depressed adolescents find themselves unable and unwilling to accept this shared optimism. Therefore, understanding this self-isolation seemed to be relevant to the context where the research was carried out.

These perceptions are interesting from both cultural and cognitive aspects: first, the idea of the development of cultural identity may be stronger among adolescents – they are experiencing, firsthand, the idea of balancing relationships with family and friends – then, these reports may shed light on a manifestation of cognitive bias in depression. While we did not find strong ties between isolation and feelings of loneliness in our data, we could argue that this self-isolation could lead to anticipating social rejection – and this, in turn, may lead to feelings of loneliness (Achterbergh et al., 2020) – working almost as a self-fulfilling prophecy. Moreover, it is worth noticing that isolation does not necessarily foster loneliness – it has been theorized that it does for those who interpret it as a reflection of their own limitations (Laursen, & Hartl, 2013).

It is interesting that isolation was highlighted by our sample of adolescents. While the number of participants in our study was similar across both genders (6 girls and 5 boys), studies carried out in WEIRD countries identified social withdrawal as more common for boys and loneliness for girls (Crowe et al., 2006). This may be due, however, to the fact that our study was not designed to explore loneliness as an experience *per se*. It is also worth noticing that experiences of loneliness may vary in different demographic and cultural groups (Achterbergh et al., 2020), and our sample comprised adolescents from a specific age group.

Finally, while adolescents most strongly described isolation, having different sources of data also contributed to the identification of isolation as a core component of adolescent depression. The perspectives of parents, health providers and educators were also sources of important insights into how adolescent depression is perceived by these groups. Shedding light on isolation, therefore, also points to a culturally relevant indicator of adolescent depression.

Another important point related to the adolescent experience of depression was the importance attributed to relationships as a source of support when facing depressive feelings. While formal healthcare settings were not mentioned expressively by adolescents as a viable source of support while facing these feelings – limited to moments where barriers were mentioned, such as long queues – adolescents referred to having someone to talk to as one of the most immediate choices for relieving bad feelings. Overall, the family system was the basic structure upon which the adolescent expected to rely when in distress.

Although having a group of friends was understood as promoting a sense of safeness, inclusion, and understanding, it can also be associated with an increase of risk-taking behaviors, such as drinking and cigarette use (Andrews et al., 2020). Additionally, bullying was mentioned by adolescents as an important peer-related issue. This is a relevant factor that was not explored in detail in our study. While the literature shows that both bullies and victims have elevated rates of childhood psychiatric disorders that extend to young adulthood (Copeland, Wolke, Angold, & Costello, 2013), the causal effect adolescents attribute to bullying shows that adolescents may be more aware of the consequences of this victimization than previously theorized (Pigozi & Machado, 2015). Moreover, it shows that while peers may be a source of comfort, they can also play an important role in threatening positive social relationships.

From the observations of the adolescents' understanding of how to cope with depression, we can see that actions directed to emotion regulation by means of engaging in contact with people close to them were the principal source of relief. This finding is consistent with another study with Brazilian adolescents: Libório and Ungar (2014) found that positive relationships with significant community members emerged as a protective factor in working adolescents (Libório & Ungar, 2014).

Additionally, gender-specific differences in coping mechanisms were cited by respondents. These accounts highlight the importance of understanding the influence of gender on depression - gender-specific attributes and socialization can influence the development of depression in adolescents (Wisdom, Rees, Riley, & Weis, 2007), and understanding these differences may be important to defining and structuring interventions, for example (Marcotte, Fortin, Potvin, & Papillon, 2002).

Based on a developmental system relational approach, Osher et al. (2020) highlighted the important role that relationships have as the primary process of development balancing intrinsic and contextual factors. Interactions based on information, communication, support, and empathy attunement are important to promote positive development. In this sense, adolescents in this study expressed the need to engage in relationships that reciprocated what was happening to them. Either by concrete experiences of difficulties with adults in their immediate context or by their own difficulties in engaging with others, there was a fracture in their ability to feel (and be) supported and nurtured.

### *4.1. Implications for identification and management of adolescent depression*

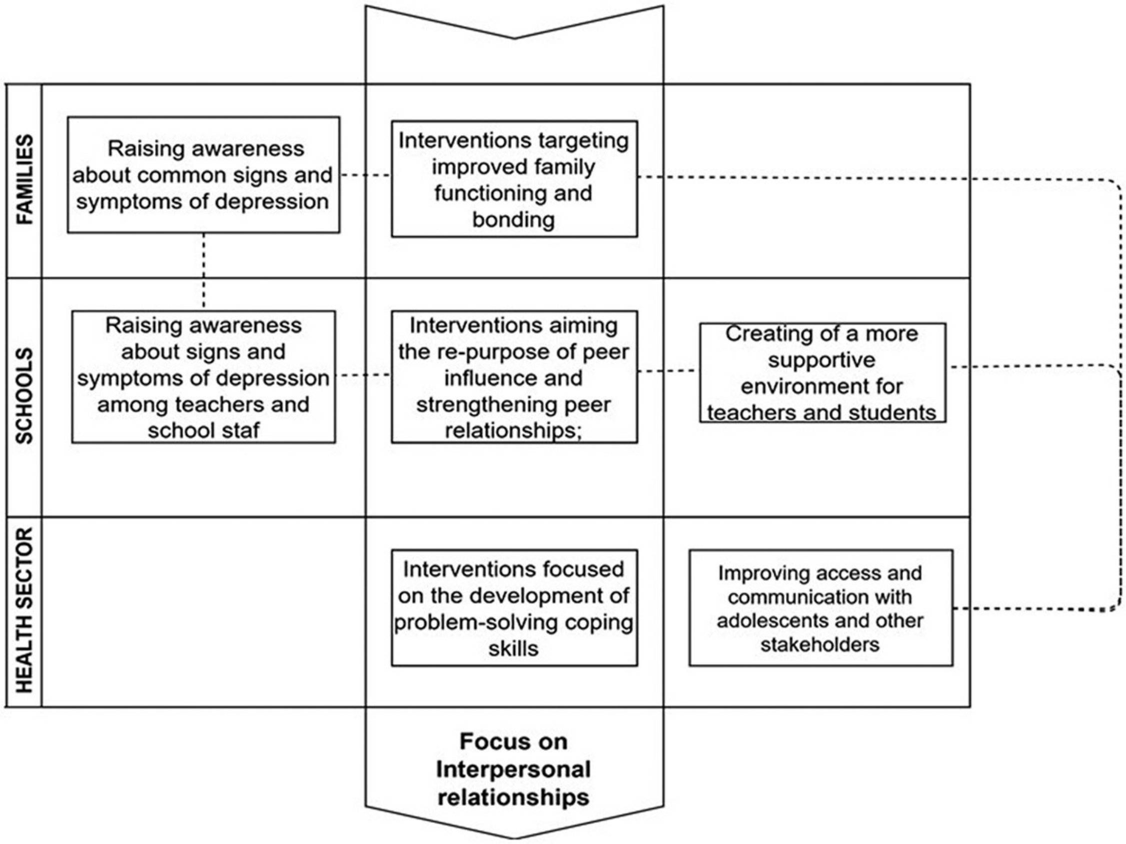
Since the notion of social interaction was described as a basic source of resilience, interventions in different contexts of adolescent life should enhance the promotion of a supportive environment. First, it is essential to address knowledge gaps in communities. Actions directed to raising awareness of signs and symptoms in the family and school context could improve the correct identification of the adolescents' needs. In this sense, the identification of depression plays an important role to lessen the burden and impact of a mental health problem in their lives. Moreover, it highlights a need for better understanding and listening to the voices of young people – they report not feeling heard. Therefore, it seems that adults need to proactively ask adolescents how they are feeling and offer support, surpassing assumptions, and preconceptions they may have.

Purposefully addressing the need for social connectedness in adolescents by focusing on interventions that offer alternative social experiences as well as educational resources would also be helpful. Adolescents are less likely to engage in risky behavior if a friend discourages them from doing so (Maxwell, 2002), therefore, repurposing peer influence may also address gaps in the identification and management of depression among peers, encouraging help-seeking behaviors and decreasing stigma. Focusing on encouraging problem-solving coping skills could also play a role in both the prevention and management of depression (Mynors-Wallis, Gath, Day & Baker, 2000).

Improving communication, family functioning and bonding can be a way of preventing depression, mitigating its impacts, and increasing self-reflection in both parents and adolescents (Elsina & Martinsone, 2020). Moreover, there is an urgent need to improve access to healthcare settings: the interviewed adolescents did not see primary care providers and other services as a source of support when in distress. These findings resonate with previous studies on access to mental health care for children and adolescents in Brazil (Fatori et al., 2019; Amaral et al., 2018), and indicate a need for adolescent-friendly health services.

Additionally, approaches centered on interpersonal relationship issues (e.g., interpersonal psychotherapy) could represent a compelling approach to both prevent/decrease depressive symptomatology and to improve interpersonal functioning (Klerman et al., 1984). There is evidence to support the effectiveness of interpersonal psychotherapy (IPT) among adolescents in LMICs (Bolton et al., 2007). And the focus on social experience in IPT lends itself well to cultural adaptation for adolescents in diverse settings (Rose-Clarke et al., 2020). On this note, a model of adolescent depression that highlights social interactions may also contribute positively to early identification and management of depression (see Figure 2 for highlights).

Figure 2. Identifying depression across different settings in Brazilian location



### *4.2. Limitations*

Despite contributing to decreasing a gap in the qualitative literature on adolescent depression in Brazil, our study must be interpreted in the context of some limitations. First, it included a limited number of adolescents and other stakeholders sampled by convenience. Therefore, it provides the views of only some individuals residing in certain community settings located in the city of Porto Alegre. Even though we highlighted the importance of schools as a place of socialization and peer interaction, we acknowledge that other community settings may be better suited for interventions directed to peer relationships. This limitation, however, stems from sampling and data analysis choices that focused on educational and healthcare scenarios.

In Brazilian Portuguese, as in many other languages, ‘depression’ is a common way of referring both to feelings of sadness and to a formal psychiatric diagnosis. In this study, however, we did not distinguish and/or probe for these linguistic differences, so the word was used in a broader way. This can result in perspectives that are biased by cultural and contextual norms and that do not refer specifically to clinical depression.

Moreover, in this paper we focused on the accounts and experiences of adolescents and their parents as guides to data analysis and reporting. However, we acknowledge that depression occurs in a wider context that involves other stakeholders. Therefore, subsequent studies focusing on other stakeholders' perspectives are required – and, since our study design enables such comparison of perspectives, we plan to develop such studies in the future. Additionally, our paper did not specifically assess gender differences in perceptions and experiences of depression, rather adopted a group-oriented approach that was, unfortunately, less sensitive to these differences. Further exploration of gender and gender roles and its influences on adolescent depression in Brazil are also required.

It is also important to acknowledge that our analysis was mostly driven by the professional background of the researchers, focusing on clinical components and perceived signs and symptoms of adolescent depression. Lastly, it is important to highlight that Porto Alegre has several cultural and socioeconomical specificities that are constrained to the South of Brazil, and thus it is impossible to assess whether the described perceptions and experiences necessarily extends to other adolescents in different contexts in Brazil.

## 5. Conclusion

In this study, although the description of adolescent depression symptoms resonated with studies conducted in HIC, the isolation component of depression highlighted the importance of social relationships – especially within families – in adolescents' lives. Thus, isolation was a central component of the perceived experience of depression and was related both to the individual and interpersonal experiences. Moreover, this sense of isolation was not seen as a symptom, but as a way of solving the problems that arose from the experience of disruption caused by depression. By taking into account social and cultural aspects of adolescence, as well as the background in which adolescents are immersed, the recognition and systematic exploration of subjective perspectives might allow the development of culturally relevant, adolescent-centered mental health care systems, and hopefully contribute to the early identification and intervention for depression in adolescence.

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**Appendix A.** Original Quotes in Brazilian Portuguese

| Original Quote in Brazilian Portuguese | Translated quote |
|---|---|
| *“E eles acham que a gente não tem problemas. [...] Eu tenho problemas e eu tenho impressões e são muito mais que as de vocês, porque vocês têm as impressões de vocês e ainda impõem as impressões de vocês na gente.”* | *“They think [parents and school workers] we don’t have problems. [...] I have problems and I have thoughts that are much more than what you think, because you [adults] have your own impressions and impose these impressions on us [adolescents]” (Adolescent 3, male, 15)* |
| *“Ah, eu senti um vazio, senti que eu não queria mais nada com nada. Tipo, não queria mais fazer nada, não queria mais estudar, não tinha mais vontade de conversar com ninguém, não queria mais ser amiga de ninguém. Queria só ficar quieta na minha.”* | *“I felt empty, like I didn’t want anything else. I didn’t want to do anything, I didn’t want to study or talk to anyone, I didn’t want to be friends with anybody. I just wanted to be quiet, and be by myself.” (Adolescent 6, female, 15)* |
| *“Sentir um vazio, não se sentir mais feliz, ou não querer mais aquilo que tu gostava de fazer antes. Eu gosto de ler, gosto de ver série, e às vezes... Às vezes, não tenho ânimo, sabe? Daí, se é uma coisa recorrente, eu vejo que tem uma coisa errada, pode até ser uma depressão.”* | *“You feel empty, not happy anymore, with no desire to do things you liked before. I like to read, to watch TV shows, but sometimes I don’t feel like doing these things, I have no will. Then, if it is something recurrent, I see that there’s something wrong, I may be depressed.” (Adolescent 8, female, 15)* |
| *“É difícil não fazer besteira. Tipo, usar drogas, coisas assim, ou até tentar se matar. Foi um desafio muito grande, muito grande mesmo. A vontade teve.”* | *“It’s hard not to mess things up. Doing bad stuff (...) like killing yourself. It’s a big, big challenge. I wanted to.” (Adolescent 6, female, 15)* |
| *“Pois é, eles acham que só estar perto é bom, que a gente não precisa conversar, ver como são os problemas. Eles acham que porque um adolescente não tem contas pra pagar a gente não tem problemas.”* | *“They think that just being around is enough, and that we don’t need to talk about our problems. (...) They think that just because we don’t have bills to pay, we don’t have any problems.” (Adolescent 2, male, 16)* |
| *“Não sei se isso é uma coisa específica do Brasil, mas bullying é uma das principais causas. A pessoa já está enfrentando* | *“I don’t know if this is specific to Brazil, but bullying is one of the main causes. The person is already facing a lot, and on* |

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|---|---|
| *bastante e ainda por cima sofre bullying. Adolescentes querem ser parte de um grupo, mas quando eles precisam enfrentar o bullying, eles se sentem ameaçados.”* | *top of that, suffers bullying. The adolescent wants to be part of a group, and when they face bullying, they feel threatened.” (Adolescent 1, female, 14)* |
| *“E quando tem um problema, assim, que nem, a minha frequência baixou na escola bastante [...] não teve um professor que chegou em mim e disse assim, "está acontecendo alguma coisa, que tu está faltando?" Não. A única coisa que eu ouvi foi "ah, tu vai rodar, porque tua frequência está baixa. Ai, mas tu só falta aula." Foi as únicas coisas que ouvi.”* | *“When there is a problem – like when I had a school attendance problem, [...] not one teacher came to me and said, “hey, is there something happening, why are you missing school?” No. The only thing I heard was ‘oh, you’re going to fail, your attendance is low. Oh, you never come to class.’ That was the only thing I heard.” (Adolescent 7, female, 17)* |
| *“Eu fiquei pensando no sentindo, assim: tristeza. Que ideia tu tem de tristeza? Que que é triste? Que conceito tu tem de triste? Porque talvez eu, enquanto mãe, entenda que ser triste é ficar com aquele semblante, quietinho... e pra ele não.”* | *“What I’m thinking is that sadness... What do you think depression is? What is sadness? What are your conceptions of sadness? Because I, as a mother, understand that being sad is looking down, being quiet… And to him, it isn’t.” (Mother 8)* |
| *“Eu notei que ela estava mais fechada tanto que eu achei que fosse por causa da adolescência em si, né, não, ela está se fechando, porque ela sempre teve uma relação muito boa... E daí eu achava ela muito triste, ela não era assim. Ela sempre foi sempre muito falante, muito alegre, sempre disposta a ajudar tudo e todos. Comecei a notar que ela estava mais para baixo, assim, mais quieta, na dela.”* | *“I noticed that she was more closed, but I thought it was just a teenager thing, because of adolescence…But, she is getting more closed, and she always had a good relationship with me. (...) And I noticed she was sad, she was not like that. She used to be talkative, happy, always ready to help everyone. I noticed she was down, quiet, in her own world.” (Mother 4)* |
| *Tipo um atraso. Um atraso que, querendo ou não, é um momento que tu perde a vontade de fazer as coisas. (...) E não é porque tu quer, é só porque tu não está sabendo lidar. Tu não tá sabendo lidar com o teu trabalho, tu não tá sabendo lidar com os seus amigos, tu não tá sabendo lidar com os teus estudos. Tu não consegue evoluir porque tu só está retrocedendo...”* | *“It’s like a delay. It’s a delay that, liking it or not, is a moment you lose all the will to do stuff. (…) And it’s not because you want to, it’s just because you don’t know what to do. You don’t know how to deal with your friends, you don’t know how to deal with your studies…You can’t develop because you’re going backwards…” (Adolescent 7, female, 17)* |

