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Mental Health Service Utilization Patterns Among Adolescents During Prolonged Lockdowns

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Abstract: Adolescent mental health has become a pressing public health concern, especially during the coronavirus disease 2019 pandemic, in light of prolonged lockdowns. A body of research has documented increased rates of depression and anxiety, and their evolution during subsequent lockdown periods. Notably, many studies indicate that few adolescents seek professional help during these distressing times. In line with health services utilization theory, these findings suggest a disconnect between expressed need and help-seeking behavior. Such research provides a wealth of information concerning the availability, accessibility, and effectiveness of mental health services during the pandemic. Perspectives on adolescents' mental health service utilization—that is, whether and when to access services—have, however, remained marginal. By integrating information from multiple sources, these utilization patterns can be better understood. The present abstract aims to provide an overview of the determinants of adolescents' mental health service seeking during prolonged periods of lockdown. The discussion focuses on issues within the adolescent's life context and perceived needs, along with important influences originating from parents, the broader social environment, and the health system.

Service utilization trends can shed light on whether adolescents sought care when required, and the reasons that might explain patterns. Evidence suggests an overall increase in the need for psychological care during lockdown periods, reflected in rising demand from both adolescents and their parents. However, adolescents appear to prefer communicating their emotional distress with family members or friends instead of professionals. Most adolescents experiencing risk factors for depression and anxiety do not seek help, even though those with higher levels of perceived need are likelier to do so. Help-seeking behavior is influenced by multiple factors, including age, gender, ethnicity, socio-economic status, stigma, and accessibility. Survey results indicate that stigma represents one of the main barriers to seeking help.

Keywords: Adolescent mental health, service utilization, lockdown effects, telehealth, accessibility, stigma, Adolescent mental health, Mental health service utilization, Prolonged lockdowns, COVID-19 pandemic impact, Tele-mental health services, Access to mental health care, psychological distress in adolescents, Health-seeking behavior, Barriers to mental health services, Youth coping and resilience.

I. INTRODUCTION

Prolonged lockdowns severely curtail adolescents' social lives and increase their mental distress. Prior evidence indicates that lockdown-related factors contribute to the higher prevalence of mental disorders among adolescents. Nevertheless, service utilization trends—especially of telehealth services—remain contentious. While some studies find increased use, others discover substantial unmet needs. Although hypotheses on accessibility are informed by prior literature, and demand models encompass multiple levels of influence, evidence gaps at policy, system, and equity levels are notable. Mental health services are an essential resource for adolescents coping with pandemic stressors. Exploring their use sheds light on the impact of lockdown conditions and the factors shaping adolescents' help-seeking behavior.

Available evidence points to substantial adolescent mental distress during prolonged lockdowns, with increased rates of depression, anxiety, acute stress disorder, and eating disorders in some groups and regulatory concerns raised in others. Admission data corroborates this pattern, with higher service access among younger patients, girls, and those with pre-existing diagnoses. However, service access may have decreased for some adolescents. Comparisons between planned and unplanned consultations reveal that most adolescents sought help when experiencing acute distress or facing life crises. Disparities also exist across service categories: emergency services experienced greater demand than outpatient care, although the gap narrowed over time.

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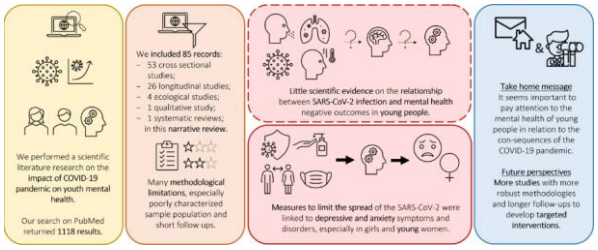

Fig 1: Mental Health Service Utilization Patterns

1.1. Background and Significance

Multiple studies and systematic reviews have documented the negative impact of COVID-19 lockdowns on adolescent mental health; the prevalence of anxiety, depression, and stress symptoms has increased substantially during the pandemic when compared with earlier studies, and continued symptoms have been reported even as COVID-19 morbidity and mortality diminished. Despite these findings, a detailed assessment of adolescent mental health-service utilization patterns during the prolonged lockdowns is lacking, particularly in light of the pronounced increase in adolescent mental-health concerns. Understanding when, and to what degree, adolescents sought mental-health services during the lockdowns is critical for effectively managing adolescent mental-health issues during any future similar crisis.

