

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Delineating the trajectories of social and occupational functioning of young people attending primary-care based, early intervention mental health services in Australia: A longitudinal study
AUTHORS	Iorfino, Frank; Hermens, Daniel; Cross, Shane; Zmicerevska, Natalia; Nichles, Alissa; Badcock, Caro-Anne; Groot, Josine; Scott, Elizabeth; Hickie, Ian

VERSION 1 – REVIEW

REVIEWER	Marie-Josée Fleury McGill University, Canada
REVIEW RETURNED	30-Nov-2017

GENERAL COMMENTS	<p>This article is well written and pertinent. It integrates original methods and results that will help improve services for youth. Other comments regarding each section of the manuscript are included below:</p> <p>Introduction: The introduction could be strengthened by providing a more thorough review of previous literature on recovery trajectories among youth, as well as predictors of functional impairment for this population. As well, I wonder why hypotheses were not developed for this research.</p> <p>Methods:</p> <ul style="list-style-type: none">• More information needs to be provided on the study context, the primary care setting from where patients were recruited, and, more generally, on the types of intervention and intensity of care provided to these young study participants. For example, "Headspace" is identified only in the discussion without any prior description of such a program, which is not known to international readers. In addition, what role(s) are assumed by specialized care services (e.g. psychiatrists, hospitals)? While hospitalization is measured in the study, the links between hospitalization and the primary care resource from where the youth were recruited have not been delineated.• What types of physical health comorbidities were measured? No information was included in the manuscript on data collected regarding substance use disorder (SUD) comorbidities. SUDs are also very prevalent among youth and highly related to mental disorders. Consideration of these comorbidities needs to be included in the manuscript, at least as a limitation in the data collection.• The methods need to account for, and explain, how types of
-------------------------	--

	<p>care, intensity of care and time to follow-up were controlled in the statistical analyses.</p> <ul style="list-style-type: none"> • More information is needed regarding instruments used in the study, including validation issues (e.g. SOFAS, NEET). • The average follow-up time intervals were limited to 4 months, and 23 months between baseline and “time last seen”. The authors should explain why these time intervals were so few, and infrequent. This point could perhaps be included in the study limitations section. <p>Results:</p> <ul style="list-style-type: none"> • Only 18% of the cohort from the larger study was included in the present study. While inclusion and exclusion criteria are broadly presented in the Methods section, further details are required concerning the exclusion criteria for patient selection. • Given that only 17% were currently receiving government benefits, and 20% identified as NEET, I wonder what economic conditions would describe the remaining participants? A more fully informed description of the sample would be helpful for readers. <p>Discussion:</p> <ul style="list-style-type: none"> • The second sentence of the discussion (“Improvement is likely to occur...”) seems to be supported by the results for very few individuals in the cohort; re this sentence needs to be revised. • Early intervention is recommended by the authors. I suggest that they provide more precise recommendations regarding types of early interventions that could be developed, especially in terms of the group trajectory targeted by the study. Other recommendations should also be provided for each specific cohort trajectory. • It is stated on page 14, line 41, that “this study examined the long term patterns of change . . .” Since the average time to follow-up is 23 months, I would be careful about making “exaggerated” claims in this regard. • Some aspects of the discussion are difficult to understand, as information is not provided regarding the services that were actually delivered to youth at the center, for example the comments regarding vocational support (p. 15, first paragraph). • The links between study results and the commentary on the introduction of new and emerging technologies are not clear; nor do I see how this discussion relates to the study context. Ibid for “feedback to clinicians”: what are the links between these recommendations and the study results? • The discussion needs to be a reworked, and more links made with previous research findings and literature on “best practice models” for youth. • More careful treatment and more clear distinctions should be made between terms such as functional impairment and symptomatic recovery/improvement in the conclusions, and throughout the manuscript as well. <p>Limitations: The validity of the database needs to be discussed.</p>
--	--

REVIEWER	Mary Cannon Royal College of Surgeons in Ireland Ireland
REVIEW RETURNED	10-Dec-2017

GENERAL COMMENTS	This paper adds to the evidence base about youth mental health
-------------------------	--