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|---|---|
| *“Parece que tudo é difícil, parece que tudo te afunda mais.”* | *“Everything’s hard, it seems like everything makes you sink deeper.” (Adolescent 4, female, 15)* |
| *“Tem alguns que não querem ir. Tem alguns que vão para a escola, mas acabam ficando isolados ou... tem outros que se expressam de outras formas, também. (...) E... tem outros que enlouquecem, né, surtam e... ou não param de rodar na escola. Cada um acho que é de um jeito.”* | *“There are some who don’t want to go [to school]. There are some that go but end up being isolated, there are those who find other ways to express themselves too. [...] And there are others who go crazy, freak out and... Fail school again and again.” (Social Worker 5, female)* |
| *“É fortíssimo, né. Como, por exemplo, é muito comum a gente receber adolescentes que já passaram pelo plantão. O primeiro impacto é ser considerado louco e se considerar louco.”* | *“[The impact of a crisis] is really strong. For example, we get many adolescents coming from the ER. The first impact is being considered as crazy and considering themselves crazy.” (Health Worker 4, female)* |
| *“Quero ficar sozinha”. A primeira vez, eu só pensava quero ficar sozinha, só quero ficar sozinha, quero ficar no meu canto sozinha. Só conseguia pensar… Que quero ficar sozinha.”* | *““I want to be alone.” The first time [first depressive episode], all I could think was that I wanted to be alone, wanted to be in my own corner. All I could think about… I want to be alone.” (Adolescent 6, female, 15)* |
| *“Eu não queria mais nada com nada. Tipo, não queria mais fazer nada, não queria mais estudar, não tinha mais vontade de conversar com ninguém, não queria mais ser amiga de ninguém. (...) E acaba ficando brabo também.”* | *“I didn’t want anything at all: I didn’t want to do anything, I didn’t want to study, I didn’t want to talk to anybody, I didn’t want to be friends with anybody anymore. (...) And you end up being mad too.” (Adolescent 6, female, 15)* |
| *“Eu já convidei várias vezes ela pra sair, ir na minha casa, ou no cinema, e ela sempre recusava”* | *“I have invited her to go out several times, go to my house, or even go the movies… But she always refused.” (Adolescent 8, female, 15)* |
| *“Eu não sei dizer, fiquei meio... Meio preso. Com alguma coisa, assim, dentro de mim, assim, para tirar. Como... Um* | *“I don’t know how to explain, I felt… trapped. Like there was something inside me I couldn’t get rid of. Like a weight on* |

| | |
|---|---|
| *peso. Daí, eu fico muito angustiado e fico pensando nisso.”* | *me. And I would get really upset.” (Adolescent 3, male, 15)* |
| *“Não querer marcar programas com eles, e se marcam acham sem graça e se vão acham que não foi legal, ou só fala mal do que aconteceu no programa ou dos guris com quem estavam. Nada está bom, é o tempo todo isso- comportamento de reclamação, de não adequação. E muitas vezes ligada a evitação, que vai entrando num ciclo que tudo é ruim e ele [adolescente] começa a nem ir.”* | *“They don’t want to hang out with their friends, and if they do, they don’t see it as something nice, they just complain about what happened in the outing. Nothing is good, and it’s all the time - they complain, they don’t feel adequate. This is often linked to avoidance, which spirals into a bad cycle, and the adolescent doesn’t even try to go out anymore.” (Health Worker 3, female)* |
| *“Eu acho que, por causa da depressão, a pessoa se isola e pensa que não tem solução para os seus problemas, e que ninguém mais está na mesma situação, que ninguém consegue entender seu sofrimento.”* | *“I think that because of depression, a person isolates themselves and thinks that there are never any solutions for their problems, and that no other person is in the same situation, that people can’t understand their suffering.” (Adolescent 1, female, 14)* |
| *“Se sentir triste, tipo, não... Se sentir sozinho, sei lá, não ter vontade de viver... Isso... Acho que são alguns sintomas que tu está com depressão.”* | *“Feeling very sad and very lonely. Having no will to live. This… I think these are the signs you are depressed.” (Adolescent 4, female, 15)* |
| *“A minha filha também, quarto, quarto, quarto. Não pega sol no nosso apartamento, só pega de manhã durante 20 minutos, é uma tristeza. E eu digo assim, "A gente tem que sair, ficar num sol, né, vamos sair, nem que seja no supermercado, mas tu tem que pegar sol", daí ela fica sempre deitada, assim, no celular. Eu me preocupo, sabe?”* | *“My daughter just stays in her room. We don’t have direct sunlight in our apartment, just in the morning for 20 minutes, it’s sad. And I tell her we have to go out, even if it’s just to the supermarket, but she is always lying down, using her phone. I worry about her a lot.” (Mother 2)* |
| *Eu, ultimamente, quando fico mal, eu tento olhar mais pelo lado positivo. Aí eu vejo que, tipo, não é só aquilo, que existem coisas boas(...) Converso com minha prima, também, tipo... Que é bom desabafar.* | *“Lately, when I feel bad, I try to look more on the positive side. Then I see that it's not just that, that there are good things (…) I talk to my cousin, too, like ... It's good to let off steam.” (Adolescent 5, female, 14)* |
| | |

| | |
|---|---|
| *“Tem horas que é insuportável estar perto das pessoas, mas tem horas que eu não quero que elas vão pra longe de mim.”* | *“There are moments when it is unbearable to be around people, but there are moments when I don’t want them to go away from me.” (Adolescent 2, male, 16)* |
| *“No psicólogo também, eu que tomei a iniciativa de ir no psicólogo, porque eu senti a necessidade de dividir os meus problemas com um profissional.”* | *“At the psychologist too, I took the initiative to go to the psychologist, because I felt the need to share my problems with a professional.” (Adolescent 8, female, 16)* |
| *“Muita gente se corta. Procurando algum tipo de alívio. Teve gente também... Até artista, que se fugiu para as drogas, não aguentava mais ter dor e fugiu para as drogas.”* | *“A lot of people self-harm. Looking for some sort of relief. There’s also people… Even artists, that scaped into drugs, they could not face being in pain anymore and scaped into drugs.” (Adolescent 3, male, 15)* |
| *“Olha, as meninas elas são, elas, elas tentam se unir mais para poder uma ajudar a outra. Então, elas tentam ser mais unidas, as meninas. E aí, uma tenta consolar a outra, às vezes. Às vezes tem o lado positivo também. Às vezes, uma coleguinha diz "não, vai lá em casa, a mãe te ajuda, minha mãe te ajuda, e tal". Então, as meninas, elas ainda têm mais, assim, união. Já os meninos, como eles são muito individualistas.”* | *“Look, the girls they are… They try to unite so they can help each other [...] They are more united. They comfort one another sometimes. There’s a positive side to it. Sometimes one girl says to another “no, you can go to my home, my mom can help you”. Girls unite themselves more, while boys are individualistic.” (Educator 5, female)* |
| *“Positiva é a fala, quando conseguem falar disso, falar nos grupos, falar com o grupo da escola, sobretudo na família - ter alguém que escute na família. Eu acho que essa é uma estratégia de enfrentamento muito positiva.”* | *“Positive [coping strategy] is talking, when they manage to talk about their feelings in groups, but mostly in the family - and having someone that listens in the family. I think this is a very good coping strategy.” (Father 1)* |

**Appendix B.** Complete Framework of Codes used for the Creation of Themes, Stratified by Respondent

| Codes > | Adolescents | Parents | Social Workers | Health Workers | Educators | Policy Makers |
|---|---|---|---|---|---|---|
| Signs & Symptoms of Depression | - Loneliness and Social Isolation linked to anhedonia and suicidal ideation<br>- Feeling empty and overwhelming cognitive symptoms<br>- Feelings of sadness | - “Not wanting to do things”<br>- Irritable mood<br>- Spending too much time in the room and withdrawing from family convivence<br>- Crying a lot<br>- Self-harm<br>- Weight loss/gain | - “Not wanting to do things”<br>- Irritable and sad mood<br>- Crying a lot<br>- Self-harm<br>- Weight loss/gain | - “Not wanting to do things”<br>- Irritable mood<br>- Self-harm<br>- Weight loss/gain | - “Not wanting to do things”<br>- Sad mood<br>- Self-harm<br>- Changing the way they look: “wearing sweaters all the time” | - Anhedonia<br>- Sad mood |
| Depression vs. Other Experiences | - Depression sticks to you like a scar;<br>- Most symptoms go unnoticed. | - Generation issues: what’s sadness to adolescents? | - Depression is a loss of will and ability to deal with adverse situations, while this does not happen in sadness | - Depression is a loss of will and ability to deal with adverse situations, while this does not happen in sadness<br>- Intensity, impact and duration | - Depression is persistent (length)<br>- Depression impairs functioning | - Intensity, impact and duration |
| Impacts of Depression | - Isolation from peers<br>- Increased inability to deal with adverse life situations<br>- Problem in relation with parents and peers<br>- Delay in development<br>- Impaired school performance | - Isolation from peers<br>- Impairment in school performance, dropout<br>- Suicide | - Isolation from peers<br>- Impairment in school performance<br>- Self-harm/suicide<br>- Difficulty in maintaining relations | - Isolation from peers<br>- Suicide<br>- Impairment in school performance | - Self-harm/suicide<br>- Impairment in school performance<br>- Isolation from peers | - Self-harm/suicide<br>- Impairment in school performance, dropout |
| Coping Strategies | - Individual level: writing and having positive thoughts<br>- Relational strategies: discussing problems with family members | - Positive coping strategies: talking about emotional issues with parents and peers<br>- Leisure time, sports | - Positive coping: talking with parents and asking for help<br>- Group strategies<br>- Negative coping: self-harm and suicidal ideation<br>- Drug and alcohol abuse | - Positive coping strategies: group support, looking for help<br>- Talking parents and peers<br>- Negative coping strategies: suicide attempts | - Positive coping: asking for help, support from family and friends<br>- Negative coping strategies: drugs<br>- Denying they need help | N/A |

| | | | | | | |
|---|---|---|---|---|---|---|
| | - Engaging in social networking<br>- Distraction activities<br>- Negative coping strategies: use of cigarettes, alcohol consumption and doing drugs. | - Negative coping strategies: bad peer influence, running away | | - Drugs<br>- Isolation | - Self-harm | |

# **Appendix C.** Consolidated Criteria for Reporting Qualitative Research

| Top ic | Item No. | Guide Questions/Description | Page No. |
|---|---|---|---|
| **Domain 1: Research team and reflexivity** | | | |
| *Personal characteristics* | | | |
| Interviewer/facilitator | 1 | Which author/s conducted the interview or focus group? | 5-6 |
| Credentials | 2 | What were the researcher's credentials? E.g. PhD, MD | 5-6 |
| Occupation | 3 | What was their occupation at the time of the study? | 6 |
| Gender | 4 | Was the researcher male or female? | 6 |
| Experience and training | 5 | What experience or training did the researcher have? | 6 |
| *Relationship with participants* | | | |
| Relationship established | 6 | Was a relationship established prior to study commencement? | 4-5 |
| Participant knowledge of the interviewer | 7 | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | 4 |
| Interviewer characteristics | 8 | What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | 26 |
| **Domain 2: Study design** | | | |
| *Theoretical framework* | | | |
| Methodological orientation and Theory | 9 | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | 5-7 |
| *Participant selection* | | | |
| Sampling | 10 | How were participants selected? e.g. purposive, convenience, consecutive, snowball | 4-5 |
| Method of approach | 11 | How were participants approached? e.g. face-to-face, telephone, mail, email | 4-6 |
| Sample size | 12 | How many participants were in the study? | 7-8, Appendix D |
| Non-participation | 13 | How many people refused to participate or dropped out? Reasons? | 8 |
| *Setting* | | | |
| Setting of data collection | 14 | Where was the data collected? e.g. home, clinic, workplace | 5-6 |
| Presence of non-participants | 15 | Was anyone else present besides the participants and researchers? | 5-6 |
| Description of sample | 16 | What are the important characteristics of the sample? e.g. demographic data, date | 7-8, Appendix D |
| *Data collection* | | | |
| Interview guide | 17 | Were questions, prompts, guides provided by the authors? Was it pilot tested? | 5 |
| Repeat interviews | 18 | Were repeat inter views carried out? If yes, how many? | N.A. |
| Audio/visual recording | 19 | Did the research use audio or visual recording to collect the data? | 6 |
| Field notes | 20 | Were field notes made during and/or after the interview or focus group? | 6 |

| | | | |
|---|---|---|---|
| Duration | 21 | What was the duration of the inter views or focus group? | 5-6 |
| Data saturation | 22 | Was data saturation discussed? | 4, 6 |
| Transcripts returned | 23 | Were transcripts returned to participants for comment and/or correction? | N.A. |
| **Domain 3: analysis and findings** | | | |
| *Data Analysis* | | | |
| Number of data coders | 24 | How many data coders coded the data? | 6 |
| Description of the coding tree | 25 | Did authors provide a description of the coding tree? | 6-7, Appendix B |
| Derivation of themes | 26 | Were themes identified in advance or derived from the data? | 6-7 |
| Software | 27 | What software, if applicable, was used to manage the data? | 6 |
| Participant checking | 28 | Did participants provide feedback on the findings? | N.A. |
| *Reporting* | | | |
| Quotations presented | 29 | Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number | 8-19 |
| Data and findings consistent | 30 | Was there consistency between the data presented and the findings? | 19-25 |
| Clarity of major themes | 31 | Were major themes clearly presented in the findings? | 19-25, Figure 1 |
| Clarity of minor themes | 32 | Is there a description of diverse cases or discussion of minor themes? | 16, 19-21 |

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. International Journal for Quality in Health Care. 2007. Volume 19, Number 6: pp. 349 – 357

# **Appendix D.** Additional Information on Stakeholders

| **11 adolescents with lived experience of depression from public state schools** | | | | | |
|---|---|---|---|---|---|
| Adolescent 1 (KII)<br>○ Girl, 14<br>○ Grade x<br>○ Not currently depressed | Adolescent 2 (KII)<br>○ Boy, 16<br>○ Grade x<br>Currently depressed | Adolescent 3 (KII)<br>○ Boy, 15<br>○ Grade x<br>Currently depressed | Adolescent 4 (KII)<br>○ Girl, 15<br>○ Grade x<br>Not currently depressed | Adolescent 5 (KII)<br>○ Girl, 14<br>○ Grade x<br>Not currently depressed | Adolescent 6 (KII)<br>○ Girl, 15<br>○ Grade x<br>Not currently depressed |
| Adolescent 7 (FGD)<br>○ Girl, 17<br>○ Grade x<br>○ Currently depressed | Adolescent 8 (FGD)<br>○ Girls, 16<br>○ Grade x<br>○ Currently depressed | Adolescent 9 (FGD)<br>○ Boy, 17<br>○ Grade x<br>○ Currently depressed | Adolescent 10 (FGD)<br>○ Boy, 16<br>○ Grade x<br>○ Not currently depressed | Adolescent 11 (FGD)<br>○ Boy, 14<br>○ Grade x<br>○ Not currently depressed | |
| **12 parents of adolescents lived experience of depression** | | | | | |
| Parent 1 (KII)<br>○ Father of girl with current depression | Parent 2 (FGD)<br>○ Mother of girls with current depression | Parent 3 (KII)<br>○ Father of girl with current depression | Parent 4 (KII)<br>○ Father of girl with current depression | Parent 5 (KII)<br>○ Father of girl with current depression | Parent 6 (KII)<br>○ Father of girl with current depression |
| Parent 7 (FGD)<br>○ Father of girl with current depression | Parent 8 (FGD)<br>○ Father of girl with current depression | Parent 9 (FGD)<br>○ Father of girl with current depression | Parent 10 (FGD)<br>○ Father of girl with current depression | Parent 11 (FGD)<br>○ Father of girl with current depression | Parent 12 (FGD)<br>○ Father of girl with current depression |
| **12 social workers working with adolescents**<br>In Brazil, social workers are professionals who work in planning, managing, and executing policies aim at the expanding access of citizens to social rights. Most social workers in Brazil work in the system of social protection to citizens, with close accounts to education and health sectors. | | | | | |
| Social worker 1<br>○ Female<br>○ Porto Alegre Public Social Assistance Policy | Social worker 2<br>○ Female<br>○ Psychiatric hospital children's ward | Social worker 3<br>○ Female<br>○ Emergency Hospital in Porto Alegre | Social worker 4<br>○ Female<br>○ Primary Care Unit | Social worker 5<br>○ Female<br>○ NGO in Porto Alegre and career in an orphanage | Social worker 6<br>○ Female<br>○ College Professor |
| Social worker 7 | Social worker 8 | Social worker 9 | Social worker 10 | Social worker 11 | Social worker 12 |

| | | | | | |
|---|---|---|---|---|---|
| ○ Female<br>○ Psychiatric hospital children’s ward | ○ Female<br>○ Public service that care for abused women and children | ○ Female<br>○ Community Health Agent | ○ Male<br>○ Works at the Tutelary Council | ○ Female<br>○ Community Health Agent | ○ Female<br>○ Specialization in course in mental health |
| **12 educators**<br>We here define educators as professionals who work in schools as teachers or principals. Schools in Brazil also usually have a Pedagogical Counselling office that mediates the teaching-learning issues. | | | | | |
| Educator 1<br>○ Female<br>○ Principal of a public School in Porto Alegre | Educator 2<br>○ Female<br>○ Counselor at public school in Porto Alegre | Educator 3<br>○ Female<br>○ Teacher at a public school in Porto Alegre | Educator 4<br>○ Female<br>○ Teacher at a public school in Porto Alegre | Educator 5<br>○ Female<br>○ Counselor at a public school in Porto Alegre | Educator 6<br>○ Female<br>○ Teacher at a public school in Porto Alegre |
| Educator 7<br>○ Female<br>○ Counselor at a public school in Porto Alegre | Educator 8<br>○ Female<br>○ Teacher at a public school in Porto Alegre | Educator 9<br>○ Female<br>○ Teacher at a public school in Porto Alegre | Educator 10<br>○ Male<br>○ Former arts teacher at public schools | Educator 11<br>○ Female<br>○ College Professor, specialized in language acquirement | Educator 12<br>○ Male<br>○ Principal of a public School in Porto Alegre |
| **12 health care workers**<br>All interviewed health workers were all in the field of mental health. This means that most of them worked in specialized care, either in private practice or public services. All had experience working with children and adolescents. | | | | | |
| Health Care Worker 1<br>○ Female<br>○ Psychologist, | Health Care Worker 2<br>○ Female<br>○ Psychologist | Health Care Worker 3<br>○ Female<br>○ Child and adolescent psychiatrist | Health Care Worker 4<br>○ Female<br>○ Child Psychologist | Health Care Worker 5<br>○ Female<br>○ Paediatric Nurse | Health Care Worker 6<br>○ Female<br>○ Psychiatric Nurse |
| Health care worker 7<br>○ Female<br>○ Psychologist | Health care Worker 8<br>○ Female<br>○ Psychologist, researcher, college professor | Health care worker 9<br>○ Male<br>○ Psychiatrist and researcher | Health care worker 10<br>○ Female<br>○ Psychologist, researcher, college professor | Health care worker 11<br>○ Female<br>○ Child and adolescent psychiatrist | Social worker 12<br>○ Female<br>○ Psychologist, researcher, college professor |