Understanding service utilization patterns is essential for both policymakers and practitioners. Information on accessibility, barriers to care, and the effectiveness of interventions can help improve service availability for adolescents during times of crisis. Research on possible fear-related determinants of care-seeking can inform ongoing school-based service delivery and responsiveness to future similar events. Finally, adolescent mental health, service utilization, and the underlying influencing determinants are an important focus for future research.

Equation 1: Prevalence, proportion, and rate (basic building blocks)

If in a sample of N adolescents, C meet criteria for depression/anxiety in a period:

$$\hat{p} = \frac{C}{N}$$

Step-by-step

- Count cases C
- Count total N
- Divide

(b) Service utilization rate

If V service visits occurred over population N across time T (e.g., months):

$$\text{Utilization rate} = \frac{V}{N \cdot T}$$

Sometimes scaled per 1,000:

$$\text{Rate per } 1000 = 1000 \cdot \frac{V}{N \cdot T}$$

II. CONCEPTUAL FRAMEWORK AND METHODOLOGICAL CONSIDERATIONS

Guided by Schwartz's ecological model, help-seeking behavior is depicted as shaped by an interplay of risk and protective factors operating at individual, family, community, and institutional levels. The literature review examines major determinants reported during the COVID-19 pandemic. Specific attention is given to patterns associated with adolescents' sociodemographic characteristics; family and household context; stigma and perceived need; and policy and system-level influences.

Adolescence is a crucial period of increased risk for mental health problems. During extended periods of elevated stress—such as during the COVID-19 lockdowns—help-seeking behavior plays a critical role in identifying and treating mental health concerns. Nonetheless, many individuals do not seek care, or delay doing so, until their condition is severe. Prior research has identified a host of factors influencing adolescents' decisions to use mental health services, yet few studies have investigated these influences within the specific context of the COVID-19 pandemic. The absence of such literature is a major gap given the unique conditions associated with the pandemic, including extended disruptions of school,

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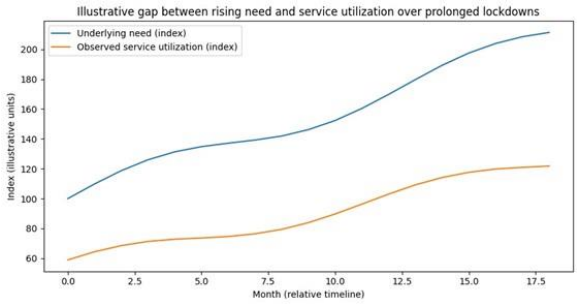
family, social, and therapeutic routines—and their potential implications for the understanding and promotion of adolescent help-seeking behavior.



III. PREVALENCE AND TYPES OF MENTAL HEALTH CONCERNS DURING PROLONGED LOCKDOWNS

Adolescents experienced increased mental health concerns during prolonged lockdowns, with higher rates of depression, anxiety, post-traumatic stress disorder, and self-harm. Studies comparing within-group proportions to pre-lockdown baselines find increases in clinically significant symptoms in both girls and boys. Worsening functioning and more severe eating disorder symptoms have been reported, but rates of suicidal ideation have not demonstrated the same upward trend. Limited evidence suggests that the demand for adolescent psychiatric inpatient care—in-person, unplanned, and categorized as psychiatric emergency/intensive care—has grown relative to the pre-lockdown situation.

Research focusing on the rates of different conditions primarily shows increases in depression, anxiety, stress, post-traumatic stress disorder (PTSD), and self-harm-related behaviors. These findings are supported by multiple studies in different geographical contexts indicating detrimental effects among adolescents experiencing prolonged lockdowns. Elevated levels of eating disorder symptoms and decline in general functioning have also been observed. The lack of a similar increase in suicidal ideation is particularly interesting given the concurrent rise in actual suicidal behaviors demonstrated by various data sources. Evidence in relation to self-harm remains inconsistent, with some studies reporting a decrease.