	<p>interventions. The authors utilise a valuable dataset of 554 young people who underwent treatment at a primary care based early intervention service. The authors identify six distinct clinical trajectories.</p> <p>The disheartening news seems to be that 60% of the cohort had poor functioning at entry to treatment and remained chronically impaired over time. These results have the potential to be used to show that primary care based youth mental health interventions are ineffective and could undo much good work and advocacy in this area. The authors could address this by identifying the characteristics of the young people at baseline who responded well to this intervention. It is extremely unlikely that a "one size fits all" intervention can work for everyone. I would recommend that the authors additionally stratify the cohort by functional impairment at outcome and analyse the response to treatment in those with mild, moderate or severe impairment at entry. It is important to identify early those who may need more specialist intervention.</p>
--	---

VERSION 1 – AUTHOR RESPONSE

Editorial Requirements:

1. Please revise your title to state the research question, study design, and setting (location). This is the preferred format for the journal.

Response: The title has been revised to reflect the preferred format: "Delineating the trajectories of social and occupational functioning of young people attending primary-care based, early intervention mental health services: A longitudinal study"

2. Please revise the Strengths and Limitations section (after the abstract) to focus on the methodological strengths and limitations of your study rather than summarizing the results.

Response: This section has been updated to focus on the methodological strengths and limitations. See below (page 3):

This study utilised a rich data set of 554 participants with between two and nine observations per person (median = 4; approximately 2200 data points) up to five years after initial presentation and applied a novel group-based trajectory modelling procedure to characterise the pattern of change in functional impairment over time. This procedure identified six distinct trajectories that differ in terms of the initial level of functional impairment at presentation and the course of functioning over a five year period.

This study is one of the first to report on the long-term functional outcomes for young people attending primary-care based, early intervention mental health services. Its naturalistic design provides valuable insight into the extent of functional impairment over the course of these common mental disorders and identifies the specific needs of young people with these disorders. The study raises specific questions about how to improve health service and individual intervention strategies to monitor, target and improve these outcomes.

Since this was a naturalistic study, there may be some factors that account for the trajectories or differences in functional outcome that weren't collected in this study, such as socio-economic status, the type and intensity of interventions an individual received or treatment resistance. Since these factors were not uniformly collected it is difficult to make specific conclusions about the effect of specific intervention or service models on these trajectories or outcomes. This will be important for future studies to determine, however it was beyond the scope of this study.

Since this study focuses on individuals who were continually engaged in clinical care and represents 18% of the total research register it is unclear how representative this sample is of the

whole population presenting to these services. Similarly, there is a lack of information about the differences between those who continually engage in care versus those who may have disengaged.

Reviewer: 1

This article is well written and pertinent. It integrates original methods and results that will help improve services for youth. Other comments regarding each section of the manuscript are included below:

1.1. Introduction: The introduction could be strengthened by providing a more thorough review of previous literature on recovery trajectories among youth, as well as predictors of functional impairment for this population. As well, I wonder why hypotheses were not developed for this research.

Response: We have revised the second paragraph of the introduction to include 3 additional references to key papers in functional recovery and trajectories. The following now appears in text (page 5):

“These patterns are also evident among young people, since most medical and psychological treatments developed to address depression do not consistently improve functioning in these populations¹⁷⁻¹⁹. Of the few studies that report long-term functional outcomes for young people, most adolescents treated for depression experienced positive functional outcomes up to three years later, however persistent functional impairment was common for those with comorbidity and recurrence of depression²⁰. Similarly, young people with psychosis tend to experience significant social disability that persists over time and may be indicative of the difficulty in achieving functional recovery in these groups²¹. For many of these severe mental disorders, the onset of functional deterioration tends to occur prior to the onset of illness and suggests there is the capacity to address these problems early^{22 23}.”

The aim of this study was to explore the patterns of social and occupational functioning, and so no specific hypotheses were being tested.

1.2. More information needs to be provided on the study context, the primary care setting from where patients were recruited, and, more generally, on the types of intervention and intensity of care provided to these young study participants. For example, “Headspace” is identified only in the discussion without any prior description of such a program, which is not known to international readers. In addition, what role(s) are assumed by specialized care services (e.g. psychiatrists, hospitals)? While hospitalization is measured in the study, the links between hospitalization and the primary care resource from where the youth were recruited have not been delineated.