<table>
<tr><td colspan="6"></td></tr>
<tr><td colspan="6"><b>6 policy makers</b><br>Policy Makers are defined as professionals who defend the well-being of children and adolescents in Brazil, representing the sectors of health, education, and social services in governmental agencies.</td></tr>
<tr>
<td>Policy Maker 1<br>○ Female<br>○ Department of Education of Porto Alegre</td>
<td>Policy Maker 2<br>○ Male<br>○ Department of Health, division of Municipal Mental Health</td>
<td>Policy Maker 3<br>○ Female<br>○ Administrative consultant at the Municipal Health Sector</td>
<td>Policy Maker 4<br>○ Male<br>○ City Councilor</td>
<td>Policy Maker 5<br>○ Male<br>○ Specialist in primary care at a public hospital in Porto Alegre</td>
<td>Policy Maker 6<br>○ Male<br>○ Specialist in public security and human rights</td>
</tr>
</table>

# 6 SECOND STUDY, PUBLISHED IN CLINICAL CHILD PSYCHOLOGY AND PSYCHIATRY

## The Experience of Receiving a Diagnosis of Depression in Adolescence: A Pilot Qualitative Study in Brazil

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## Abstract

Receiving a diagnosis of depression can have an important impact on the lives of adolescents. However, there is limited information about how youth tackle, attribute meaning to, and understand mental health diagnoses. The aim of this study was to explore adolescents' initial reactions after receiving a clinical diagnosis of Major Depressive Disorder in the context of a neurobiological study of depression in Brazil. Using a qualitative design, eight Brazilian adolescents were interviewed twice: immediately after a psychiatric assessment and neuroimaging study, in which they were given a diagnosis of depression, and in a follow-up visit two weeks later. Interviews were designed to explore the subjective experience of receiving the diagnosis and the impacts of depression on the adolescents' lives. Framework Analysis was used to analyze the accounts. Diagnosis was perceived as a reification of an abnormal status, highlighting the role of stigma and the process of disclosing the diagnosis to others. Adolescents reported the multiple sensemaking processes that occurred when they received a diagnosis of depression, and most struggled with the idea that negative emotions would equate their experience with a disorder. The results show that future efforts could enhance clinical assessment processes with adolescents by exploring adolescents' reactions to diagnosis, as well as the support networks available to them, resulting in increased help-seeking behaviors, and diminished social and personal stigma.

Keywords: Major Depressive Disorder; Adolescence; Qualitative Methodology; Lived Experience; Psychiatric Diagnosis.

## Introduction

Receiving a diagnosis of a mental health condition can have a major impact on the lives of patients (Perkins et al., 2018), as it “marks the point when formal status of psychiatric patient is conferred” (Rose & Thornicroft, 2010, p. 140). It can also be an important part of the illness experience - especially since it is embedded in the social and cultural context, but also connected to the biography of a person and to the disease process (Kleinman & Seeman, 1999). Therefore, it is important to understand how people tackle, attach meaning to, and understand symptoms and diagnoses (Petersen et al., 1993).

There is a modest body of literature on the experience of receiving a diagnosis of a mental health condition. Most of the studies are conducted with adults from western, educated, industrialized, rich and democratic countries and focus on the contradictory nature of the experience of receiving a diagnosis (Pitt et al., 2009). The positive side of this is described as giving patients something to focus on and a way to think about their difficulties, and as giving a sense of relief (Rose & Thornicroft, 2010). The negative side, however, is more focused on the idea of a diagnosis as a label for not fitting in or as a negative judgment (Hayne, 2003), and the concern of being stigmatized and discriminated against by others (Hamilton et al., 2014). Among adolescents, studies show similar results, highlighting the impacts of making sense of a diagnosis (Bluhm et al., 2014; Wisdom & Green, 2004).

During adolescence, however, there is a heightened focus on the impacts of accepting depression as congruent with their previous experiences on self-image and identity, therefore engaging in different ways of integrating the information of the diagnosis into their self-image (Wisdom & Green, 2004). In these cases, diagnoses can give adolescents a sense of insight and validation of previous experiences and feelings, acting as a gateway to intervention and self-management (O’Connor et al., 2018), as well as having a role in integrating past and present experiences considering the diagnosis (Jones & Hesse, 2018). Receiving a diagnosis involves interpersonal relations, social identity and stigma experiences, being therefore a key point in mental health trajectories of youth (O’Connor & McNicholas, 2020).

However, there are still important gaps in the literature: we need to further investigate how adolescents experience receiving a diagnosis. This approach is highly relevant since adolescence is the phase of development when the prevalence of depression rises sharply (Thapar et al., 2012). Moreover, depression often has a chronic course across the lifespan, and thus the first onset of symptoms during adolescence may be the best opportunity for early intervention to prevent chronicity (Davey & McGorry, 2019). Therefore, understanding how adolescents feel when they are diagnosed and how they make sense of it can provide insights into how to enhance this process, facilitate it, or even contribute to address the gaps in identification and management of mental health disorders.

In this sense, it is important to explore this experience from the perspective of Brazilian adolescents. By contrasting and exploring the experience of Brazilian teens, we can also shed light on the differences and similarities from similar studies in high-income countries, which is particularly important since 90% of the world’s adolescents live in low- and middle-income countries (Kieling et al., 2011). We here present the results of a qualitative study with adolescents’ who received a clinical diagnosis of Major Depressive Disorder (MDD) during a research assessment in an urban hospital setting in southern Brazil. We also report on how adolescents perceive and experience depressive symptoms and the ways they manage and cope with depression and depressive feelings.

## Materials and Methods

### Study Design and Sampling

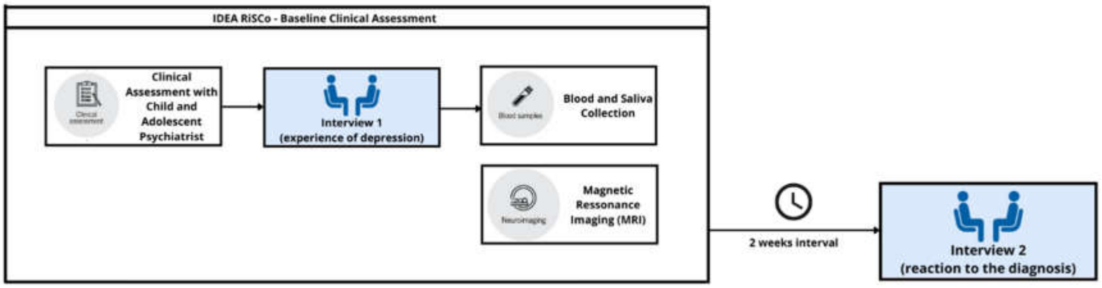
The Identifying Depression Early in Adolescence Risk Stratified Cohort (IDEA RiSCo) study (Kieling et al., 2021) included a sample of 150 adolescents aged 14 to 16 years from schools in Porto Alegre, Rio Grande do Sul, Brazil, who had undergone screening for risk factors associated with MDD (see Table 1 for the list of factors). Additional information on the study setting is provided in Appendix A. As part of the IDEA RiSCo study protocol, participants and their primary caregivers were invited to a clinical assessment (see Appendix B) by a child and adolescent psychiatrist using the DSM-5 Brazilian Portuguese version of Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL) (Caye et al., 2017).

Recruitment for this qualitative study began during the final stages of the IDEA-RiSCo baseline assessment, focusing on the last 10 included adolescents who met criteria for a formal DSM-5 diagnosis of MDD and were in a current depressive episode. Participants were approached immediately after receiving the diagnosis by the clinician at the end of the clinical assessment and invited to participate in two semi-structured interviews: one immediately after initial recruitment and the second two weeks later. After the first interview, participants also underwent an fMRI protocol and had their blood taken. The final analysis included 8 adolescents, as two were excluded due to incompleteness of the second interview.

### Data Collection

To capture both immediate and subsequent reactions to receiving a diagnosis of MDD, we divided the interview process into two stages. In the first, immediately after the adolescent received feedback from the psychiatrist, the adolescents were asked about their experience of depression. Two weeks later, they returned for a follow-up interview which focused on understanding the adolescents' reaction to the diagnosis (see Figure 1 for detailed timeline of events). The questions included explored the experience of depression and its symptoms, and the experiences of receiving and disclosing diagnosis. For the complete interview guide, see Appendix C.

Figure 1. Detailed Timeline of Events



Data collection took place at the Clinical Research Center, Hospital de Clínicas de Porto Alegre, where the IDEA RiSCo study was being performed. Individual interviews were conducted in Brazilian Portuguese by AV and SB and were audio-recorded and transcribed. Interviews were carried out by a master's student (AV, female) and a Doctor in Psychology (SB, female), both with a background in Psychology and qualitative research.

## Data Analysis

Interviews were analyzed using Framework Analysis (FA) (Ritchie & Spencer, 1994). The creation of the codes was inductive - we used line-by-line coding of two initial interviews to create a framework of codes that was subsequently adapted and expanded until no new codes emerged (Thomas, 2016). Additionally, constant comparison - comparing newly coded sections to previous coded data (Glaser & Strauss, 1967) - and discussions with the research team were used to refine and create the final codebook. The final codebook was used to code the full dataset using NVivo version 12 (Richards, 1999). Coding was conducted in Portuguese by two researchers (AV and SB), under the supervision of a senior researcher (CK). We assessed inter-rater reliability (IRR) using Cohen's Kappa, and considered an IRR of 0.7 as indicating adequate agreement (McHugh, 2012). Afterwards, code queries were generated in NVivo and code summaries were written to capture adolescents' perspectives and experiences. All stages of analysis and reporting were executed according to the Consolidated Criteria for Reporting Qualitative Research (Tong et al., 2007) (Appendix D). In preparing the manuscript for publication, the original quotes were translated into English by one of the researchers (AV, Brazilian researcher with advanced proficiency in English), and reviewed by two of the other authors who speak fluent Portuguese and English (SB and CK).

## Ethics

This study was approved by the Hospital de Clínicas de Porto Alegre Ethics Committee (CAAE: 03220818.0.0000.5327) All adolescents and their caregivers provided written consent to participate in the study. All adolescents were provided feedback on their clinical evaluation by a child and adolescent psychiatrist prior to their inclusion in the present study and were referred for care within the Brazilian public health system. No adolescents presenting with imminent risk were included. Participants and primary caregivers were informed that the refusal to take part in this component of the research would not interfere with the overall participation and referral process. To ensure protection of confidentiality and anonymization of the data, all identifiable details given by participants during their interviews were omitted from interview transcripts.

## Results

Eight adolescents had full data available - two girls and six boys (mean age of 15.3 years). This sample was equally composed of white and non-white adolescents. Given the IDEA RiSCo study ascertainment design, included adolescents exhibited a high load of social risk factors for developing depression. Additionally, adolescents had a mean score of 49 on the Children’s Depression Rating Scale–Revised (CDRS-R), indicating moderate depression (Plener et al., 2012) (for additional information, see Table 1 and Appendix E). Interview duration ranged from 32 to 54 minutes, with an average of 42 minutes per respondent. The two themes and three subthemes were generated in a way that represented the overarching narrative across all respondents.

### *Theme 1: Reaction to Diagnosis: does having a diagnosis mean it is real?*

All adolescents included in the study received a formal diagnosis of depression by a child and adolescent psychiatrist. For most of them (six of eight), this was their first contact with a mental health specialist and the diagnosis was undisclosed until that moment. Adolescents were grouped into two types of reaction to the diagnosis: half of them said it was no surprise, and the other half struggled with the diagnosis.

To those for whom the diagnosis did not come as a surprise, the possibility of having depression was something they were already considering prior to taking part in the research project. They mentioned either searching for the symptoms online and relating to them or comparing their feelings to others' who were diagnosed with MDD.

*"It wasn't a surprise, so I took it well. I already imagined it could have something to do with my heritage - my mom has [depression], my grandmother…" (Boy 3, age 15)*

To those who were surprised to be diagnosed with depression, the reaction was of disbelief.

*"I was surprised and... I think that it made me tense, because I had never thought about something like this, so maybe I don't have it. Having a diagnosis does not mean that this is real." (Boy 1, age 15)*

This disbelief about the diagnosis of depression also expressed the adolescents' concerns about the weight of a diagnosis of depression. They seemed to link the idea of having a diagnosis with being a "depressed person", which was seen as something negative. The diagnosis, to them, was a powerful label that defines someone.

In Portuguese, as in many languages, 'depressive' [Brazilian Portuguese: 'depressivo'] is a common way of referring to both feelings of sadness and to define someone who has a formal psychiatric diagnosis. This creates a difference between the idea of being depressed and having depression - the first as an indicator of a state and the latter as a trait - that adolescents reflected upon:

*“I don’t feel like a depressed person. Or I could be one, but right now. The psychiatrist said that, but… [Said] That I have to take medication. But I don’t see myself as a depressive person. Do I have depression? This can be something of this moment. (…) I’m not a depressed person.” (Boy 4, 16)*

*Subtheme: Stigma as a Barrier to Disclosing the Diagnosis*

The beliefs about depression and its diagnosis also seemed to be linked to stigma. Adolescents stressed common shared beliefs of depression as a personal weakness. The idea of depression as something experienced by "crazy people" [“gente louca”] was also a component mentioned by half of the participants.

In the first two weeks after receiving the diagnosis, five adolescents chose to disclose their diagnosis to people outside their families, limiting it to one or two close friends and/or significant others. They reported mixed reactions, but most of them being negative - only one adolescent mentioned a positive and supportive reaction. Most times, adolescents reported that this disclosure led to arguments:

*“[Talking about a friend] She was really upset [...] She told me I never tell her things, I never open up to her [...] she was mad at me because I’m not happy.” (Boy 1, 15)*

As for the reaction of family members, adolescents also reported mostly negative reactions:

*“It wasn’t very good. […] My dad says things like ‘I didn’t raise you to be sad, I raised you to be strong, because this is something from a weak person’.” (Boy 1, 15)*

Those who did not disclose the diagnosis expressed concerns about the stigma that still surrounds a depression diagnosis:

> *"[I did not tell anyone because] they will call me crazy. […] They already called me crazy because you invited me to this research. Imagine if I told someone I have depression?" (Girl 1, 16)*

*Subtheme: Trusting Relations as a Facilitator for Disclosing the Diagnosis*

While distraction techniques were most often mentioned by the adolescents to forget negative feelings, for four of the adolescents, distraction techniques involved relying on meaningful relations with friends or family members.

> *"I think that talking to my friend or… Some of my friends, people that are really important to me. Sometimes they distract me with jokes, our way of being together… The jokes, the playing, it totally changes my mood." (Boy 1, 15)*

From these four adolescents, only one chose not to disclose their diagnosis. Close relations with family, peers, and significant others were often cited as a reason to disclosing the diagnosis:

> *"I told only a friend of mine. Just her. Because she is a person who is always with me. She is very especial to me, she is always with me and I trust her a lot." (Boy 1, 15)*

While relationships, especially those with friends, were mentioned by all adolescents as being an important part of their lives, the idea of trust was prominent in all respondents who chose to disclose the diagnosis:

*“I told my friend about it [the diagnosis] because I trust him very much” (Boy 3, 15)*

### *Subtheme: Biological perspectives on depression*

Two weeks after receiving the diagnosis, providing blood samples, and undergoing a magnetic resonance imaging exam, adolescents were interviewed regarding their diagnosis. For most adolescents, depression was like a “very strong emotion that someone can’t deal with properly” (Boy 1, 15), and they struggled with the idea of these emotions as indicators of a formal disorder – which made it harder for them to accept the diagnosis.

*“You are talking that this [depression] is a disorder, but it is also a kind of emotion. And knowing emotions from blood or other exams is... Different.” (Boy 1, 15)*

When talking about the exams they underwent and possible results that could arise from neurobiological markers, adolescents pondered whether feelings were something from “the brain” or “the organism” not only from “the mind.”:

*“Maybe I would think that sometimes some of the things I feel are not from my mind, but of how my organism works.” (Boy 5, 15)*

This separation of bodily functions and emotions – where depression lies – was often a point of discussion in interviews:

*"I've never seen finding anything in the blood that caused something I have – like sadness. One thing is feelings and other is what there's on the blood." (Girl 1, 16)*

While for four adolescents finding neurobiological causes for depression could be a relief, two adolescents were also concerned about the implications of this. Interestingly, these concerns were strictly related to neuroimaging results that could reflect the cultural idea of "madness" ["loucura"] as something that comes from a "damaged" brain:

*"If it were something from the head ["alguma coisa da cabeça"] then I would be terrified." (Girl 2, 16)*

### *Theme 2: Experience of Depression*

All adolescents were asked about their personal interpretation and experience of depression. Depression was predominantly described based on the emotions they felt and was associated with an inability to deal with these feelings:

*"I think… It's an emotion so strong someone can't deal with it properly; can't deal with it alone. It's a disease, right? I think it's very hard, I don't know why people treat it like it's a disease, but I know it is. Because I think it is much more like an emotion, but stronger. Sadness, but the deepest summit. The person loses will, changes who they are. Change completely their life patterns and ways." (Boy 1, 15)*

Adolescents referred to difficulty in understanding why their emotional experience was labeled as a “disease”. At the same time, they expressed willingness to establish a meaning for what they were experiencing. It was clear that depression marked their lives, creating a division between the before and after the symptoms started. Not all adolescents were able to name actions and feelings that changed after they started experiencing depression-like symptoms, but all agreed that the idea of change was a big part of the experience.