Equation 2: "Unmet need" gap (matches the article's "disconnect" idea)
Let:

- N_t = need index (or estimated number needing care) at time t
- U_t = utilization (visits or users) at time t

Define unmet need (in the same units):

$$G_t = N_t - U_t$$

If you want a *relative* unmet need fraction:

$$g_t = \frac{N_t - U_t}{N_t} = 1 - \frac{U_t}{N_t}$$

Step-by-step

1. Compute need N_t (from screening prevalence, symptom scores, etc.)
2. Compute utilization U_t (users or visits)
3. Subtract to get G_t, or divide by N_t for g_t

IV. UTILIZATION TRENDS OF MENTAL HEALTH SERVICES

Overall mental health service utilization trajectories during prolonged lockdowns reveal notable features important for service provision. The timing of an adolescent's mental health service use—planned for maintenance or unplanned due to a worsening condition—also suggests differential association with specific mental health issue types or service categories. These aspects of service utilization are discussed in light of prior findings.

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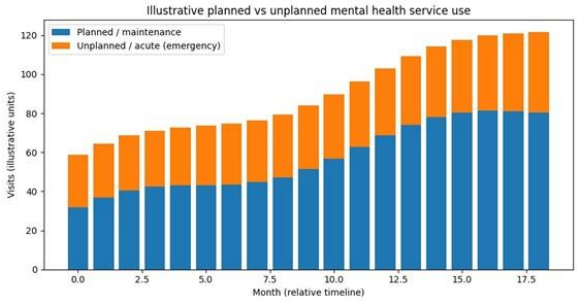
Initial collective swings into and out of service use are mirrored in subsequent patterns. Adolescents who require care but do not use it constitute a neglected group. However, understanding the determinants of actual help-seeking behavior is complicated by the structure of service systems. Multiple sets of interrelated factors delineate whether, when, and where adolescents access support for difficulties that persist, worsen, or appear later in lockdown. Offer availability, service accessibility, and perceived severity, sufficiency, and stigma shape whether and when care is sought. These influences operate across the contextual levels described by the ecological model of adolescent mental health and in the theory of health service utilization.



4.1. Accessibility and Barriers to Care

A range of structural, financial, geographic, and cultural obstacles to care exists, especially among adolescents at higher risk. Delays in receiving the help needed can have significant negative consequences. Long wait times, limited transportation options, and a lack of digital devices or adequate digital literacy all hinder the uptake of digital interventions. In the context of mental health care, stigma persists as an important barrier. Concerns about confidentiality, reduced accessibility, and the negative impact of COVID-19 on hospitalizations and appointments are further deterrents to the use of teletherapy and telepsychiatry.

Over the duration of the prolonged lockdowns, the underlying demand for mental health services has steadily increased, but the supply of services has not kept pace. Overall, mental health service usage remains lower than the rising demand, despite increased availability. The most frequently reported reasons for not receiving help are a lack of perceived need, the desire to cope alone, stigma, and concerns about confidentiality. Perceived service-related restraints include not knowing where to access help, long waiting times before receiving help, insufficient information about available services, insecurity around the quality of teaching and its impact on future academic goals, and lack of insurance cover or costs associated with help-seeking.

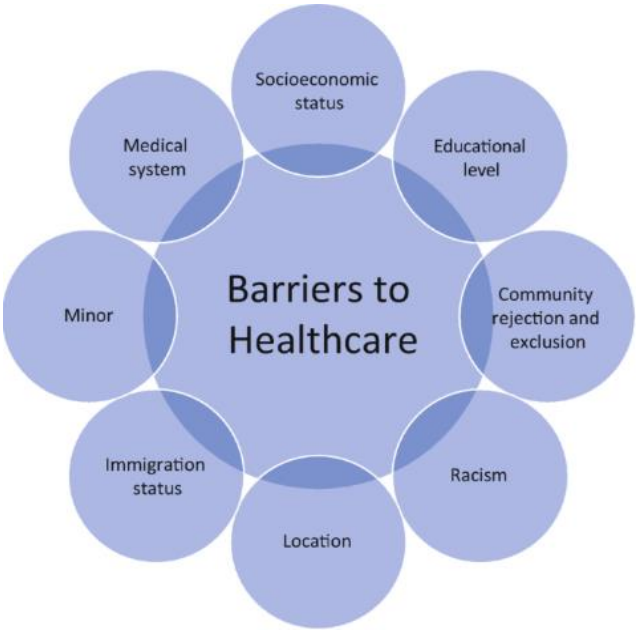


Fig 2: Barriers to Access for Transgender Healthcare

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4.2. Telehealth and Digital Interventions