Response: The first paragraph of the method section, sub-section ‘participants’ has been revised to provide a better description of the study context. We have also provided two references to previous publications that also describe this population and study setting. We have also clarified the role of specialised care services in this paragraph. The paragraph now reads as follows (page 7):

“Study participants were drawn from a larger cohort of young people (n=3087; 59% female, mean age = 18.52 ± 3.8) presenting to the Brain and Mind Centre's youth mental health clinics in the Sydney suburbs of Camperdown and Campbelltown. These clinics consist of an integrated mix of primary-level services branded as headspace³⁵ as well as more specialised services including psychiatric services. These clinics primarily attract young people with a range of mental health problems, including those with sub-threshold and full threshold mental disorders, who may have been self-referred, referred via a family member or friend, or else via the community including external general practitioner, schools or university²⁹. The young people in this study were recruited to a research register for mood, psychotic, developmental and other mental disorders between January 2005 and August 2017. All young people received clinician-based case management and relevant psychological, social and/or medical interventions over the duration of their time in care, which may

also include referral to/from higher tier mental health services or hospitalisation for those whose needs exceed the capacity of the primary care services.”

1.3. What types of physical health comorbidities were measured? No information was included in the manuscript on data collected regarding substance use disorder (SUD) comorbidities. SUDs are also very prevalent among youth and highly related to mental disorders. Consideration of these comorbidities needs to be included in the manuscript, at least as a limitation in the data collection.

Response: Further information about the physical health comorbidities recorded have been provided in text. For example, “...(iv) comorbidities (physical health diagnoses, such as autoimmune, endocrine, metabolic etc.,....” (page 8). Regarding the data collected on SUDs, this information is collected as part of the diagnosis data, and so reporting on these disorders are covered in the “other” category for primary diagnoses and the “comorbid mental health problem” category.

1.4. The methods need to account for, and explain, how types of care, intensity of care and time to follow-up were controlled in the statistical analyses.

Information about these interventions was not uniformly collected and so we were unable to include this in the analyses. We have revised the following sentences of the limitations section in the discussion to state this (page 18):

“Finally, there may be other factors that account for these trajectories or differences in functional outcome that weren’t collected, such as, but not limited to socio-economic status, the type and intensity of interventions an individual received, or pre-existing undiagnosed learning or developmental disorders. It is important for future work to determine the effectiveness of specific interventions on functional impairment trajectories and improving these outcomes.”

1.5. More information is needed regarding instruments used in the study, including validation issues (e.g. SOFAS, NEET).

In addition to the changes described in review 1.3., we have also added a description about the SOFAS rating scale and reference to provide further details about this instrument. The following text now appears in text (page 8):

“...(v) functioning (assessed using the Social Occupational Functional Assessment Scale (SOFAS)³² and engagement in part-time or fulltime education, employment or training, used to determine not in education, employment or training [NEET] status). The SOFAS is a clinician-rated measure that assesses functioning on a 0–100 scale, with lower scores suggesting more severe functional impairment. The instructions emphasise that the rater should aim to avoid confounding the rating with clinical symptoms.”

1.6. The average follow-up time intervals were limited to 4 months, and 23 months between baseline and “time last seen”. The authors should explain why these time intervals were so few, and infrequent. This point could perhaps be included in the study limitations section.

Response: To clarify, the number of follow up time points recorded for an individual varied between 2 and 9 (median = 4) and the number of months between baseline and time last seen was between 1 and 126 (median = 23 months) (figures 1 and 2, page 9), and so follow up time points were not limited to 4 months and 23 months.

1.7. Only 18% of the cohort from the larger study was included in the present study. While inclusion and exclusion criteria are broadly presented in the Methods section, further details are required concerning the exclusion criteria for patient selection.

Response: All inclusion and exclusion criteria have been included in the methods sections (page 7). This study includes a subsample of the entire cohort included on the case register, who have follow

up clinical file data completed (i.e. 18%). The case register cohort has basic baseline information, whereas the this study subsample includes participants who have more detailed follow up information entered via the clinical file audit (detailed in the methods section of this manuscript).