*“Things weren’t like this before. I didn’t feel like this.” (Boy 3, 15)*

Descriptions of concrete experiences were also mentioned.

*“Sadness and boredom… When depression comes in certain people, like my brother, it is this sadness and this boredom.... He didn’t want to go out to work, to go to school, he was very bored. [He] only wanted to be inside the house, so I see depression a lot like boredom, like sadness.” (Boy 4, 16)*

Participants reported that depression had changed their lives in two complementary ways: a decrease in their will and ability to do different things, meet new people, and engage in interests that they previously considered to be gratifying; and an increased importance was given to their own thoughts and beliefs. They described it as “being stuck” in their own heads: there is added value to thoughts and beliefs and less focus on external situations. The escape through isolation and the difficulty to share depressive feelings made it harder breaking this cycle:

*“Sometimes I don’t go out with my friends so I can stay home, you know? Be alone, in my room. On my phone, on the computer. Just being quiet.” (Boy 6, 16)*

The negative feelings and words that were most used to express what depression meant to them were: sadness, discomfort, loneliness. One participant said his depression:

*“Is like a water jar with a leak… It just empties little by little. It fades, but not at once. But then it is also like someone grabs it and turns it over because they can’t stand this slow leak […] So it’s just empty and they can start over, buy a new one.” (Boy 1, 15)*

## Discussion

The present pilot study generated data on Brazilian adolescents’ experiences and processes of constructing and attributing meaning to the diagnosis of depression by conducting interviews with adolescents at two time-points – immediately after receiving the diagnosis and then again two weeks later. Participants’ reports point towards an experience of depression marked by intense emotional features.

Most adolescents, however, struggled with the idea of these emotions as indicators of a formal disorder - which made it harder for them to accept the diagnosis. There was separation of body and mind expressed by adolescents when they pondered whether these feelings were something from “the brain” or “the organism” not only from “the mind.” However, IDEA RiSCo was a study designed to investigate neurobiological features associated with the risk of developing and the presence of depression in adolescence (Kieling et al., 2019, 2021), and accounts on the separation of body and mind were cited in the second interview, after providing blood samples and undergoing a magnetic resonance imaging exam. Therefore, they could have been influenced by the study design. However, this fracture was already documented in other studies, notably by Bluhm and colleagues (Bluhm et al., 2014), where adolescents perceive “the mind” as separate from the biological processes that constitute the brain. This entails the belief that there are different forces acting upon behaviors and emotions and can impact the treatment adherence.

This initial struggle has also been described in other studies, where participants expressed an “initial sense of disbelief” following a diagnosis (Loughland et al., 2015). By drawing on the conceptual separation of illness and disease (Kleinman, 1978), it could be argued that, by putting these feelings in “the mind”, adolescents were in the realm of experience, and the diagnosis marks the introduction of technical terminology, accompanied by a specific healing system, by explaining these emotions and introducing the idea of disease. By providing the name of Major Depressive Disorder, the diagnosis also acts in a way of ‘containing’ something previously without meaning (Rose & Thornicroft, 2010).

However, not all adolescents responded like this. Adolescents who were not surprised by the diagnosis were, at least to some extent, familiar with the idea of depression as a disease. To these adolescents, the diagnosis itself was a recognition of previous suspicions. They cited their prior knowledge about depression as an important aspect of this reaction - they knew the symptoms of depression by either searching for them online or by having someone close to them diagnosed with it. The importance of reaching out to those people identified as having suffered from depression was also congruent with previous studies on the topic and was often linked with increased help-seeking behaviors (Wisdom & Green, 2004). This importance of information about the diagnosis in the process of understanding is consistent with prior literature involving adults. Patients frequently find it empowering learning about the diagnosis and its associated symptoms (Perkins et al., 2018), which can facilitate access to treatment and support (Milton & Mullan, 2015). This is often linked to the positive aspect of receiving a diagnosis, but participants here also attributed importance to the negative aspects of it.

Some adolescents see the diagnosis as a negative, fixed label, and acknowledge the difficulty of disclosing the diagnosis to others. This engulfment of the self by the diagnosis – rendering teens feeling unable to manifest other parts of their selves that were not affected by the diagnosis – seems an experience common to teens who are diagnosed with other mental health conditions (Jones & Hesse, 2018). Concerns about the diagnosis seemed to be similar to what has previously been described as the idea of diagnosis as a “master status” - something that becomes an adjective that describes the person and ordains their whole life (Rose & Thornicroft, 2010). This idea of stagnation of their lives was a common concern to adolescents, who seem to struggle with the polarization of their self-identities. Moreover, many adolescents reported seeing the diagnosis as the reification of an abnormal status – which is similar to reports from adolescents suffering from different conditions, such as ADHD (Jones & Hesse, 2018). Stigma apparently also plays an important role in this scenario, affecting especially the non-disclosure of the diagnosis to others. The interviewed adolescents reported both personal and perceived stigma (Barney et al., 2006) as influencing their diagnosis acceptance and help-seeking behaviors (Schomerus et al., 2019). They also highlighted the pivotal role of caregivers’ and peers’ perceptions in this process - these may be the people that hold the greatest influence on making sense of the diagnosis. Therefore, further investigation of the role of perceived and personal stigma and its implications on the diagnostic process and search for help are required among adolescents.

One important aspect of this study needs to be contextualized. Given the fact that participants were originally recruited for another study (IDEA RiSCo), they had to meet several inclusion and exclusion criteria (including, but not limited to, meeting diagnostic criteria for other disorders such as post-traumatic stress disorder, or substance use; as well as other factors that could interfere with the biological data collection, such as wearing braces or using anti-inflammatory medication) (Kieling et al., 2021), and therefore are not representative of the general population. Considering that the IDEA RiSCo sample was recruited from a school setting, adolescents were not actively seeking mental health care, so that the context and setting in which we collected data is different from most initial clinical encounters. Therefore, we cannot extrapolate that the experience reported by these participants can be generalized to adolescents receiving the diagnosis within the healthcare system.

Moreover, the limited number of interviewed adolescents must be recognized as an important limitation of this pilot study. The fact that two girls did not return for the second interview and were therefore excluded from the analyses is another limitation both in terms of sample size, but also in terms of unbalancing the gender distribution in the opposite direction of what is observed in terms of prevalence estimates of depression in community-based samples (Salk et al., 2017).

Despite these limitations, it is worth noting that, in Brazil, most adolescents face important limitations in accessing specialized care, such as long queues, and generally seek help elsewhere, like other medical specialties, friends and religious leaders for advice and referrals (Amaral et al., 2018). Therefore, among the strengths of this study are the focus on an infrequently studied population (community sample of adolescents with depression in a middle-income country), as well as the careful diagnostic procedures and two-staged interview process. The investigation of the reaction to receiving an MDD diagnosis in this age group, though very particular in its needs and characteristics, has been overlooked by researchers. We understand that enhancing the clinical assessment process beyond formal symptom-based diagnostic procedures is a vital component of addressing the mental health needs of this population, and this can only happen by also acknowledging the voice and experiences of adolescents. This study, therefore, investigated some aspects through which adolescents perceive and understand a mental health diagnostic process.

Their reports help to corroborate the importance of understanding adolescents' uncertainties and questions about depression. This could be done in clinical settings through understanding common doubts and misconceptions about it by exploring adolescents' reactions to the diagnosis. Moreover, this approach could strengthen awareness and increase help-seeking behaviors, diminishing stigma and negative perceptions about people with mental health problems. By actively engaging adolescents and exploring their process of assimilating the diagnosis, clinicians also may motive and facilitate disclosure to others by understanding the adolescents' support network. This may be important since perceived stigma and concerns about family response are often cited as significant barriers to treatment for adolescent depression (Meredith et al., 2009).

Additionally, it is worth noting that, even with the pilot nature of the present study, results reflect some specificities of the experience of adolescent depression in LMICs. The role of relationships emerges as a defining factor: it is in relations that adolescents can explore and differentiate the meaning of sadness and depression, and disclosure becomes a central discussion regarding stigma, family and peer relationships and help-seeking. This finding is consistent with previous research in LMICs that put social relations and social experiences as central in the experience of adolescent depression (i.e., (Rose-Clarke et al., 2020), and point to culturally-relevant directions regarding receiving a diagnosis in LMICs.

## Conclusions

The present study investigated the aspects through which adolescents perceive and understand a mental health diagnostic process. The participants' reports corroborate the importance of understanding and taking into account the voice and experiences of adolescents in clinical and research settings – which is often overlooked by researchers. Moreover, the interviews show the importance of understanding adolescents' concepts of depression, as well as highlight the role of stigma in the process of attributing meaning to the diagnosis. By acknowledging difficulties in disclosing their diagnosis, but also the many doubts that emerge from the diagnosis itself, adolescents indicate relevant directions for enhancing this process.

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## Table 1 - Characteristics of the Sample

| ID | Gender | Age | Skin Color* | Meet friends to talk, play, do anything else?* | Failed a school grade?* | Ran away from home?* | Lifetime use of alcohol/ other drugs?* | In the last 12 months, got into any fight in which somebody got hurt?* | Relationship with father* | Relationship with mother* | Relationship between father and mother* | History of maltreatment* | CDRS-R score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Female | 16 | Non-white | No | Yes | No | Yes | No | Regular | Regular | Regular | Severe | 56 |
| 2 | Female | 16 | White | No | Yes | No | Yes | No | Very Good | Regular | Good | Severe | 34 |
| 3 | Male | 15 | Non-white | Yes | Yes | Yes | Yes | Yes | Very Good | Good | Great | Severe | 66 |
| 4 | Male | 14 | White | Yes | Yes | Yes | Yes | Yes | Bad | Great | Bad | Severe | 60 |
| 5 | Male | 15 | Non-white | Yes | No | No | Yes | Yes | Regular | Very Good | Bad | Probable | 43 |
| 6 | Male | 16 | Non-white | No | Yes | Yes | Yes | No | Very Good | Very Good | Good | Severe | 40 |
| 7 | Male | 15 | White | No | Yes | Yes | Yes | No | Regular | Regular | Regular | Severe | 43 |
| 8 | Male | 16 | White | Yes | Yes | Yes | No | Yes | Bad | Great | Bad | Severe | 50 |

CDRS-R = Children’s Depression Rating Scale

*Variables from the Identifying Depression Early in Adolescence Risk Score (IDEA-RS). For additional information on IDEA-RS, see Appendix E.

# Supplemental Material for “The Experience of Receiving a Diagnosis of Depression in Adolescence: A Pilot Qualitative Study in Brazil”, by Viduani et al.

## Appendix A. Study Setting

Brazil is a middle-income country (58), the largest nation in Latin America. It is a diverse country with an estimated population of 212 million inhabitants - most of whom (82%) live in urban areas. A rapid and intense urbanization process occurred in Brazil, and the demographic growth is associated with high levels of territorial and social inequality - markedly in housing conditions, per capita income and years of schooling (59). Brazil has a population of around 51 million of youth between the ages of 10 and 24 years (60), but its model of care for children and adolescents’ mental health is uneven and the majority of youth are unassisted (61).

The present study was conducted in Porto Alegre, a city in the South of Brazil with a population of 1.5 million inhabitants, 325 thousand of which are between the ages of 10 and 24 years old (62). The vast territorial extension of Brazil creates a country with great differences in cultural and sociodemographic aspects, and Porto Alegre has specific sociodemographic characteristics: it has the Highest Human Development Index among Brazilian metropolises (63), and around 20% of its population declares themselves as black, while the overall percentage in Brazil is 56% (64).

## Appendix B. Clinical Evaluation and Procedures

The clinical evaluation adolescents underwent consisted of diagnostic interviews with both adolescent and caregiver, self- and clinician-based instruments, collection of blood and saliva samples, and a neuroimaging protocol. All procedures were conducted on a single day at the Clinical Research Center, Hospital de Clínicas de Porto Alegre.

The clinical assessment was conducted by board-certified child and adolescent psychiatrists who interviewed both the adolescent and their primary caregiver using the Brazilian Portuguese translation of the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL) (65). Comorbid diagnoses were also assessed using K-SADS-PL. The module on mood disorders was applied to adolescents and caregivers, while other domains were assessed using information from either adolescents or caregivers. Participants were excluded if they met diagnostic criteria for autism spectrum disorder, bipolar disorder, eating disorders, post-traumatic stress disorder, schizophrenia or substance use disorders. After diagnostic interviews, adolescents and caregivers underwent assessments on further psychological and socio-environmental factors including self- and clinician-based instruments. After the clinical evaluation, participants also had their blood and saliva sampled. Following the sampling, adolescents underwent a structural and functional magnetic resonance imaging scan.

## Appendix C. Interview Guide

### *1. Interview 1 - immediately after the clinical assessment*

I understand that the clinician has asked you several questions just now. You talked a lot about your emotions and behaviors and I would like to also talk to you about this.

(a) How was it for you answering the questions that the clinician has asked you?

(b) I understand that you talked about moments when you faced difficulties or felt bad. Can you tell me about one of these moments?

(c) When was this?

(d) Nowadays, do you feel like this?

(e) How have you been feeling these past weeks?

[If adolescent mentions sadness]

(f) What is it like for you to feel sad? What kind of thoughts go through your mind when you feel like this? And how do you act when these feelings occur?

(g) How long have you been feeling sad?

[If adolescent mentions irritability]

(h) What is it like for you to feel irritated? What kind of thoughts go through your mind when you feel like this? And how do you act when these feelings occur?

(i) How long have you been feeling irritable?

(j) Can you identify some connection between sadness and irritability? Do they occur together?

(k) Have these feelings and emotions affected your daily life in some way?

(l) Have these feelings and emotions ever affected the way you relate to people in your life? How?

(m) When you are feeling down, what do you do to feel better, or to reduce these bad feelings?

### 2. *Interview 2 - two weeks later*

(a) Do you remember the moment when you did the questionnaire in your school?

  (i) How did you feel answering the questions?

  (ii) Do you think all your friends should answer the questionnaire?

(b) Have you ever participated in some research before? How was your experience participating in the study?

(c) Have you ever had your blood drawn before?

  (i) How did you feel when it was time to draw blood? What went through your mind?

  (ii) *[If the participant felt uneasy]:* Did something help you to feel better?

(d) Have you ever done an MRI before?

  (i) How was the experience during the MRI?

  (ii) Can you describe how you felt inside the scan?

(e) Did you understand the reasons why we invited you to have a blood draw and do the MRI?

  (i) If this research found something in the brain or the blood, something that could explain what you are experiencing, how would you feel?

(f) What is the first thing you think when you hear the word “depression”?

(g) And what does this term mean to you?

(h) Do you know someone who has or had depression?

(i) Can you see any similarities between how you feel and act and how this person feels or acts?

(j) I understand that, by the end of the research, the clinician gave you a diagnosis of depression. How was it for you to receive this diagnosis?

(k) Did you tell anyone about your diagnosis?

- *(i)* *[If yes]* Who did you tell? Why did you choose this person?
  How did this person react to what you told them?
- *(ii)* *[If not]* Why haven’t you told anyone about this?
  If you were to tell someone, who would you tell?

(l) Do you recognize yourself as someone who has depression?

(m) Is there something you wish people knew about depression?

## Appendix D. COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| **Domain 1: Research team and reflexivity** | | | |
| *Personal characteristics* | | | |
| Interviewer/facilitator | 1 | Which author/s conducted the interview or focus group? | 3 |
| Credentials | 2 | What were the researcher's credentials? E.g. PhD, MD | 3 |
| Occupation | 3 | What was their occupation at the time of the study? | 3 |
| Gender | 4 | Was the researcher male or female? | 3 |
| Experience and training | 5 | What experience or training did the researcher have? | 3 |
| *Relationship with participants* | | | |
| Relationship established | 6 | Was a relationship established prior to study commencement? | 3 |
| Participant knowledge of the interviewer | 7 | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | N.A. |
| Interviewer characteristics | 8 | What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | N.A. |
| **Domain 2: Study design** | | | |
| *Theoretical framework* | | | |
| Methodological orientation and Theory | 9 | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | 5-6 |
| *Participant selection* | | | |
| Sampling | 10 | How were participants selected? e.g. purposive, convenience, consecutive, snowball | 3-5 |
| Method of approach | 11 | How were participants approached? e.g. face-to-face, telephone, mail, email | 3 |
| Sample size | 12 | How many participants were in the study? | 3-5 |
| Non-participation | 13 | How many people refused to participate or dropped out? Reasons? | 3 |
| *Setting* | | | |
| Setting of data collection | 14 | Where was the data collected? e.g. home, clinic, workplace | 3 |
| Presence of non-participants | 15 | Was anyone else present besides the participants and researchers? | 3 |
| Description of sample | 16 | What are the important characteristics of the sample? e.g. demographic data, date | 3-5 - Table 1 |
| *Data collection* | | | |

| | | | |
|---|---|---|---|
| Interview guide | 17 | Were questions, prompts, guides provided by the authors? Was it pilot tested? | Appendix B |
| Repeat interviews | 18 | Were repeat interviews carried out? If yes, how many? | 3 |
| Audio/visual recording | 19 | Did the research use audio or visual recording to collect the data? | 3 |
| Field notes | 20 | Were field notes made during and/or after the interview or focus group? | N.A. |
| Duration | 21 | What was the duration of the interviews or focus group? | 5 |
| Data saturation | 22 | Was data saturation discussed? | 5 |
| Transcripts returned | 23 | Were transcripts returned to participants for comment and/or correction? | N.A. |
| **Domain 3: analysis and findings** | | | |
| *Data Analysis* | | | |
| Number of data coders | 24 | How many data coders coded the data? | 5 |
| Description of the coding tree | 25 | Did authors provide a description of the coding tree? | N.A. |
| Derivation of themes | 26 | Were themes identified in advance or derived from the data? | 3-5 |
| Software | 27 | What software, if applicable, was used to manage the data? | 5 |
| Participant checking | 28 | Did participants provide feedback on the findings? | N.A. |
| *Reporting* | | | |
| Quotations presented | 29 | Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number | 6-9 |
| Data and findings consistent | 30 | Was there consistency between the data presented and the findings? | 9-11 |
| Clarity of major themes | 31 | Were major themes clearly presented in the findings? | 6-9 |
| Clarity of minor themes | 32 | Is there a description of diverse cases or discussion of minor themes? | 6-11 |

Developed from: Tong A, Sainsbury P, Craig J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care, 19(*6), 349 – 357.