Overall, adolescents demonstrated modest levels of engagement in telehealth services. While more than half reported any use of telehealth, only one in ten used these services regularly, typically receiving care one to three times during lockdowns for planned concerns. Telephone and text-based support were more common than video consultations. Patients were generally satisfied, but socioeconomically disadvantaged youth expressed lower levels of satisfaction. Although some studies suggested clinical outcomes comparable with those of in-person care, others highlighted greater deterioration in mood and functioning among adolescents using exclusively digital interventions. The absence of observed benefits for exclusively remote service utilization underscored concerns about equity in access to telehealth.

The increasing reliance on technology during lockdowns also prompted the development and dissemination of mental health apps, particularly among university-aged youth. Evidence of patient interest and engagement was complemented by indications of treatment response. However, both the low numbers of young people using mental health apps and the absence of evidence on wider adoption in the adolescent population raised questions about the extent of their real-world impact on adolescent mental health under lockdown.

4.3. School-Based Services and Community Programs Access to school counselors plays a critical role in supporting adolescents' mental health. Rates of access appear to be sufficient for the majority of adolescents, with proximity facilitating on-site service provision. School-based partnerships with community organizations offering additional on-site mental health services have been identified as promising from both a user and provider perspective. However, the increase in demand for on-site services during lockdowns may have outstripped supply, with data suggesting that some adolescents with unmet needs did not receive help from school counselors. Indeed, the high rate of on-site service disruption at the start of reintegration into in-person learning highlights the need for extensive preparations before reopening.

In addition to school-based support, various community programs specifically aimed at mitigating the negative impact of Covid-19 on adolescents' mental health have emerged. Such programs are especially important for adolescents who are not linked to other services and may present with less severe problems. Nevertheless, although these programs have generally received positive feedback, they are resource-intensive and may not be scalable.

Equation 3: Odds, odds ratio, and logistic regression (for "who seeks help")

If probability of seeking care is p:

$$\text{odds} = \frac{p}{1-p}$$

Compare two groups (e.g., low stigma vs high stigma):

- group A: probability p_A
- group B: probability p_B

$$\text{OR} = \frac{\frac{p_A}{1-p_A}}{\frac{p_B}{1-p_B}}$$

Step-by-step

4. Convert each probability to odds.
5. Divide odds(A) by odds(B).

Let $Y_i = 1$ if adolescent i used services, else 0. Predictors:

- Stigma score S_i
- perceived need P_i
- access A_i
- gender G_i, SES E_i, etc.

Model:

$$p_i = \Pr(Y_i = 1 \mid X_i)$$

Logit link:

$$\log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 S_i + \beta_2 P_i + \beta_3 A_i + \cdots$$

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Deriving probability from the logit (step-by-step)
Start with:

$$\log\left(\frac{p_i}{1-p_i}\right) = \eta_i$$

where $\eta_i = \beta_0 + \beta_1 S_i + \cdots$
Exponentiate both sides:

$$\frac{p_i}{1-p_i} = e^{\eta_i}$$

Multiply both sides by $(1-p_i)$:

$$p_i = e^{\eta_i}(1-p_i) = e^{\eta_i} - e^{\eta_i} p_i$$

Bring p_i terms together:

$p_i + e^{\eta_i} p_i = e^{\eta_i}\ p_i(1+e^{\eta_i}) = e^{\eta_i}$
Divide:

$$p_i = \frac{e^{\eta_i}}{1+e^{\eta_i}} = \frac{1}{1+e^{-\eta_i}}$$

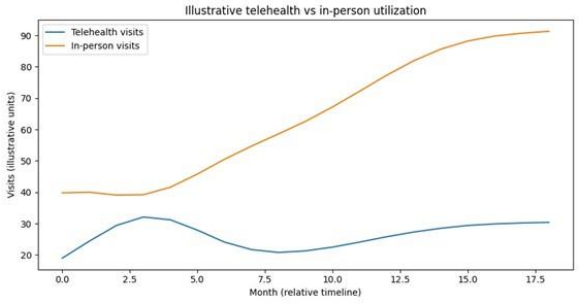
Interpretation (key for the article's determinants)
A one-unit increase in S_i changes log-odds by β_1.
So the odds ratio for a one-unit change is:

$$\text{OR} = e^{\beta_1}$$

V. DETERMINANTS OF HELP-SEEKING BEHAVIOR

Some factors are known to reduce help-seeking, e.g., high stigma and low mental health literacy. Drivers indicate not just whether adolescents seek care but also when. Various influences correspond to different levels of the ecological model. Immediate factors for any need include perceived severity, privacy concerns, and stigma. Often, whether to ask for help reflects a combination of enabled access and motivating need. Age, gender, ethnicity, urban versus rural living, and socioeconomic status all shape patterns of counseling, therapy, and hospitalization. Adverse family context also hinders help-seeking.

Stigma inhibits help-seeking, especially among boys, and perceived severity correlates positively with seeking. Being male, of minority ethnicity, and from an immigrant background predicts longer delays; results are inconsistent for biological age. Misunderstanding mental health needs such as having someone "to talk to" and lack of emotional closeness with parents add further barriers. Private and functional difficulties may inhibit requests. Older adolescents also appear less inclined to seek help from schools, perhaps due to stigma, absence of perceived need, or a need for confidentiality. For younger adolescents, help-seeking intentions are significantly associated with confidentiality perceptions and home-sharing.



5.1. sociodemographic factors

Age and gender were scrutinized in 14 studies covering diverse Western and Asian regions. Findings indicate distinct age-related effects, with utilization intensifying during early to middle adolescence before tapering in late adolescence.

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Gender differences were also evident: adolescent girls more frequently sought assistance than boys, and female beneficiaries accessed care earlier than male counterparts. Notably, disproportionate usage patterns were observed among adolescents with conductor disorders. Utilization rates remained consistent across various ethnic groups, while socioeconomic status exhibited a bimodal effect, favoring service utilization at both extremes. However, urban-rural differences were often inconclusive, except among ethnic minorities and low-income communities where residence significantly influenced care-seeking behavior.

Examination of parental education, marital status, and family size involved six studies, revealing positive correlations between maternal education levels and the likelihood of seeking help. Notably, a greater number of siblings reduced care-seeking behavior, and single-parent families reported a lower incidence of help-seeking behavior compared to two-parent households. The influence of parental support received mixed attention; some studies implicated low parental support in decreased help-seeking tendencies, while others highlighted its role in ensuring timely help-seeking. Additional family-contextual elements—family functioning, caregiving burden, and home environment—garnered limited scrutiny despite their potential importance.

Level (ecological)	Construct	Example measurable variable	Expected direction on utilization
Individual	Perceived need/severity	symptom score, self-rated severity	↑
Individual	Stigma	stigma scale	↓
Family	Parental support	support scale / cohesion score	↑
Family	Household stress	conflict scale	mixed (may ↑ acute, ↓ planned)
System	Access	Waiting time, distance, digital access	↑ when access improves
Policy	Coverage	reimbursement availability	↑ telehealth

Table: Determinant mapping table (conceptual variables)

5.2. Family and Household Context

Family factors influence whether and when adolescents seek mental health care during prolonged lockdowns, with parental support, family functioning, caregiving burden, and the home environment playing important roles. Recent studies show that adolescents living with a stepparent report less mental health service use than those living with two biological parents, but heterogamous households do not entail greater help-seeking stigma, implying a supportive parent-child relationship is central. A supportive family climate and parental emotional support predict higher rates of care use. Parental mental health also affects help-seeking: adolescents whose parents report severe mental health symptoms are less likely to initiate care, possibly due to reduced family functioning, caregiving pressure, or environmental stressors in the home.

Evidence highlights the burden of home confinement and supports requirements for families with children experiencing emotional distress. Adolescents who feel frustrated with home life use community support services more and digital mental health services less, suggesting that dissatisfaction prompts help-seeking, but community services are available only to 10–42% of those with MHSU. In contrast, adolescents with family-related stressors engage more in chat-based services, perceived as a safe option. Overall, a favorable family climate positively influences help-seeking, while the behavioral and emotional stability of family members creates additional MHSU burdens. Greater home stress diminishes use of face-to-face support.