1.8. Given that only 17% were currently receiving government benefits, and 20% identified as NEET, I wonder what economic conditions would describe the remaining participants? A more fully informed description of the sample would be helpful for readers.

Response: A more fully informed description of the sample has been provided in column 2 of table 3 (page 14-15), and some of this information has been summarised in the first paragraph of the results (page 9). In terms of more detailed economic conditions, we are unable to report on this beyond what has been provided. Future studies should aim to characterise the economic situation (socio-economic status etc) of participants to provide more details about this. We have added the sentence below to the discussion section to communicate this (page 18).

“Finally, there may be other factors that account for these trajectories or differences in functional outcome that weren’t collected, such as, but not limited to socio-economic status, the type and intensity of interventions an individual received, or pre-existing undiagnosed learning or developmental disorders. It is important for future work to determine the effectiveness of specific interventions on functional impairment trajectories and improving these outcomes.”

1.9. The second sentence of the discussion (“Improvement is likely to occur...”) seems to be supported by the results for very few individuals in the cohort; re this sentence needs to be revised.

Response: The sentence has been revised and now appears in text as follows (page 15-16):
“Improvement occurs throughout the course of care, however the rate of clinical impairment and functional deterioration remains high for a large number of people.”

1.10. Early intervention is recommended by the authors. I suggest that they provide more precise recommendations regarding types of early interventions that could be developed, especially in terms of the group trajectory targeted by the study. Other recommendations should also be provided for each specific cohort trajectory.

Response: The second paragraph of the discussion has been revised to provide more detailed discussion about the types of interventions and which trajectory groups may be targeted. The following now appears in text (page 16-17).

“For others, however, not being able to return to work or education, or improve social functioning could be detrimental to their future health and socio-economic wellbeing and may reflect a lack of sufficient integrated psychological and vocational interventions to directly address these outcomes 34 35. These results suggest that for those who present with mild functional impairment, functional improvement is likely to occur relatively quickly (i.e. evident from the quadratic trend toward improvement within the first 6 months), however for those with more serious impairment there may be the need for more intensive strategies delivered over a longer period of time to prevent or address ongoing functional impairment. Previous research has shown that only a small number of young people attending these primary mental health services received specific vocational support in the previous year²⁷, despite evidence to suggest that adjunctive interventions targeting vocational activity can have a positive impact on functional outcomes^{36 37}. Even among those with severe, comorbid disorders, early intervention combined with focused social recovery has demonstrated clinical utility over early intervention alone for improving functional outcomes³⁸. Together, this reiterates the need for early intervention and ongoing care that does more to directly address functional impairment over longer periods, particularly for those who present with substantial functional impairment.”

1.11. It is stated on page 14, line 41, that “this study examined the long term patterns of change . . .” Since the average time to follow-up is 23 months, I would be careful about making “exaggerated” claims in this regard.

Response: This sentence has been revised for clarity. This statement follows a series of sentences that report on “short term” periods of care (i.e. less than 1 year), therefore the use of “longer term” highlights that this study follows individuals over a longer period. We have added the actual time in brackets for clarity and to remind the reader. The following sentence now appears in the discussion (page 16):

“While the overall rate of change is important, this study examined the longer term patterns of change (i.e. over a 5-year period), which were informed by multiple time points.”

1.12. Some aspects of the discussion are difficult to understand, as information is not provided regarding the services that were actually delivered to youth at the center, for example the comments regarding vocational support (p. 15, first paragraph).

Response: Revision 1.2. addresses the comment about providing further information about the study context and the services delivered. These details are now presented in the methods section (page 16-17). Furthermore, regarding the comment about vocational support, this statement references previous work by our group that investigated the frequency of vocational support interventions being provided by these services. The findings from this study indicated that these types of interventions were sparingly provided. Thus, we use this previous study to support our claim that further vocational support interventions may be required to address the ongoing functional impairment/chronic trajectories identified in this study.

1.13. The links between study results and the commentary on the introduction of new and emerging technologies are not clear; nor do I see how this discussion relates to the study context. Ibid for “feedback to clinicians”: what are the links between these recommendations and the study results?