## Appendix E. The Identifying Depression Early in Adolescence Risk Score (IDEA-RS)

The IDEA-RS is a self-report questionnaire administered in schools with students between 14 and 16 years of age. It was performed using a coded, unidentified form distributed to students after information on name, date of birth, self-reported sex, self-reported race/skin color, handedness, and parental contact information had been collected. Questions were selected to match *ipsis litteris* the original phrasing used in the Pelotas 1993 Birth Cohort study. On average, less than 15 minutes were required for administration of the IDEA-RS (66).

| | |
|---|---|
| Sex: | Male/Female |
| Your skin color or race is:* | White/Yellow/Indigenous/Brown/Black |
| Do you meet your friends often to talk, play or do anything else? | No/yes |
| Have you ever failed a school grade? | No/yes |
| Have you ever run away from home? | No/yes |
| Have you ever tried cigarettes?** | No/yes |
| Have you ever tried alcohol?** | No/yes |
| Have you ever tried sniffing glue?** | No/yes |
| Have you ever tried sniffing solvents or ethyl chloride (EC)?** | No/yes |
| Have you ever tried marijuana?** | No/yes |
| Have you ever tried cocaine or crack?** | No/yes |
| Have you ever tried LSD or acid?** | No/yes |
| Have you ever tried ecstasy or molly?** | No/yes |
| Have you ever used weight loss pills?** | No/yes |
| Have you ever used tranquilizers or sleeping pills?** | No/yes |
| Have you ever used any drug? ** | No/yes |

| | |
|---|---|
| In the last year, did you get into any fight in which somebody got hurt? | No/yes |
| Would you say your relationship with your father is: | Great/Very good/Good/Regular/Bad |
| Would you say your relationship with your mother is: | Great/Very good/Good/Regular/Bad |
| Would you say the relationship between your father and mother is: | Great/Very good/Good/Regular/Bad |
| Have you ever been separated from your parents so that you had to stay with someone else?*** | No/yes |
| At home, have you witnessed fights with physical aggression between adults, or has any adult assaulted a child or teenager?*** | No/yes |
| Have you experienced not having enough food at home, or have you had to wear dirty or torn clothes because you had no others?*** | No/yes |
| Have you ever thought or felt that your parents wished you were never born?*** | No/yes |
| Have you ever thought or felt that someone in your family hated you?*** | No/yes |
| Have you ever been beaten by an adult in your family or by someone who was taking care of you hard enough to leave marks or hurt you?*** | No/yes |
| Has anyone ever tried to touch you in a sexual way, or tried to make you touch them against your will, threatening you or hurting you?*** | No/yes |

* Self assigned skin color following Brazilian official census categories. For analyses, two categories (white vs. non-white) were formed.

** Questions about any lifetime use of alcohol, tobacco, cannabis, cocaine, and inhalants were combined into one variable using the OR rule, generating a binary variable for analyses.

*** Responses to seven dichotomous questions regarding lifetime psychological, physical and sexual abuse and/or neglect were combined into three categories: zero positive answers=none, 1 positive=probable, 2 or more positive=severe.

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# 7 CONCLUSION

In this work, two studies were presented focusing on understanding the experience of adolescent depression. This dissertation contributes to addressing gaps in the contemporary literature about adolescent depression using qualitative methodologies as powerful tools for building in-depth interpretations regarding how one interprets, understands, and shares their experiences.

The first study presented here had as its primary goal to capture how different social actors understand depression in adolescence. As part of the analysis, the adolescents' voices were chosen to guide the synthesis and presentation of the data, which allowed the aspects regarding the experience of depression to arise as the focus of the study. The results suggest a circular relationship in which internal symptoms of depression (such as the feeling of emptiness, sadness, and loss of interest) lead to a withdrawal of spaces of social interaction and, as consequence, also influence relational aspects of adolescent depression. These problems, in their turn, worsen the depression symptoms and lead youth to further withdraw from social relationships.

This result is consistent with other studies in the field. In the work of McCann and colleagues (67), for example, self-isolation is defined as a self-protective reaction that allows adolescents to reflect upon the lived experience and shield meaningful relationships when facing a challenging situation (depression) that youth still struggle to comprehend. This frame of loss of connection to meaningful people was also mentioned by other studies that explored the experience of adolescent depression (47,68,69).

In this sense, qualitative studies seem to corroborate this circular vision regarding the role of social relationships in the experience of depression, being seen as both the result of negative feelings and triggers to the worsening of pre-existing symptoms such as rumination (70). This finding seems to expand to older audiences as well – Granek (2) also found depression as a relational phenomenon – whether through loss, lack of connection, loneliness, or inability to find social support – when interviewing youth aged 25 to 30 years old.

From these results, the vital role of interpersonal relationships in adolescent depression emerges. The idea of connection reiterates its central role: in the study, interpersonal coping strategies were mainly cited among the ways adolescents cope with depression, in line with existing reports concerning the difficulty of maintaining meaningful connections (71). Likewise, recent studies have been demonstrating the relevance of feelings of loneliness in the way depression is experienced by different groups in the world (72), as well as its centrality among other symptoms in adolescent depression (73). Recognizing the importance of this impaired social functioning in depression also points to a relevant – but often overlooked – domain beyond the classical ones used by practitioners and researchers to propose interventions and/or track improvement (74).

The frame of connection also includes other important aspects of the experience of depression. Issakainen (41), when studying the ways youth communicate their depression, defended that communication was a way of attempting to establish relations with others as an approach to managing depression. In this sense, by understanding the experience of depression from a relational approach, another important theme arises: the ways these young people communicate their depression.

Thus, the second study is presented. This pilot study had as a goal to explore the experience of ten Brazilian adolescents that received a diagnosis of MDD during their participation in a large neurobiological study that engaged 150 adolescents from Porto Alegre (48). The results pointed to an overall lack of opportunities for these young people to articulate the expression and meanings of being diagnosed with depression, a finding consistent with reports of youth from other LMICs (75).

The adolescents were grouped into two types of reactions to the diagnosis: the first group was not surprised by it, but the second expressed difficulty in accepting it. In this sense, these adolescents reported having a hard time conceptualizing depression as something that correlated to their lived emoticons. These results corroborate that there seems to exist a complex network of meanings that are associated with being diagnosed with depression, and that adolescents often do not know how to name or understand their distress (76).

The impacts of this lack of space and knowledge have greater significance both in terms of personal impact and from a public-health approach. The ways adolescents understand their diagnosis highly influences coping and help-seeking trajectories (77), an apparently consistent association throughout the lifespan (78). WIsdom and colleagues (79) suggested that teens desire to be normal, connected, and autonomous and that these desires facilitated or limited their decisions regarding accepting medical advice from providers. Moreover, when these core desires were addressed, teens reported increased satisfaction with and benefit from clinical services. These results resonate with findings from our study since understanding young people's beliefs and perceptions regarding depression opens a range of intervention possibilities that prioritize the adolescent's standpoint (80). In a scenario where barriers seem to overcome facilitators to care, a greater understanding of how different groups of adolescents experience and conceptualize optimal care is vital to address inequalities in accessing care (81).

Both works present leads on how Brazilian adolescents understand and experience adolescent depression. Exploring the multiple sense-making processes that influence how adolescents understand, conceptualize and express depression is vital to create a more adequate and context-sensitive approach to the disorder. In this sense, the adopted qualitative approach was flexible enough to accommodate the unknowns of exploring the experience of depression in adolescence in ways in which we sought to capture depression beyond the proposed diagnostic criteria and existing tools. The use of qualitative methodology allowed for discourses and narratives to arise, making it possible to "enhance understanding of the context of events, as well as the events themselves" (24).

The relational aspect of qualitative research puts the researcher in charge of understanding and interpreting different accounts, often guided by their own set of experiences and beliefs (28,82). In this trajectory, the role of the researcher has come with several encounters and questions. First, intense work had to be done in terms of situating the research object between the lens of objective psychiatric science versus subjective understandings of depression. The latter prizes internal mental reality as a way of knowing (2). In this sense, research findings were often in dialogue with this mental reality of youth as the primary source of evidence. This meant dealing with information that often contested traditional knowledge, and valuing personal narratives.

In this sense, new concepts emerged. Namely, the idea of *lived experience* became increasingly present throughout the process of researching adolescent depression. This is because exploring depression in adolescence does not speak only of the raw material of experience, but of a material that is shaped through interpretation, reinterpretation, and communication – there is a centrality of the meaning attributed to the experience (83). With this understanding of lived experience, new possibilities of understanding and making research arise, claiming a new interpretation of the researcher's assumptions and biases. In this sense, both studies presented so far subscribe to a path that led to the need for a deeper understanding of what is to research lived experience.

Therefore, we certainly recognize that these studies do not fully subscribe to an in-depth exploration of the lived experience of adolescent depression. Hence, we did not exhaust the theme or the ways Brazilian adolescents understand and communicate depression. Both studies included a small sample of adolescents from Porto Alegre, and therefore we cannot claim to fully address the existing knowledge gap of this theme in Brazil. These studies, however, start to address one significant challenge to the current research on the experience of adolescent depression: the fact that most studies are conducted in high-income countries (HICs) (39), and that we have, to date, only two studies that investigated the experience of depression in a Brazilian sample (84,85).

Finally, one important point remains: while qualitative methodologies have historically been a way to acknowledge and include young people's experience in research, engaging adolescents as research participants is not the only type of youth engagement in research. Youth's voices are long to be heard in their full bloom, and reasons for this vary from lack of representativeness in research to a longstanding mistrust towards scientists (86). In these studies, we have come to realize that listening to adolescents is but a start to more comprehensive forms of youth engagement in research.

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# APPENDICES

In the following pages, we present studies published during the Master’s of the candidate that are related to the works that compose the dissertation but were not led by the candidate.

# APPENDIX A

Rationale, Methods, and Baseline Characteristics of the Identifying Depression Early in Adolescence Risk Stratified Cohort (IDEA-RiSCo), published in Frontiers in Psychiatry.

# The Identifying Depression Early in Adolescence Risk Stratified Cohort (IDEA-RiSCo): Rationale, Methods, and Baseline Characteristics

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**Background:** The characterization of adolescents at high risk for developing depression has traditionally relied on the presence or absence of single risk factors. More recently, the use of composite risk scores combining information from multiple variables has gained attention in prognostic research in the field of mental health. We previously developed a sociodemographic composite score to estimate the individual level probability of depression occurrence in adolescence, the Identifying Depression Early in Adolescence Risk Score (IDEA-RS).

**Objectives:** In this report, we present the rationale, methods, and baseline characteristics of the Identifying Depression Early in Adolescence Risk Stratified Cohort (IDEA-RiSCo), a study designed for in-depth examination of multiple neurobiological, psychological, and environmental measures associated with the risk of developing and with the presence of depression in adolescence, with a focus on immune/inflammatory and neuroimaging markers.

**Methods:** Using the IDEA-RS as a tool for risk stratification, we recruited a new sample of adolescents enriched for low (LR) and high (HR) depression risk, as well as a group of adolescents with a currently untreated major depressive episode (MDD). Methods for phenotypic, peripheral biological samples, and neuroimaging assessments are described, as well as baseline clinical characteristics of the IDEA-RiSCo sample.

**Results:** A total of 7,720 adolescents aged 14–16 years were screened in public state schools in Porto Alegre, Brazil. We were able to identify individuals at low and high risk for developing depression in adolescence: in each group, 50 participants (25 boys, 25 girls) were included and successfully completed the detailed phenotypic assessment with ascertainment of risk/MDD status, blood and saliva collections, and magnetic resonance imaging (MRI) scans. Across a variety of measures of psychopathology and exposure to negative events, there was a clear pattern in which either the MDD group or both the HR and the MDD groups exhibited worse indicators in comparison to the LR group.

**Conclusion:** The use of an empirically-derived composite score to stratify risk for developing depression represents a promising strategy to establish a risk-enriched cohort that will contribute to the understanding of the neurobiological correlates of risk and onset of depression in adolescence.

## Introduction

Major advances have been accomplished in healthcare through the identification of factors that increase or decrease the probability of an individual developing a negative outcome (1). In the field of cardiovascular medicine, for example, the identification of a set of risk factors has enabled the implementation of multiple preventative strategies that have ultimately translated into decreased burden of heart disease (2). A crucial aspect of this approach is the combination of multiple factors into one single, composite score—e.g., the Framingham Risk Score aggregates information from six variables to estimate the 10-year risk of coronary disease (3).

There is a dire need to reduce the burden associated with depressive disorders globally (4). Differently from other branches of medicine, however, research in the field of psychiatry and mental health has often examined a single risk factor at a time (e.g., poverty, child maltreatment, discrimination) in the effort to identify mechanisms associated with the disorder's pathophysiology. Despite unquestionable advances in the identification of individual markers of depression risk—notably the role of a positive family history of depression in increasing the probability of the disorder in the offspring—a broader, more comprehensive approach is likely to be required in the context of multifactorial disorders such as depression (5).

The incidence of depression peaks in adolescence (6), which implies not only a substantial disease-related burden early in life, but also an important window of opportunity for prevention. Universal approaches addressing entire groups of adolescents have been less successful than selective and indicated interventions focusing on those who are at high-risk because of the presence of either proximal risk factors or subclinical symptoms (7). To further advance targeted preventive interventions, however, an important challenge that remains is the characterization of who is at high risk, as well as which neurobiological, psychological, and environmental mechanisms are associated with the development of depression (8). Crucially, relying on single risk factors can be potentially misleading in the identification of high- and low-risk individuals, as, for instance, an adolescent with no family history of the disorder (frequently assigned as being at low risk) can actually be at an increased risk for developing depression due to the experience of other risk factors (e.g., childhood maltreatment) (9).

In fact, the ability to move beyond a binary approach to risk (i.e., absent/present) to incorporate a dimensional perspective is another opportune advantage of using composite scores. Most of the current samples in mental health research contrast cases and non-cases, with the latter usually defined by lack of a current psychiatric disorder. However, especially among younger individuals, non-cases may have a number of risk factors that make them likely to develop a disorder in the future, leading to a high degree of noise and heterogeneity in these typical designs. The use of risk scores derived from multiple risk factors therefore does not assume adolescents without the disorder as a homogenous group, allowing researchers to specifically focus on individuals at extremely high, but also at extremely low risk for developing depression.

In that sense, efforts have been proposed in terms of using composite scores to stratify risk, with great attention recently directed to the use of genetic information (10). Polygenic risk scores (PRS) are calculated as the sum of genetic risk variants for a specific trait or disorder weighted according to previous genome-wide association studies. Considering that non-genetic factors also contribute to the etiology of depression (5, 11), the case for what has been termed a “polysocial risk score” could also be made, modeling the combination of socio-environmental factors to capture individual-level risk of developing the disorder (12). As suggested by many PRS studies, a focus on extreme strata (e.g., below the lowest and above the highest deciles) could potentially allow for the characterization of more homogeneous groups.

As part of the Identifying Depression Early in Adolescence (IDEA) international consortium (8), our group has developed a composite score to estimate individual-level probability of developing major depression among Brazilian adolescents (13). The IDEA risk score (IDEA-RS) comprises only sociodemographic variables that can be easily obtained directly from the adolescent to facilitate translation into practice: biological sex, skin color, drug use, school failure, social isolation, fight involvement, relationship with mother, relationship with father, relationship between parents, childhood maltreatment, and ran away from home (Figure 1). Among 15-year-old adolescents in Brazil, the IDEA-RS exhibited good discriminative performance (C-statistic of 0.78) to parse individuals at high- and at low-risk for developing depression at age 18 (13). External validation indicated that the IDEA-RS was also able to predict the occurrence of depression in samples from other countries and continents (13–15).

As a further step, we here present the Identifying Depression Early in Adolescence Risk Stratified Cohort (IDEA-RiSCo), established to investigate neurobiological features associated with the risk of developing depression and with the presence of depression in adolescence, with a focus on immune/inflammatory and neuroimaging markers. Using the IDEA-RS as a tool for risk stratification, we recruited a new sample of adolescents enriched for low and high depression risk, as well as a group of adolescents with a currently untreated major depressive episode. Methods for phenotypic, peripheral biological samples, and neuroimaging assessments are described, as well as baseline clinical characteristics of the IDEA-RiSCo sample. Additionally, we present adolescents' perspectives on taking part in this study.

## Methods

### Ethics Approval

This study was approved by the Brazilian National Ethics in Research Commission (CAAE 50473015.9.0000.5327). Adolescents provided written assent and their primary caregivers written consent prior to entering the study. Approval for the school screening phase was obtained from the 1st Regional Education Bureau, in charge of public state schools in the city of Porto Alegre. All participants received feedback with findings from the diagnostic assessment and were referred for care in the Brazilian public health system if clinically indicated. Situations of imminent risk of self-harm or maltreatment were referred to emergency care or protective services following Brazilian legislation. Participants received no financial incentive for taking part in the study, but were compensated for expenses related to their participation (e.g., travel). Approval was also obtained from the Ethics Committee at King's College London for secondary data analysis for biological measures.

### Ascertainment and Group Assignment

In this report, we present cross-sectional data from the baseline stage of the IDEA-RiSCo study, following the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guidelines (16). Individuals at low- and at high-risk for developing depression were identified using the IDEA-RS questions (Supplementary Material 1). The IDEA-RS was initially developed and validated on a sample of adolescents aged 15 years old to estimate the probability of a diagnosis of major depressive disorder at age 18 (13) in the Pelotas 1993 Birth Cohort Study (17).