5.3. Stigma and Perceived Need

The perceived need for assistance affects almost all analyses of help-seeking behavior. Cognitive appraisal theory posits that perceived severity determines whether an individual will initiate help-seeking behavior; adolescents who are aware of their own mental health problems are more likely to seek help than those who consider their symptoms to be minor. Conversely, those with lower levels of self-stigmatization may also be more open to reaching out for help. Perceived need should therefore be analyzed in tandem with stigma-related factors.

The level of stigma experienced by adolescents regarding mental health problems matters especially during or after crises. High levels of stigma relate to decreased willingness to use mental health services and a greater chance of being bullied. Furthermore, respondents experiencing peer stigma are less likely to use supportive services, private triggers, general practitioners, or helplines than those not encountering peer stigma. Potentially disclosing mental health problems to a peer is the most important barrier to reducing service utilization.

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Equation 4: Count models for "number of visits" (Poisson / Negative Binomial)
If Y_i = number of visits by adolescent i in a time window, Poisson model:

$$Y_i \sim \text{Poisson}(\lambda_i)$$

Log link:

$$\log(\lambda_i) = \beta_0 + \beta_1 S_i + \beta_2 P_i + \cdots$$

So:

$$\lambda_i = \exp(\beta_0 + \beta_1 S_i + \cdots)$$

Rate ratio derivation
A one-unit change in S_i:

$$\frac{\lambda(S+1)}{\lambda(S)} = \frac{e^{\beta_0+\beta_1(S+1)+\cdots}}{e^{\beta_0+\beta_1 S+\cdots}} = e^{\beta_1}$$

So e^{β_1} is a **visit rate ratio**.
(If data are overdispersed, replace Poisson with **Negative Binomial**; same log-link interpretation.)

5.4. Policy and System-Level Influences

Adolescents' mental health service utilization was influenced by policy and system factors across the different phases of lockdown. Insurance coverage and reimbursement were crucial determinants of access to telehealth. In jurisdictions with no insurance or funding, decreases in mental health service use were detected. Similarly, during the first lockdown of the COVID-19 pandemic in Canada, billing codes were implemented for child and adolescent telehealth services covered by provincial insurance. Subsequently, a significant increase in telehealth visits was found among children and adolescents in Ontario compared with pre-pandemic levels. School policies oriented toward mental health-related issues during the lockdown, such as enabling the organization of support groups and ensuring confidentiality for students requesting support services, were also found to influence help-seeking behavior.
Public health guidelines and recommendations were other factors contributing to help-seeking behavior. British Columbia's Mental Health Support for Children and Youth guidance and public messaging indicated that mental health services remained open and that adolescents should seek support if they experienced any psychological distress. In Taiwan, the Ministry of Health and Welfare also encouraged adolescents to express their feelings, seek assistance when in need, and continue counseling services.

VI. OUTCOMES AND EFFECTIVENESS OF INTERVENTIONS

Care utilization trajectories over the course of prolonged lockdowns have been documented, together with availability in various formats, settings, and categories. Considerable evidence demonstrates that help-seeking decisions are determined by influences operating at multiple levels. Despite the diversity of service types and the vast array of accessibility factors, there has been little examination of the effect these elements have on young people's likelihood of contacting appropriate services or, once contact is established, identifying when, with whom, and in what format the intervention takes place. Adolescence has been identified as a period of elevated suicide risk, and outcome data for young people in mental distress can be obtained from a variety of sources, enabling examination of the perceived need for and care-seeking patterns of emotionally distressed youth during lockdowns.