Response: This commentary refers to the use of technology as a potential solution/ strategy to address the ongoing functional impairment. We acknowledge in the third paragraph of the discussion the need for targeted vocational support to address functioning, however there is still a need to determine when these interventions are appropriate. Thus, in the fourth paragraph of the discussion we provide a commentary about the challenges health professionals face when identifying specific trajectories, and suggest that technologies may be a potential solution to this problem. We have revised the wording in this paragraph to communicate this point more clearly. The following section now appears in text (page 17-18):

“...Thus, there is a need to improve health service approaches to help clinicians identify and track individual functional outcomes and trajectories over the course of care, so that the appropriate interventions can be strategically implemented. One solution may be the development and integration of new and emerging technologies that use routine outcome measurement and feedback within health services, to deliver more personalised interventions that respond to an individual’s needs^{38 39}. Regular feedback to clinicians and individuals can provide important insights about functional impairment overtime as well as the effectiveness of particular interventions for addressing key clinical and functional outcomes⁴⁰.”

1.14. The discussion needs to be a reworked, and more links made with previous research findings and literature on “best practice models” for youth.

Response: The discussion section has now been reworked and integrated further to include references and commentary to best practice models for youth, with specific recommendations for the results of this study (see reviews 1.10, 1.12 and 1.13).

1.15. More careful treatment and more clear distinctions should be made between terms such as functional impairment and symptomatic recovery/improvement in the conclusions, and throughout the manuscript as well.

Response: We have revised the conclusion to make this distinction clearer, specifically we removed the term 'recovery' and just use the term 'symptomatic improvement'. The term symptomatic recovery/improvement does not appear anywhere else in the manuscript. The following sentence now appears in text (page 19):

"The significant chronicity observed in this clinical cohort reiterates that ongoing functional impairment is prevalent among young people with emerging mental health disorders and should be a primary focus of intervention, in addition to symptomatic improvement."

1.16. Limitations: The validity of the database needs to be discussed.

Response: We have added the following discussion point to the limitations section to address this issue (page 18):

"Moreover, given that the study was conducted within the context of normal clinical service, the clinical and functional information available for particular individuals was diverse and while the option for "not enough information available" was provided to raters, it is unclear how the type of information available impacted on the completion of the clinical proforma."

Reviewer: 2

This paper adds to the evidence base about youth mental health interventions. The authors utilise a valuable dataset of 554 young people who underwent treatment at a primary care based early intervention service. The authors identify six distinct clinical trajectories.

2.1. The disheartening news seems to be that 60% of the cohort had poor functioning at entry to treatment and remained chronically impaired over time. These results have the potential to be used to show that primary care based youth mental health interventions are ineffective and could undo much good work and advocacy in this area. The authors could address this by identifying the characteristics of the young people at baseline who responded well to this intervention. It is extremely unlikely that a "one size fits all" intervention can work for everyone. I would recommend that the authors additionally stratify the cohort by functional impairment at outcome and analyse the response to treatment in those with mild, moderate or severe impairment at entry. It is important to identify early those who may need more specialist intervention.

Response: As described in review 1.2. and 1.10., we provide a better discussion about how these results fit in the context of early intervention services and the types of intervention strategies that may be effective with reference to relevant publications (page 16-17).

"These results suggest that for those who present with mild functional impairment, functional improvement is likely to occur relatively quickly (i.e. evident from the quadratic trend toward improvement within the first 6 months), however for those with more serious impairment there may be the need for more intensive strategies to prevent or address ongoing functional impairment. Previous research has shown that only a small number of young people attending these primary mental health services received specific vocational support in the previous year²⁷, despite evidence to suggest that adjunctive interventions targeting vocational activity can have a positive impact on functional outcomes³⁶⁻³⁷. Even among those with severe, comorbid disorders, early intervention combined with focused social recovery has demonstrated clinical utility over early intervention alone for improving functional outcomes³⁸. Together, this reiterates the need for early intervention and ongoing care that does more to directly address functional impairment over longer periods, particularly for those who present with substantial functional impairment."

Furthermore, these results do not suggest early intervention is ineffective, especially since no specific intervention strategies were tested or measured, and we have added this comment to the limitations section of the discussion, see review 1.4.