For the present study, 14 to 16-year-old adolescents (to resemble the developmental stage in which the IDEA-RS was originally devised) were screened in 101 public state schools located in the city of Porto Alegre, Brazil (see Supplementary Materials 2, 3 for detailed procedures). The answers to the questions were aggregated to create a continuous score (i.e., the IDEA-RS) for each adolescent who participated in the screening stage of the study. Using cut-offs for the IDEA-RS based on the Pelotas 1993 Birth Cohort Study (13), we a priori operationalized risk strata for recruitment of participants into the new cohort: low-risk (LR) adolescents were those scoring equal to or below the 20th percentile of the IDEA-RS; and high-risk (HR) adolescents were those scoring equal to or above the 90th percentile of the IDEA-RS. We allowed a larger stratum in the LR group as the absolute risk difference between the 10th and the 20th percentiles was minimal. Importantly, as the probability of depression is known to be higher in females in comparison to males, we opted to generate sex-specific IDEA-RS in order to guide the recruitment of this risk-enriched sample. According to IDEA-RS in Pelotas, the probabilities of depression for the 20th and the 90th percentiles were 1.87 and 8.39% for girls and 1.12 and 3.37% for boys. Of note, these estimates refer to the probability of presenting a depressive episode exactly at age 18 years, as in the Pelotas 1993 Cohort Study only the point-prevalence of a current unipolar depressive episode was assessed. This means that the lifetime probabilities of MDD are likely higher for all groups.

In addition to the LR and HR groups, we also recruited a third group of adolescents with major depressive disorder (MDD). To allow for two-by-two comparisons between groups, adolescents with MDD were also required a score equal to or above the 90th percentile of the IDEA-RS. Thus, LR and HR groups were similar in showing no lifetime history of any depressive disorder, but markedly different regarding the IDEA-RS. Conversely, HR and MDD groups were similar regarding IDEA-RS, but while HR participants showed no evidence of depression at any time, those in the MDD group had to be in a current unipolar depressive episode at the time of the assessment.

To optimize the recruitment process and increase the probability that diagnostic criteria for depression were met in the MDD group, but not in the LR and HR groups, during the school screening adolescents also completed the Patient Health Questionnaire—adolescent version (PHQ-A) (18). Adolescents with a PHQ-A ≤ 6 were considered for further assessment for the LR/HR groups, and those with a PHQ-A ≥ 10 for the MDD group. Importantly, PHQ-A cutoffs were necessary but not sufficient for group assignment, as, for instance, the absence of a lifetime history of depressive disorders was also required for the LR/HR groups, and this was only determined during clinical assessment.

Based on school screening information, participants meeting criteria for further assessment were invited to the Clinical Research Center at Hospital de Clínicas de Porto Alegre (HCPA). Clinical assessment was conducted by board-certified child and adolescent psychiatrists who individually interviewed both the adolescent and their primary caregiver and were unaware of the participant's risk group status. Absence of a lifetime history of depressive disorders (including dysthymia) for the LR and HR groups and presence of a current depressive episode for the MDD group were determined using the Brazilian Portuguese translation of the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL) (19). Clinicians received prior inter-reliability training on the K-SADS-PL, and for each participant a clinical formulation and best estimate diagnoses were generated and subsequently reviewed by an experienced child and adolescent psychiatrist (CK) to confirm diagnoses and assure uniformity in participant assignment. Participants in all three groups were excluded if they met lifetime diagnostic criteria for autism spectrum disorder, bipolar disorder, eating disorders, post-traumatic stress disorder, schizophrenia, or substance use disorders. Additional exclusion criteria are listed in Supplementary Material 2.

### Phenotypic Assessment

Youth assigned to LR, HR, or MDD groups underwent further phenotypic assessment. Comorbid diagnoses were assessed using the K-SADS-PL (19). Whereas the module on mood disorders was applied to both adolescents and caregivers, other domains were assessed primarily using information obtained from adolescents (anxiety, obsessive-compulsive, trauma-related, eating, and substance use disorders) or caregivers (schizophrenia/psychosis and neurodevelopment/disruptive disorders). Adolescents' IQ was estimated using the Wechsler Abbreviated Scale of Intelligence (WASI) (20, 21). Caregivers were asked about the adolescent's family history of depression—information was collected on parents, grandparents, and siblings and summarized in a family liability index that estimates the proportion of affected family members, adjusting for relatedness (22). Pubertal stage was determined by adolescent self-report using the Tanner Puberty Staging Scale (23). Further psychological and socio-environmental assessments included self- and clinician-based instruments as described in Table 1, Supplementary Material 4.

Anthropometric measurements were performed right after the clinical evaluation. Axillary temperature (°C) was measured using an electronic thermometer. Weight (kg) was measured using an electronic scale, with individuals wearing light clothes and without shoes. Height (cm) was measured using a stadiometer. Waist circumference (cm) was measured with a non-stretching tape at the midpoint between the iliac crest and the lowest rib margin.

### Collection of Blood and Saliva Samples

On the same day of clinical/phenotypic assessment, once the risk/MDD status was ascertained, participants underwent collection of blood and saliva samples (Figure 2). Only participants for whom blood and saliva samples were successfully collected were included in the cohort.

Briefly, procedures included a previous instruction not to change their eating habits the day before the blood and saliva collection, and to take any medications as usual. Participants were also required to avoid excessive fasting (over 24 h); to avoid intake of any kind of food, natural water, coffee, tea, juice, milk, or other drinks at least 2 h before the collection; and to avoid smoking or chewing gum during the period between awakening and sample collection. The following samples were collected, processed, and stored at −80°C: serum from whole blood (6.0 mL of blood using a vacutainer tube without any anticoagulant); plasma from EDTA whole blood (6.0 mL of blood using a K3EDTA anticoagulant tube); RNA (2.5 mL of blood using PAXGene tubes, PreAnalitix, Qiagen/BD Company). Peripheral blood mononuclear cells (PBMC) were collected from whole blood (4.0 mL of blood collected in 2 Vacutainer EDTA tubes) by the density gradient centrifugation method using Histopaque®-1077 reagent (Sigma-Aldrich) according to manufacture instructions. The cells were kept frozen in liquid nitrogen with a cryoprotectant solution (bovine fetal serum F4135-Gibco and 10% DMSO-D2650-Sigma Aldrich). Saliva samples were collected using Oragene RNA tubes (RE-100) supplied by DNA Genotek (Ottawa, Ontario, Canada). A total of 2.0

mL of unstimulated saliva was collected by directly spitting into the tubes; once collected, Oragene RNA tubes were stored at −20°C.

All samples were shipped using a courier specialized for transferring biological samples. Four serum, four plasma, and two PBMC cryovials were sent in a single batch to The Maurice Wohl Clinical Neuroscience Institute Laboratory at King's College London, United Kingdom. One PAXGene tube and saliva samples were sent in two batches to IRCCS Istituto Centro San Giovanni di Dio Fatebenefratelli in Brescia, Italy. The remaining two serum and plasma cryovials and one PAXGene tube were kept as a backup in Brazil.

### Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) was performed on the same day, following collection of blood and saliva samples. Only participants who were able to successfully complete the entire MRI procedure were included in the cohort. Both structural and functional images were acquired on a 3T Ingenia scanner (Koninklijke Philips N.V., The Netherlands), software version 5.3.1, at Hospital de Clínicas de Porto Alegre.

Before entering the MRI suite, participants were asked to remove all metal objects from their body (e.g., earrings, piercings, rings, watches). They received instructions regarding scanning procedures (including the request to keep their head still during the scan) and scanning duration. A 30-s demonstration for each task was provided. Finally, they were informed about loud banging noises during scanning, and that communication with the experimenter would be possible at any time during the scan. Once they entered the MRI room, participants were positioned in the scanner. Images were acquired in the same order for every participant—structural, gambling task, face-matching task, and resting-state (Figure 3; see Supplementary Material 5 for data acquisition parameters).

### Tasks

The gambling task was adapted from Barch et al. (53) and translated into Brazilian Portuguese. The task was to guess whether the number behind a question mark was higher or lower than 5 by using two one-button boxes with the left and right index fingers. After each guess, participants received pre-determined feedback consisting of reward (i.e., correct guess), punishment (i.e., incorrect guess), and neutral feedback (i.e., the number is 5). The task included four runs, each with 2 blocks consisting primarily of reward trials (i.e., 6 out of 8 trials) and blocks consisting primarily of punishment trials (i.e., 6 out of 8 trials) in each run. The task consisted of 4 runs with different orders of reward and punishment blocks, which were counterbalanced across participants. Each block took 28 s and consisted of 8 trials, which contained a question mark (1.5 s) and feedback (1 s). Participants conducted at least 10 practice trials before the actual task.

The face-matching task was adapted from Hariri et al. (54) and translated into Brazilian Portuguese. During the task, participants viewed a trio of faces or shapes and had to select which of two stimuli on the bottom row matched the target stimuli on the top row by pressing a button with their left or right index finger. This task included counterbalanced presentation of 10 face blocks, including 5 facial expressions (i.e., angry, fearful, happy, sad, and neutral faces) and 11 shapes blocks. Face and shape blocks were alternatively presented and the order of face blocks was counterbalanced across participants. Each block included 6 trials. Face blocks included 2 blocks of 5 facial expressions (i.e., angry, fearful, happy, sad, neutral). Each block took 26 s and consisted of 6 trials with 2 s of stimuli presentation.

### Task-based fMRI Data Analysis

After preprocessing (Supplementary Material 6), we estimated generalized linear models (GLM) to examine neural activity and connectivity during reward processing (i.e., reward vs. punishment) and emotional face processing (i.e., angry faces vs. shapes, fearful faces vs. shapes, happy faces vs. shapes, sad faces vs. shapes, and neutral faces vs. shapes), and we generated contrast maps (Figure 4). The contrast maps of each individual will be carried forward into group-level random-effects models and will be used to examine differences in neural activity between the LR, HR, and MDD groups in future research papers.

### Resting-State fMRI Data Analysis

The resting-state functional connectivity (rsFC) images were preprocessed and denoised using the CONN toolbox (https://web.conn-toolbox.org). In future papers, we plan to conduct three types of analyses to examine differences in rsFC between the LR, HR, and MDD groups: (1) seed-based connectivity analysis that examines the connectivity between a seed region (e.g., amygdala, posterior cingulate cortex) and other regions in the whole brain, (2) ROI-to-ROI analysis that examines the connectivity of all nodes within a specific network, and (3) graph theory analysis that examines the topological properties of a network (e.g., how much a particular node is efficiently connected with other nodes of the network) (Figure 4).

### Sample Size Calculation

One of the major goals for this study is to examine both concurrent and prospective (in planned longitudinal follow-ups that are underway) associations between risk status, depression symptoms, and neurobiological features. In prior work (55), an IDEA investigator had examined differences in threat-related amygdala function in adolescents at high familial risk for depression compared to those at lower risk, and with high exposure to recent life stress compared to low exposure to recent life stress. In that research, models that included age, family history, and recent life stress as predictors explained 11% total variance in amygdala function. Thus, for the IDEA-RiSCo sample, we conducted a power analysis using an expected effect size of partial η2 = 0.10. Assuming this effect size and an F-test with 3 groups stratified by sociodemographic risk and MDD status, we estimated we would need at least 90 participants (30 in each group) to identify an effect of this size with at least 80% power. Additionally, prior research has shown that neural activity predicts depression/internalizing symptoms with effect sizes of partial r2 = ~0.05–0.30 (29, 56–59). We computed a power analysis using G*Power based on partial r2 = 0.10 and obtained a required sample size of 73 to achieve 80% power to detect significant associations between neural activity and continuously-measured depression symptoms. Based on these power analyses, we determined a sample size of at least 90 participants would be required to test our primary hypotheses. We also assumed there would be ~10% data loss in the MRI data due to quality control procedures, which would require a total sample of 100 participants to achieve a final sample of 90 participants meeting all quality control criteria. Because we also planned to follow participants longitudinally and assumed some loss of data due to attrition and MRI quality control at the second longitudinal scan, we determined our final sample size for the baseline data collection to be 150 participants (50 LR, 50 HR, and 50 MDD).

### Data Management and Statistical Analyses

All clinical data were collected and managed using the Research Electronic Data Capture (REDCap) system hosted at Hospital de Clínicas de Porto Alegre (60, 61).

Sample characteristics are presented using descriptive statistics, Kruskal-Wallis, two proportion Z-test, and network analysis. The Kruskal-Wallis non-parametric test was used for mean comparisons, as all distributions of the instruments were non-normal. Two-proportion Z-tests were used to compare the proportions of risk score variables in the Porto Alegre vs. Pelotas samples (62). Network analysis was performed using the Mixed Graphic Model, which estimates networks from data with dichotomous, categorical, discrete and continuous variables (62). All statistical analyses were performed using R 3.6.1 (R Foundation for Statistical Computing, Vienna, Austria) through RStudio. A $p < 0.05$ was considered the threshold for statistical significance. The Tidyverse package (63) was used for data manipulation. The ggplot2 package was used for plotting figures (64). The “bootnet” package (65) and “mgm” method (corresponding to the Mixed Graphic Model) were used for network analysis. This model allows simultaneous analysis of different types of variables (e.g., categorical, dichotomized, and continuous). The “cor_auto” method, which automatically computes an appropriate correlation matrix for polychoric and polyserial correlations, was used to calculate correlations between variables. To visualize the networks, the qgraph package with the layout = “string” function was used, corresponding to the Fruchterman-Reingold algorithm for approximation of variables. Network structure and connectivity were compared with the Network Comparison Test (NCT) (66).

### Qualitative Component

Qualitative data collection on the study experience is an extension of a broader IDEA qualitative study on feasibility and acceptability of early detection of depression among adolescents in global settings (67). Qualitative interviews aimed to explore the experience of adolescents diagnosed with depression while taking part in the clinical evaluation. These participants were sampled by convenience, as the recruitment began at the final stages of the IDEA-RiSCo baseline assessment: the last 10 included adolescents who met criteria for a formal DSM-5 diagnosis of depression were invited to participate. They were first approached by the interviewers after the clinical evaluation and were invited to participate in two semi-structured interviews: one immediately after the clinical evaluation and the second 2 weeks later. This interview focused on understanding the adolescents' reaction to receiving a diagnosis of depression, but also explored the experience of participating in the clinical evaluation, having their blood and saliva collected and doing the fMRI, and their comprehension of the study's aims and objectives. Both interviews were audio recorded and later transcribed. The final analysis included 8 adolescents, as two were excluded due to incompleteness of their second interview.

One-on-one interviews were conducted in Brazilian Portuguese by two researchers (AV and SB, who had previous training and experience in qualitative research) and took place in a private room in the same setting as the remainder of the research protocol. Coding was done by both researchers using Framework Analysis (FA) (40) and this process was supervised by a third senior researcher (CK). The creation of the codes was inductive—we used line-by-line coding of two initial interviews to create a framework of codes that was later adapted and expanded until no new codes emerged (68). Additionally, constant comparison methods (69) and discussions with the research team were used to refine and create the final codebook.

The full dataset was coded by two researchers using NVivo version 12 (70). Inter-rater reliability was assessed using Cohen's Kappa with 0.7 indicating adequate agreement (71). Afterward, code queries were generated in NVivo, and code summaries were written to capture adolescents' perspectives and experiences. Results highlight the main aspects of participation, presenting the number of adolescents who endorsed such views and following the steps of the described research protocol.

## Results

### The IDEA-RS in Porto Alegre and Its Comparison to Pelotas

Between July 2018 and November 2019, 7,720 adolescents (54.93% females) were screened in 101 schools (for details, see Supplementary Material 3). A comparison of the IDEA-RS in Porto Alegre and Pelotas, where the risk score was originally developed, indicated a higher average probability of developing a depressive episode within 3 years in Porto Alegre (5.30%) in relation to what was observed in Pelotas (3.39%). Supplementary Material 7 shows the probability of depression in 3 years for girls and boys in Porto Alegre and Pelotas.

Individual IDEA-RS variables were more prevalent in Porto Alegre than in Pelotas (Figure 5), with two exceptions: biological sex, which was not significantly different in the two samples, and school failure, which was more prevalent in Pelotas. The higher prevalence of school failure could be expected in the population-based Pelotas sample, as opposed to the school-based Porto Alegre sample, which included only students around the expected grade for age.

To further explore potential similarities and differences of the IDEA-RS in Pelotas vs. Porto Alegre, we performed a network analysis to assess the associations among variables in both samples. We observed a similar pattern of positive and negative associations between the 11 nodes in the two networks (Figure 6). There was no evidence of significant differences in terms of connectivity (summarized by global strength, which is taken as the weighted absolute sum of all edges in the network) (72) or structure (calculated by the distance measure M, which is based on the maximum difference in edge weights of the observed networks) (73), suggesting comparability between the Pelotas and the Porto Alegre samples. A detailed description of the network analysis results can be found in Supplementary Material 8.

### Characteristics of Adolescents Included in the IDEA-RiSCo

School screening in Porto Alegre confirmed higher IDEA-RS for girls (7.34%) in comparison to boys (2.78%). The mean PHQ-A score was 9.52, with higher scores also observed for girls (11.51 vs. 7.07 in boys). To reach the target sample size, 260 clinical assessments were conducted at Hospital de Clínicas de Porto Alegre. The distribution of IDEA-RS and PHQ-A for all boys and girls screened in schools appears in Figure 7, which also shows the 150 adolescents included in the IDEA-RiSCo sample. Following study design, both LR and HR adolescents exhibited lower mean PHQ-A scores in comparison to those with MDD. Likewise, mean IDEA-RS was lower for the LR in comparison to HR and MDD groups. In terms of age, there was a small but significant difference between groups, with the LR group being slightly younger than the HR and MDD groups. Detailed statistics are presented in Table 2.

As shown in Table 3, there were no significant differences in the proportion of adolescents who self-identified as having white skin color across the three groups. School failure, drug use, and involvement in fights were less common in the LR group in comparison to both HR and MDD. Conversely, a history of running away from home was reported more frequently by those in the MDD group in comparison to both LR and HR. Adolescents in the LR group rated both their relationship with their father and between their parents more favorably than the adolescents in the HR and MDD groups. In terms of the relationship with mothers, there was a stepwise decrease from LR to HR to MDD—a similar pattern was observed for the proportion of adolescents who reported regularly meeting friends. Whereas all LR participants fell into the "no maltreatment" category, three quarters and almost all of those in the HR and MDD groups were classified, respectively, as having experienced "severe maltreatment."