Studies indicate that adolescents experiencing clinically oriented levels of depression, anxiety, or stress achieve improved mental health outcomes through the care they receive. Adolescents receiving mental health care break down with greater functional capacity, fulfill educational demands with greater ease, and report a higher level of life satisfaction than youth not accessing services. Telehealth is equally effective for adolescents as face-to-face intervention, and school-based professional counseling and mental health services provided by community and faith organizations reduce symptom severity among those receiving support. Nevertheless, few studies have explored the outcomes achieved by adolescents accessing mental health services during periods of heightened distress, and the topic warrants urgent attention given the consensus that the COVID-19

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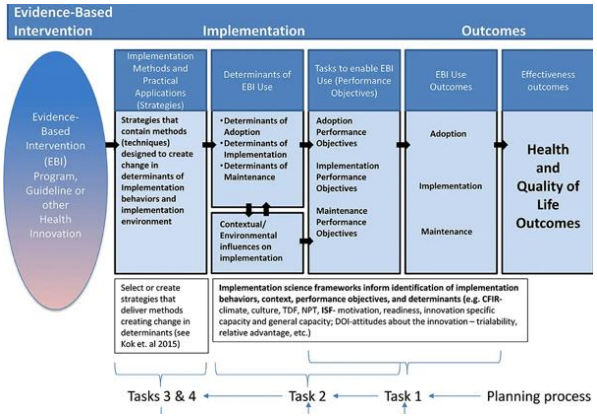
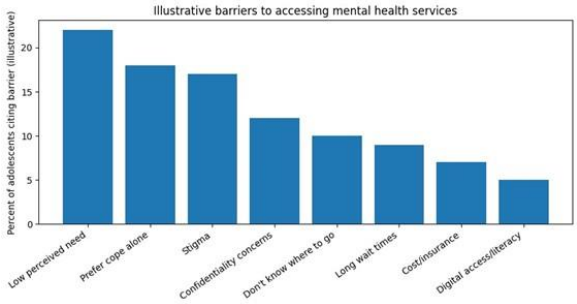


Fig 3: Outcomes and Effectiveness of Interventions

VII. GAPS, CHALLENGES, AND EQUITY CONSIDERATIONS

Not all groups and concerns received commensurate attention during the pandemic, leading to important data and evidence gaps. Studies have concentrated on anxiety, depression, and suicidal ideation, yet far fewer on eating disorders, obsessive-compulsive disorder, or psychotic disorders. Methodological constraints have hindered the robustness and reliability of information on severity, determinants, or trends in help-seeking behavior. Particularly, qualitative studies warrant further investment in order to understand the process and meaning of help-seeking among adolescents, as well as to access hidden populations. Moreover, no research has analyzed the impact of the COVID-19 pandemic on NICU adolescent patients, HIV patients, juvenile delinquents, minorities, and youths living in institutions, foster care, or in residential programs for addiction, emotional distress, psychosis, or learning disabilities.

Although the presence of school-based support structures increased the likelihood of obtaining help, school settings should be further equipped to address mental health needs, especially in adolescents who acknowledged a greater perceived need yet did not seek help. Social stigma still deters those seeking assistance. Integration of private and public mental health services and measures to reduce stigmatization are fundamental to getting adolescents into care. Digital technologies and telehealth solutions may play a key role in the provision and access of mental healthcare services for adolescents. However, attention to an equity perspective is crucial: although evidence suggests that adolescents benefit from digital solutions, gaps related to access and digital skills persist within various sociodemographic subgroups, which risk exacerbating existing inequalities. pandemic has increased the prevalence of mental health problems in adolescence and youth.



VIII. IMPLICATIONS FOR PRACTICE, POLICY, AND RESEARCH

Strengthening the availability of effective mental health services, especially during future lockdowns and periods of reintegration, requires action at multiple levels. Clinicians must ensure accessible and acceptable therapeutic offerings. Schools should promote school-based counselling services, facilitate the provision of on-site mental health services, and strengthen partnerships with community mental health agencies to better support their adolescents during and after lockdowns. At the policy level, equipping schools with a mental health system of care would assist in monitoring and addressing mental health needs during challenging transitions.

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In conjunction with the implementation of evidence-based practices, it will be vital to address the short- and long-term inequities resulting from the COVID-19 pandemic, with particular focus on the mental health of adolescents. Moreover, priority questions and gaps warranting attention from researchers include exploring how the COVID-19 experience will affect future mental health needs, whether lockdown and telehealth service use within the adolescent population constitute a turning point in the perception of mental health difficulties and help-seeking behaviours, how new technologies may change the relationship with health practitioners and service delivery, and how the mental health response to the pandemic will influence future planning. Future research employing robust longitudinal, population-based study designs can adequately address these questions and determine whether the current observations represent a radical breakthrough or merely an accelerated evolutionary trend. Such research is also essential for preparing future health systems to meet the persistent challenges of adolescent mental health, especially during crucial periods of transition or reintegration.

Equation 5: Interrupted Time Series (ITS) for lockdown phases (very relevant here)
If Y_t is utilization at month t, and lockdown starts at $t = t_0$.
Define:

- t = time trend
- $D_t = 0$ before t_0, 1 after t_0 (level change indicator)
- $T_t = 0$ before t_0, $t - t_0$ after (slope change term)

Segmented regression:

$$Y_t = \beta_0 + \beta_1 t + \beta_2 D_t + \beta_3 T_t + \varepsilon_t$$

Step-by-step meaning

- β_0: baseline level at $t = 0$
- β_1: baseline monthly trend
- β_2: immediate level jump at lockdown
- β_3: change in slope after lockdown

This matches the article's "initial swings" and later changes in patterns.

IX. CONCLUSION

During prolonged lockdowns, prevalence rates for anxiety, depression, PTSD, eating disorders, and self-harm rose sharply among adolescents, but only a minority sought care. Patterns of mental health service utilization reveal both challenges and opportunities. Although interest in support was high, underlying structural barriers often led young people to forgo help or consult emergency services. Telehealth use increased dramatically, but for some groups, take-up rates remained low. Schools and community programs provided a critical safety net, yet access to on-campus counselors was insufficient, provision of on-site services fell short of needs, and burgeoning external partnerships were vulnerable to disruption. Stigma and perceived levels of need emerged as key determinants of care-seeking behavior.

Looking ahead, the available evidence points toward a gradual but uneven increase in demand for mental health support among adolescents, with particular consideration needed for the uptake of specialized services. Engagement in telehealth interventions is expected to accelerate, particularly among technology-savvy populations, yet implementation gaps may widen in the absence of policy guidance and appropriate reimbursement frameworks. Monitoring mechanisms should be established to track utilization trends and equity-related patterns and to ensure that no demographic or geographical group is left behind. Public health advocacy at the systems level is also required to reinforce confidence in school-based services, whether directly provided by counselors or delivered through established partnerships with community mental health agencies.

9.1. Future Trends

Although the future demand for adolescent mental health services is uncertain, some changes appear likely. Attention to these areas can help address the ongoing needs of young people and the services available to support them. Research indicates that a large proportion of adolescents desire more mental health care. The increasing focus on mental health among adolescents and young adults, coupled with the ongoing pandemic, may be driving demand at school-based and community-based sites and increasing acceptability and use of telehealth services, novel local delivery models, and publicised youth mental health campaigns. Increased opportunities for digital engagement may also enhance interest in online and app-based services.

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Equation 6: Delay-to-care / "when they seek help" (Survival analysis)

Let T = time until first service contact after symptom onset.

- Survival function: $S(t) = \Pr(T > t)$
- Hazard: instantaneous help-seeking rate at time t

$$h(t) = \lim_{\Delta t \to 0} \frac{\Pr(t \le T < t + \Delta t \mid T \ge t)}{\Delta t}$$

Cox proportional hazards model:

$$h_i(t) = h_0(t)\exp(\beta_1 S_i + \beta_2 P_i + \cdots)$$

Hazard ratio derivation (one-unit stigma change)

$$\frac{h(S+1)}{h(S)} = \frac{h_0(t)e^{\beta_1(S+1)+\cdots}}{h_0(t)e^{\beta_1 S+\cdots}} = e^{\beta_1}$$

So e^{β_1} is a **hazard ratio** (earlier vs later help-seeking).

Diverse factors, including the response to COVID-19, are shaping the future demand for adolescent mental health services. Recognition of the demand for mental health services is likely to prompt a different response in a future public health emergency. School systems may continue to expand opportunities for school-based mental health services. Suicide prevention efforts may remain a priority, especially for vulnerable groups, and campaigns to increase mental health literacy and reduce stigma are expected to continue. These priorities are informing research agendas, which must establish the impact of service use on long-term outcomes, including quality of life and functioning, and measure the effectiveness of services for neglected groups and in low-income settings.

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