Figures 8, 9 exhibit the results of phenotypic measures in the three groups based on reports by adolescents and primary caretakers, respectively. As shown in the figures, there was a stepwise increase from LR to HR to MDD across a variety of phenotypic measures: adolescent-reported (MFQ-C) and clinician-rated (CDRS-R) depressive symptomatology, clinical impression (CGI), and overall functioning (CGAS), as well as in specific measures of anhedonia (SHAPS) and irritability (ARI-C). A pattern in which the MDD group differed from both LR and HR groups emerged in relation to adolescent-rated suicidality (C-SSRS), anxiety (SCAS-C), insomnia (ISI), and positive attributes (YSI-A); as well as in caregiver-rated depression (MFQ-P), irritability (ARI-P), anxiety (SCAS-P), and positive attributes (YSI-P). This was also observed for the presence of any anxiety disorder (22, 26, and 56%) and any comorbid disorder (28, 36, and 62%) for the LR, HR, and MDD groups, respectively. Further details are provided in Table 2, Supplementary Material 9.

Participants in the MDD and HR groups had an elevated load of family history of depression in comparison to the LR group (Table 2). There was a stepwise decrease from MDD to HR to LR in terms of reporting childhood traumatic experiences (CTQ). Adolescents in the MDD group also reported more recent negative events (LEQ) in comparison to HR and LR; no differences in regard to neutral and positive events were observed. Both MDD and HR families exhibited lower socioeconomic scores (ABEP) in comparison to those in the LR group. The three groups did not significantly differ in terms of IQ scores and body mass index.

### Qualitative Interviews

Adolescents in the MDD group included in the qualitative analysis reported their perspectives on receiving a diagnosis of depression and participating in the IDEA-RiSCo study. The last participants included in the study (2 girls, 6 boys) were interviewed from October 2019 to December 2019. Extracts of their accounts can be found in Box 1. Another two girls were unable to attend the second interview and therefore were not included in the current analyses.

### Discussion

In this article, we described the rationale and methods for the IDEA-RiSCo study. Using a previously developed composite score (the IDEA-RS), we devised a new, risk-stratified cohort to study neurobiological correlates of risk and presence of depression among adolescents. Up to now, most studies with high-risk groups have focused on single risk factors to characterize groups. Relying on an empirically generated composite score comprising 11 sociodemographic variables allowed us to characterize groups using a definition anchored in the simultaneous occurrence of a range of risk factors and separate non-cases into those at high and low risk of future depression (rather than unhelpfully lumping them together).

Our risk score was developed using data from the Pelotas 1993 Birth Cohort study and exhibited a good discriminative capacity for the identification of adolescents at risk for depression (similar for instance to the Framingham Risk Score) (3). Although originally generated in a sample of Brazilian adolescents, the IDEA-RS has been demonstrated to predict (74) depression in other settings around the globe. Even without information on all the original 11 variables, the score was able to parse beyond chance high- and low-risk adolescents when externally assessed in samples from Nepal, New Zealand, Nigeria, and the United Kingdom (13–15). For the IDEA-RiSCo study, we collected information using the exact same questions from the Pelotas cohort, observing some differences in the prevalence of specific risk factors between the Pelotas and Porto Alegre samples, which could be at least in part understood as a consequence of differences in terms of the size of the cities (300,000 vs. 1,400,000 inhabitants), year (2008 vs. 2018–9), and setting (birth cohort vs. school-based sample) of data collection. Although the average IDEA-RS was higher in Porto Alegre in comparison to Pelotas, there was a remarkable resemblance in terms of how each factor was related to the others, as demonstrated by the similarity of the network structure in both samples.

The IDEA-RS uses sociodemographic information to stratify for the risk of developing depression. Differently from other approaches more aligned with the concept of indicated prevention (75), our score does not rely on using subthreshold symptomatology to predict a full-blown syndrome. Using subsyndromal psychopathology to identify at-risk mental states can require training and extensive assessments (76, 77), being less suitable in general population contexts (78). Our approach also differs from many high-risk studies as the IDEA-RS does not contain information on family history of depression. Although this has been one of the most replicated risk factors in the literature (79), our score was developed to be easily collectable directly from adolescents (who are frequently unlikely to know sufficient details about family psychiatric history), without needing to engage caregivers, which can be burdensome in terms of screening procedures. Moreover, we also acknowledge that the probability of someone reporting a positive family history can be largely influenced by the probability of family members having access to services and to diagnostic assessment, something that can be highly variable, especially in low- and middle-income settings. Furthermore, we assessed the incremental value of adding information on maternal depression to the IDEA-RS in the Pelotas dataset, and no meaningful classification improvement was observed (the opposite [adding the IDEA-RS to a stratification based on history of maternal symptoms of depression], however, enhanced risk estimation) (13).

Whether and to what extent the IDEA-RS captures the liability conferred by having a positive family history of depression remains to be understood. Future analyses comparing the IDEA-RS with information from polygenic risk scores (PRS) could be one strategy to further disentangle this issue. There is some suggestion that adding PRS to traditional risk scores can improve classification, although this has not always been the case (80). Importantly, families usually share not only genetic, but also environmental backgrounds, and some of the familial influences on depression risk could have been captured by the family-related items in the IDEA-RS (e.g., relationship with and between parents).

Considering the multifactorial etiology of depression, multiple pathways to the susceptibility for developing the disorder are likely (5). Individuals with a positive family history of depression have twice as much risk of developing the disorder (81). Also, a recent PRS for depression demonstrated a 2.5-fold increase in risk when comparing the highest and lowest risk deciles (82). In the IDEA-RiSCo sample, sociodemographic information was used to stratify individuals for risk of developing depression. Taking into account the evidence on social and environmental influences on immune/inflammatory factors and brain structure and function (83–85), focusing on adolescents at low and high extremes might enhance our ability to identify neurobiological correlates of depression risk. Indeed, the magnitude of risk associated with the IDEA-RS does not appear to be inferior to what has been observed using other traditional stratification strategies. Using similar cut-offs in the Pelotas 1993 Cohort, a 15-year-old girl classified as HR (≥90th percentile), in comparison to one classified as LR ( ≤ 20th percentile), exhibited an 8.67 (95% CI 3.56–21.08) times increased odds for having depression at age 18 years. Additionally, none of the boys in the LR group had depression at age 18. Still, although efficient in terms of parsing extremes, the specific cut-offs chosen for assigning individuals to LR and HR strata are arbitrary and should be further assessed for clinical relevance in subsequent studies.

In this report, we also presented the baseline clinical characteristics of the IDEA-RiSCo sample. After an extensive school-based screening process to identify individuals at low and high risk for developing depression in adolescence, we were able to form three groups consistently distinct in a wide range of phenotypic characteristics. Across a variety of measures of psychopathology and exposure to negative events, there was a clear pattern in which either the MDD group or both the HR and the MDD groups exhibited worse indicators in comparison to the LR group. Importantly, the differences seen between the LR and HR groups underscore the importance of not lumping them together as a homogeneous group of “non-cases.”

Regarding the adolescents' perspectives on participating in the IDEA-RiSCo study, they highlighted the importance of several aspects of conducting research with adolescents. First, eliciting trust from adolescents is a crucial aspect of the process. When answering questionnaires in the school setting, adolescents reported contemplating lying on their answers. Moreover, adolescents stressed the positive role of the research team in this process of trust and self-disclosure, as well as their overall comfort during specific steps of the process. Our data suggest that it is essential for adolescent participation to ensure that the research is conducted in an adolescent-friendly manner—especially by providing comfort and trust. Understanding how to better communicate with adolescents about research purposes and design plus consulting with them in designing research studies is likely to be crucial to ensure adolescent engagement.

Among the strengths of our study is the careful phenotypic characterization of the three groups with marked differences in terms of exposure to risk factors and manifestation of symptomatology. The comprehensive clinical assessment procedures, including the use of gold-standard instruments to collect information both from the adolescent and their primary caregiver and generate best estimate diagnoses is also an asset of the IDEA-RiSCo. Given the episodic nature of depression, it is extremely relevant to ensure that individuals with past depression, but who are not in an active episode, are not wrongly classified as “at risk,” as well as to require “cases” to be in a currently active depressive episode at the time of the assessment. Furthermore, we only included participants not using psychotropic medications, thereby making the sample more homogeneous. Due to possible temporal fluctuations in depressive symptomatology, performing clinical and neurobiological collections on the same day can also be seen as advantageous; unfortunately, due to logistical reasons we were not able to standardize the time of day for collection, but there were no differences in group proportions in terms of participants who were assessed in the morning or in the afternoon. The sample size can also be seen as a possible limitation of our study, which we believe can be counterbalanced by focusing on more homogeneous groups and employing comprehensive clinical assessment procedures, which is not always the case in large samples that frequently rely only on short, self-reported measures. Targeting extreme groups, although potentially advantageous for the identification of neurobiological correlates, has the intrinsic drawback of reducing the external validity of findings to individuals in the middle range. Furthermore, the requirement of a high IDEA-RS for the MDD group included in our design to allow for direct comparisons with the HR group, although focusing on adolescents with depression and high degree of vulnerability, inevitably makes the former less representative of the overall population of youths with depression. Lastly, we will be able to overcome the present cross-sectional constraint of the study with follow-up assessments that are currently underway—which will be essential, for instance, to confirm that HR adolescents are indeed at increased risk (as opposed to an alternative interpretation, according to which they could be more resilient to the emergence of depression despite high loading of risk factors).

The use of an empirically-based composite score to stratify risk for developing depression is a promising strategy to better understand the neurobiological mechanisms on the path to depression onset. The fact that nine out of ten children and adolescents in the globe live in low- and middle-income countries (LMICs) makes conducting this study in a middle-income country such as Brazil even more compelling (86, 87). Moreover, there is support for the approach adopted here among adolescent mental health experts in LMICs, including the focus on many of the IDEA-RS factors and the use of risk calculators (88). The underrepresentation of large proportions of the globe's population in the scientific literature is evident in the field of child and adolescent mental health (86, 87, 89). We hope that the IDEA-RiSCo study, by using state of the art methods to further understand the neurobiological underpinnings of risk and presence of depression among adolescents, will contribute to closing this gap.

### Data Availability Statement

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author/s.

### Ethics Statement

The studies involving human participants were reviewed and approved by Brazilian National Ethics in Research Commission (CAAE 50473015.9.0000.5327). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

### Author Contributions

CK, AC, HLF, RK, BAK, TR, LAR, JRS, and VM conceptualized the study and/or wrote the grant funding it. CK, AC, PM, AV, MA, LB, SB, HLF, BAK, RK, TM, SP, JP, TR, LS, BV, ZZ, VZ, JRS, and VM developed the study protocol. CK, CB, AC, PM, RP, AV, LB, SB, HLF, BAK, TM, SP, JP, TR, FR, LS, BV, AW, LY, ZZ, VZ, JRS, and VM contributed to data collection, analyses, and/or management. CK, CB, AC, PM, RP, AV, MA, LB, SB, HLF, RK, BAK, TM, SP, JP, TR, LAR, FR, LS, BV, AW, LY, ZZ, VZ, JRS, and VM wrote or revised sections of the manuscript. All authors approved the final version of the manuscript.

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## Disclaimer

The views expressed are those of the authors and not necessarily those of the NHS, the NIHR, the Department of Health and Social Care, the ESRC, or King's College London.

## Conflict of Interest

VM has received research funding from Johnson & Johnson, a pharmaceutical company interested in the development of anti-inflammatory strategies for depression, but the research described in this paper is unrelated to this funding. LAR has received grant or research support from, served as a consultant to, and served on the speakers' bureau of Bial, Medice, Novartis/Sandoz, Pfizer, and Shire/Takeda in the last 3 years. The ADHD and Juvenile Bipolar Disorder Outpatient Programs chaired by him have received unrestricted educational and research support from the following pharmaceutical companies: Novartis/Sandoz, and Shire/Takeda. He has received travel grants from Shire/Takeda to take part in the 2018 American Psychiatric Association congress. He also receives authorship royalties from Oxford Press and ArtMed.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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## Supplementary Material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2021.697144/full#supplementary-material

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# APPENDIX B

Protocol for the qualitative study implemented by the Identifying Depression Early in Adolescence (IDEA) research consortium, published in BMJ Open.

# Detection of risk for depression among adolescents in diverse global settings: protocol for the IDEA qualitative study in Brazil, Nepal, Nigeria and the UK

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ABSTRACT

## Introduction

Globally, depression is a leading cause of disability among adolescents, and suicide rates are increasing among youth. Treatment alone is insufficient to address the issue. Early identification and prevention efforts are necessary to reduce morbidity and mortality. The Identifying Depression Early in Adolescence (IDEA) consortium is developing risk detection strategies that incorporate biological, psychological and social factors that can be evaluated in diverse global populations. In addition to epidemiological and neuroscience research, the IDEA consortium is conducting a qualitative study to explore three domains of inquiry: (1) cultural heterogeneity of biopsychosocial risk factors and lived experience of adolescent depression in low-income and middle-income countries (LMIC); (2) the feasibility, acceptability and ethics of a risk calculator tool for adolescent depression that can be used in LMIC and high-income countries and (3) capacity for biological research into biomarkers for depression risk among adolescents in LMIC. This is a multisite qualitative study being conducted in Brazil, Nepal, Nigeria and the UK.

## Methods and analysis

A systematic set of qualitative methods will be used in this study. The Delphi method, Theory of Change (ToC) workshops, key-informant interviews and focus group discussions will be used to elicit perspectives on the study topics from a broad range of stakeholders (adolescents, parents, policy-makers, teachers, health service providers, social workers and experts). Delphi panellists will participate in three survey rounds to generate consensus through facilitated feedback. Stakeholders will create ToC models via facilitated workshops in the LMIC sites. The framework approach will be used to analyse data from the study.

## Ethics and dissemination

Ethical approvals were received from the Ethics Review Board of George Washington University and from site-specific institutions in Brazil, Nepal, Nigeria and the UK. The findings generated from this study will be reported in highly accessed, peer-reviewed, scientific and health policy journals.

## INTRODUCTION

Globally, depression is a leading cause of illness and disability among adolescents aged 10–19 years old[1]. The presence of depression also increases the risk of suicide, which is the third-leading cause of death in this population[1]. As the incidence of depression peaks in adolescence, and often remains undiagnosed, the negative consequences of depression persist as a chronic condition throughout the life course[2]. Major depressive disorder, the most commonly diagnosed form of depression, has a lifetime prevalence of 11% representing a major cause of disability across the world[3].

On a global scale, treatment alone is insufficient to address this problem. Limited efficacy of available interventions along with the limited availability and low-quality of mental health services in many parts of the world persist as significant barriers[1,4,5]. Therefore, increased identification of depression early in adolescence and administering preventive strategies become highly salient in addressing this global burden[5]. Understanding the biopsychosocial risk factors that can predict the onset of depression, and the protective factors which can inform measures for preventing its manifestation and severity, are important steps towards achieving this goal.

Research on depression among adolescents in Western Educated Industrialised Rich and Democratic countries is insufficient to understand the full scale of the problem[6]. Identification and prevention measures need to account for the heterogeneity of risk and protective factors and signs and symptoms of depression, as they manifest across cultures and countries[7]. Therefore, investigating depression across multiple global settings can provide clearer insight into the universal and context-specific risk and protective factors.

Currently, there are three major gaps in global research to address prevention and early identification among adolescents. First, there is a need for context-specific understandings of mental health, adolescent experiences and risk and protective factors. Cultural conceptions of depression or adolescence vary in their meaning and social implications across populations and context. Accordingly, discerning such factors are crucial in informing culturally sensitive depression identification and prevention efforts.

Second, despite a wide range of research on depression, there is a lack of feasible and acceptable tools to determine the risk of depression among adolescents before the disorder develops. Risk scores are important in other fields of medicine to determine when and how to intervene and how best to allocate resources, for example, risk determination and treatment provision for cardiovascular disease, diabetes and cancer[8–10]. Adopting similar tenets to develop a risk calculator for adolescent depression could have substantial public health benefit. Third, the ethical and institutional policies for research involving adolescents vary widely in low-income and middle-income countries (LMICs). Specifically, ethical policies are often lacking for biological psychiatry research, which is needed to shed light on mechanisms and risk markers for adolescent depression[11]. Biological markers may be an important contributor to risk calculation for depression and to evaluate efficacy of prevention efforts[12]. Therefore, assessing the feasibility of implementing biological psychiatry research and determining its ethical and cultural acceptability is critical to identify necessary infrastructural and policy recommendations to increase LMICs capacity for conducting such studies.

To address these three gaps, this article presents the protocol of a global, multisite, qualitative study which will inform the development of successful adolescent depression identification and prevention initiatives. First, in our qualitative study, we will investigate the cultural and contextual perceptions and considerations of identifying adolescent depression, including risk and protective factors, and depression prevention interventions. Second, we will explore the feasibility, acceptability and utility of a risk calculator for depression in adolescence. Third, we will investigate the feasibility of conducting biological psychiatry research in LMIC settings. To achieve this, a diverse set of qualitative methods will be used in four countries: Brazil, Nepal, Nigeria and the UK, representing high-, middle-income and low-income settings.

## OBJECTIVES

### Identifying Depression Early in Adolescence research consortium

This qualitative study is part of a larger integrated research portfolio being implemented by the Identifying Depression Early in Adolescence (IDEA) research consortium (https://www.mqmentalhealth.org/research/ profiles/identifying-depression-early-in-adolescence)[5]. The consortium comprises psychiatrists, epidemiologists, neuroscientists and anthropologists from Brazil, Nepal, Nigeria, the UK and USA conducting multidisciplinary research on adolescent depression identification and prevention. The consortium was established with the support of the MQ charity Brighter Futures initiative. The operational dates of the IDEA study are from November 2018 to November 2021.

### General objective of multicomponent qualitative study

The objective of the current study is to qualitatively explore key topics that will complement epidemiological and biological psychiatry research being conducted through IDEA. For this multicomponent qualitative study, we will consult with adolescents, parents, healthcare providers, social workers, educators, policy-makers and other key stakeholders in Brazil, Nepal, Nigeria and the UK, as well as global experts, about the experience of adolescent depression cross-culturally, the use of a risk calculator for depression during adolescence, and conducting biological psychiatry research with adolescents in LMICs.

### Specific objectives

1. The qualitative component of IDEA will compare cultural and contextual differences in depression, adolescent experiences, health systems and health policy across Brazil, Nepal, Nigeria and the UK. Additionally, information will be collected from an expert panel on risk factors and detection approaches that are specific for adolescent depression and feasible for implementation in LMICs.

2. A risk assessment tool for depression in adolescence has been developed via predictive modelling using cohort data from Brazil, Nigeria, Nepal and the UK[5,13,14]. The tool will determine future risk of depression and is derived from research that classifies risk based on the presence of sociodemographic risk factors[13]. This qualitative study will explore the feasibility, acceptability, utility and the ethical implications of such a tool.

3. The IDEA research includes biological psychiatry studies with functional neuroimaging and inflammation pathways. The qualitative work will also explore feasibility, acceptability and ethics related to expanding biological psychiatry research in LMIC and incorporating biological markers to evaluate risk of the onset of depression during adolescence.

## STUDY SETTINGS: COUNTRY DESCRIPTIONS

The four IDEA country sites were selected to provide a wide range of contexts to study adolescent depression. Brazil is an upper-middle-income country representing the growing number of countries with rapidly developing economies and urbanisation, collectively known as the Brazil, Russia, India, China and South Africa (BRICS) nations. Nepal is one of the poorest countries in the world and represents conditions of adolescents living in the least-developed nations. Nepal is also representative of the large number of adolescents living in humanitarian settings due to its recent emergence from a protracted civil war, and frequent environmental disasters. Nigeria is a lower-middle-income country and the most populous country in Africa. The experiences of adolescents in Nigeria reflect the rapid development of African economies as well as chronic exposure to political violence, community violence and high rates of infectious diseases, including HIV/AIDS. The UK is the study setting representative of adolescents living in highly resourced regions such as Western Europe and North America. Further details of the countries and country-specific IDEA research teams are provided in online supplementary appendix 1.

## METHODS

### Conceptual framework

The IDEA qualitative study is structured according to the social ecological model of health and Singer and Baer's world system theory on the social origins of disease[15,16]. Using these two guiding theoretical frameworks, we seek to understand the role of individual, interpersonal, institutional, community and policy factors and their interrelations, in depression risk and identification in adolescence (please refer to figure 1). Informed by George Engels' classic model, we will elicit biopsychosocial risk and protective factors of depression within and between each ecological stratum[17]. We will use Kleinman's Explanatory Model framework to explore the lived experience of depression at the individual level, including culturally driven local idioms of distress[18,19]. We will further explore how these explanatory models are influenced by relationships at the interpersonal and primary group levels (family and friends), and cultural and social norms at the community level. At the institutional level, we will examine mental health services for depression identification and management, and acceptability and feasibility of risk detection at schools, primary healthcare and social services. At the policy level, we will seek to understand challenges and opportunities to facilitate better depression detection and management. Additionally, in the LMIC sites, we will explore institutional capacity for conducting biological psychiatry research (ie, biological specimen collection, storage and testing capacity; and research capacity of universities and staff) and policy-level considerations for ethical research governance that can support sensitive biological psychiatry research.

To conduct this study, three methodologies will be used: a Delphi activity, Theory of Change (TOC) workshops and qualitative interviews including both key informant interviews (KII) and focus group discussions (FGD) (see table 1).

### Delphi activity

A Delphi panel consensus study using quantitative and qualitative methods will be conducted soliciting opinions from global experts in the field of adolescent depression. The Delphi method allows for the systematic generation and scoring of research questions using predetermined criteria, and has been widely used for consensus studies in depression research[20–25]. The Delphi panel will provide a state of the field recommendation on the range and relevance of biopsychosocial risk factors for adolescent depression, strategies for early identification of depression in adolescence and the feasibility for research and preventive interventions, in heterogeneous global settings. Recently, qualitative interviews have been incorporated in Delphi studies to provide meaning to the quantitative results[26,27].

### Participants

A small international steering committee will be formed to guide the Delphi activity. To identify panellists, key publications in the field will be reviewed and authors will be invited to participate via email. Additional panellists will be identified and recommended by the Delphi steering committee. Respondent profiles will include researchers and academics, clinicians and service providers, and policy-makers from diverse global and economic settings. The sample required for reliability in consensus methodology is between 6 and 15 participants, and this study will aim to establish a panel of 20 global experts[28].

### Data collection and analysis

The results of a systematic literature review of common biopsychosocial risk factors, a separate component of the IDEA research portfolio, will inform the development of the Delphi questionnaires[29]. Three rounds of surveys will be administered in the Delphi activity. Respondents will generate a list of biopsychosocial risk factors, possible early signs and early detection strategies for adolescent depression in round 1 via an open-ended free listing exercise. The results will be collated via categorisation of similar items into a final list. The finalised items from round 1 will be ranked by panellists according to feasibility and specificity in round 2. From the ranking exercise, measures of centrality will be generated, including frequency, average rank and Smith's salience index, for each item[30]. In round 3, panellists will be provided with these group summary statistics, and given the opportunity to compare and change their rankings, to derive expert consensus. The web-based survey software, Qualtrics, will be used to implement rounds 1–3[31]. Following the three Delphi rounds, we will conduct in-depth interviews with panellists based on quantitative results. Panellists will provide comments on summary results tables explaining personal and panel rankings, interesting patterns in the quantitative results, and provide narratives on how cultural and contextual factors influence biopsychosocial risk factors. Qualitative data will be analysed using thematic analysis[32].

### Theory of Change workshops

ToC methodology has emerged as a viable alternative to conceptualising programme design and evaluation in global mental health[33]. The ToC method offers a theory-driven approach which identifies and lays out causal pathways that lead to the outcome of a programme or process. A ToC explicitly includes the short-term, medium-term and long-term outcomes that lead up to an expected impact, the interventions and indicators that constitute the programme and measure its progress, and relevant programmatic and contextual assumptions[34].

### Participants

The ToC workshops will be composed of approximately 6–12 participants and vary according to context-specific needs. In Brazil, we will conduct four ToC workshops with researchers, adolescents, parents and policy-makers. We will conduct three ToC workshops in Nepal: one with adolescents and youth researchers; one with parents/ guardians, schoolteachers and service providers (clinical psychologists); and one with clinicians and policy makers. In Nigeria, we will conduct two ToC workshops with adolescents, parents, non-governmental organisation (NGO) leaders, health service providers, teachers and policy-makers. ToC workshops will not be conducted in the UK because a lot of research on the neurobiological underpinnings of adolescent mental health is already occurring in this context. Rather, the UK team will conduct interviews with global health academics to gain better understandings regarding their views on the barriers and facilitators to conducting such research in LMIC contexts.

### Theory of Change development

For the IDEA project, a ToC approach is well suited to address each of the objectives as it allows country-specific stakeholder groups to conceptualise and create causal pathways of the feasibility and acceptability of conducting biological and psychosocial research and integrating risk and preventative interventions into existing health, education and social services systems of the study sites. Stakeholder driven discussion during ToC workshops facilitated by IDEA researchers will produce visual maps of these pathways in each research site. Soliciting perspectives from diverse stakeholder groups from the socioecological hierarchies of these countries will enable the formulation of integrative, country-specific and global theories of change of these causal processes.

### Key-informant interviews and focus group discussions

In order to achieve the three objectives, we will conduct qualitative KIIs and FGDs at each site. Key informants are individuals with ‘great knowledge…who can shed light on the inquiry issues’ and in-depth semistructured interviews with key informants will drive the major focus of data collection for this study[35]. FGDs are highly useful in gleaning both commonly shared and divergent views of a group[36]. FGDs are a useful method for collecting insights from relatively homogeneous groups or among those who have a shared common experience, such as the lived experience of depression[35].

The thematic areas that will be explored in the interviews include the pathogenesis and lived experience of depression and the contextual considerations of depression identification mechanisms. The experience of depression is heterogeneous across the world[37]. Symptoms of anxiety disorder often co-present or can play a role in the onset of depression[38]. Accordingly, in the interviews, we will explore a range of negative affective symptoms by adopting an open-ended approach to probing the signs and symptoms of adolescents’ experience of depression. We will also explore the biopsychosocial risk and protective factors and structural and social mediators and moderators of depression manifestation and prevention. Specifically, we will gather stakeholder perspectives on the cultural acceptability and feasibility of the implementation of a risk calculator for adolescent depression (please see box 1).

We will also explore the pathways of how stakeholders seek help for depression, and the availability, accessibility and acceptability of treatment modalities. Finally, we will elicit perspectives exploring the pathways that lead towards or prevent successful recovery from depression.

### Participants

We seek to generate a sample consisting of diverse stakeholders that can provide unique perspectives and help constitute an integrated understanding of the phenomena and processes under investigation. We will engage primary stakeholders such as adolescents (those with both a history of depression and those without) and their parents. Secondary stakeholders will be recruited from the socioecological systems and institutions that develop and nurture the environments which shape the experiences of the primary stakeholders. These include schoolteachers and counsellors, health service providers, social workers and policy-makers. Accordingly, we use a purposeful sampling strategy to solicit key informants with direct experience and deep insight of the inquiry topics (eg, adolescents and parents), or due to the strategic positions they occupy in the health and education systems and social services (eg, social workers or policy-makers)[35].

This multiperspective approach will allow triangulation of the data through comparison of insights between, and across, stakeholder groups. For KIIs, a sample of 12 qualitative interviews is sufficient for identification of themes in relatively homogeneous groups[39]. Only those policy-makers who hold relevant roles and expertise will be recruited for KIIs. Each FGD will be composed of approximately 8–12 participants. In each site, the sample will vary according to context-specific priorities. Table 2 presents the various stakeholder groups targeted for KIIs and FGDs.

For each stakeholder group indicated in table 2, relevant inclusion and exclusion criteria apply. Health service providers need to have training and experience working with adolescents and/or mental health. These can include psychiatrists, psychologists, paediatricians and general physicians. The inclusion of mental health specialists in the IDEA study is foundational, as these stakeholders are pivotal in providing care to depressed adolescents. However, as adolescents often present to primary care with depression, specifically with somatic symptomology, the inclusion of paediatricians and primary healthcare physicians are essential, especially in settings with diminished numbers of, and limited access to, mental health specialists[40]. We will include those social workers who have experience in working with adolescents. For educators, we will only include teachers and school counsellors who work with adolescent students and exclude those working with younger children in the school system. Researchers and academics will be recruited based on expertise in adolescent depression. Policy-makers will be included based on relevant linkages to the health, education and social care systems, and the ability to comment meaningfully on the programmatic and policy environments of the country. Finally, to get rich narratives on context-specific lived experience of depression we will recruit adolescents with current or past history of depression. We will also interview adolescents with no history of depression to broaden our understanding of the knowledge and attitudes surrounding depression. Parents of these two subsets of adolescents will be recruited to gain perspectives of parental attitudes towards, and knowledge of depression, and understand its impact on families.

### Data collection

The KII and FGD guides will be developed using an iterative process. We will first create an interview guide drawing from our conceptual framework and conduct approximately six preliminary KIIs with different stakeholders, across each site. The data from these initial KIIs will be used to revise the guides for contextual sensitivity. The subsequent KIIs and FGDs will be conducted with these revised guides, with the provision for further edits if subsequent findings indicate it to be necessary. Please refer to figure 2 for an overview of the data collection and data analysis process.

All data collection procedures and decisions will be collated into memos to preserve an auditable record of methodological decisions. KIIs and FGDs will be audio recorded with consent (and assent where applicable), and audio recordings will be professionally translated to English (except brazil, where analysis will be conducted in Portuguese) for data analysis. Local terminology for depression and idioms of distress will be included in the local language along with English translations.

Researchers will complete debriefing forms to capture salient ideas, important exchanges, salient events and other features of the interaction during KIIs and FGDs. Debriefing forms are an essential component of the data analysis process and are intended to provide meaning and understanding of the culture, social situation or phenomenon under investigation, and contextualise the interview transcript[35,41].

### Data analysis

The major deductive themes of the qualitative study are as follows:

1. Understanding of developmental, social and health changes in adolescents.
2. Understanding of depression in adolescents: symptoms, impact and help-seeking (eg, how candepression be detected early and where, whom and when would be best to identify it early).
3. Perception of causes or contributory factors to depression in adolescents.
4. Views regarding risk detection and possible preventive measures (primary and secondary prevention), including their feasibility, acceptability and utility.

We will use framework analysis (FA) to guide the data collection and analysis of this study[42,43] following the stages of the FA approach in applied qualitative research:

1. Transcription.
2. Familiarisation with the interview.
3. Coding.
4. Developing a working analytical framework.
5. Applying the analytical framework.
6. Charting data into the framework matrix.
7. Interpreting the data.

We will adopt a modified approach to implementing the framework approach, as presented in figure 1. The first step will be to create the KII and FGD interview guides and develop a universal codebook that can be used across the four countries. This deductive codebook will be derived from the study objectives, existing literature, theory and expert knowledge. Each country will adjust the codebook to include country-specific codes as necessary. The methodological approach to data collection and analysis will be cyclical and iterative, with each step informing and enhancing subsequent steps, as presented in figure 1.

IDEA researchers across the four country sites will code the data. Codes and themes will be refined using the constant comparison method[44]. This involves moving back and forth between newly coded data and comparing it with previously coded segments to check that the code is still capturing the same essence in the excerpts, as data analysis continues to mature. The addition of new codes and themes will continue until no new codes, categories, or themes emerge from the data, indicating theoretical saturation[45]. Throughout analysis, researchers will maintain memos to capture ideas, themes, problems, that are extracted from the coding process. Inductive themes can be identified at any stage during the analysis. We will engage in a reflexive approach to data analysis, critically reflecting on the theoretical structures that are drawn out of the analysis[46]. Wherever applicable we will reconceptualise the evidence using other possible theoretical and conceptual models, to test, validate or refine ideas and findings.

Once coding is completed, a summary of each code will be written capturing the essence of that code across the whole dataset, with supporting quotes and researcher insights. We will stratify results according to site and stakeholder characteristics to gain nuanced understandings of how themes vary and converge across groups. In a final step, thematic narratives will be developed in preparation for article manuscripts. For each theme, we will present results from each site to facilitate comparison across countries. We will present similarities and differences in results, across stakeholders and across sites. If applicable, we will construct and present explanatory narratives for any heterogeneity in the results, that is, possibly attributing to cultural or contextual factors. We will use NVivo V.12 software for coding and analysis[47].

## PATIENT AND PUBLIC INVOLVEMENT

Youth advisory boards have been engaged or established in each of the IDEA countries. The overall IDEA study has been discussed with members of the youth advisory board, and they will be regularly updated on the study progress throughout. The dissemination plan will be developed in accord with the youth advisory boards. Youth advisory boards are not responsible for participant recruitment.

## ETHICS AND DISSEMINATION

The IDEA qualitative study has been reviewed and approved by the institutional review board of the George Washington University, USA. Additionally, the study has country-specific approvals from the Nepal Health Research Council in Nepal; the Ethics Committee at Hospital de Clínicas de Porto Alegre, in Brazil; the Lagos State University Teaching Hospital Research and Ethics Committee and The Research and Ethics Committee of The Federal Neuropsychiatry Hospital Yaba, Lagos, in Nigeria; and the Psychiatry, Nursing and Midwifery Research Ethics Subcommittee at King's College London, in the UK.

All data collection will operate under the ethical principles of informed consent and assent. Data from the project will be deidentified and stored in password-protected computer servers with access restricted to essential study personnel only. All results will be presented in the aggregate to minimise any potential risks to confidentiality of research participants. Study findings will be reported via publications in academic journals and conferences. In addition to coordination with youth advisory boards, results will also be disseminated through traditional and social media, wherever applicable. We will follow the Consolidated criteria for Reporting Qualitative research guidelines in resultant publications[48].

## DISCUSSION

In this protocol, we discuss a systematic and progressive set of methods to understand the complex problem of contextual variations in IDEA globally. Through this research we seek to establish the acceptability, feasibility and utility of integrating such approaches in Brazil, Nepal, Nigeria and the UK. Approaches determined to be culturally acceptable, feasible and effective could then be proposed for health providers to support the early detection of depression or identification of risk factors. IDEA and understanding the risk and protective factors of depression would inform policy decisions for funding allocation, amendments to legislation and programming for interventions. Although the prominence of mental health services in health systems varies across countries of different income classifications, compiling stakeholder perspectives can help tailor national mental health policies towards the needs of the specific country. For instance, revelations regarding the effectiveness of existing policies or the level of public awareness about mental illness provide national and community leadership with the context necessary to actualise improvements in current mental health infrastructure. Investigating these issues using qualitative methods in multiple global settings has not been conducted to date. Therefore, this study will contribute to addressing this gap in the literature. Additionally, there is growing movement and discussion on the transparency, reliability, validity and reproducibility of qualitative research[49]. A systematic presentation of the conceptualisation and procedural implementation of such studies can contribute to the discussion surrounding the transparency and veracity of qualitative methods, and its utility for global mental health research.

The variety of stakeholders to be interviewed presents the opportunity for a range of solutions to be developed across sectors, potentially in the form of public campaigns, health governance restructuring or additions to school resources. Engaging community members and leaders in discussions surrounding adolescent depression is crucial for the sustainability of these changes. By investigating these issues across a range of low-income, middle-income and high-income settings, we hope to generate context-specific, and potentially global understandings of, and responses to, depression among the world’s 1.2 billion adolescents.

### Study status

The IDEA qualitative study has finished primary data collection and is in the process of analysing data and preparing manuscripts for publication.

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