Perspective
Volume 11:4, 2022

Clinical Schizophrenia and Related Psychoses

ISSN: 2162-6359 Open Access

Predicting the Pathways of Adolescents and Young Adults at High-Risk for Psychosis: Moving from Being Highly Vulnerable to Expressing Full-Scale Pathology using an Integrated Dynamic Network Approach Mapping Digitally Collected Ecologically Valid Data

Johanna MC Blom[1,5*], Pierfrancesco Sarti1[1], Chiara Colliva[2], Cristina Benatti[3,5], Fabio Tascedda[3,5] and Luca Pani[1,4,5]

[1]*Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena Italy*

[2]*Department of Biomedical, University of Modena and Reggio Emilia, Reggio Emilia, Italy*

[3]*Department of Life Sciences, University of Modena and Reggio Emilia, Modena, Italy*

[4]*Department of Psychiatry and Behavioral Sciences, University of Miami, Miami, USA*

[5]*Departments of Neuroscience and Neurotechnology, University of Modena and Reggio Emilia, Modena Italy*

Introduction

Consolidated knowledge affirms that the early detection of Adolescents and Young Adults (AYAs) at high clinical risk for the development of psychosis (CHR-P) may lead to its prevention [1-4]. Acknowledging that in AYAs at high risk psychosis is a disorder of the developing brain and that behavior is the last step of a cascade that starts long before problems manifest themselves, implies that we probably should start with the brain development, wiring, and connections, with its ways of interacting with its surroundings and with its susceptibility to context [5]. Much variation exists in how the brain is wired and functions [6-8]. Still, this variation does not exclude the existence of some possible and predictable set of factors that put AYAs at a high risk of moving from being vulnerable to develop full-blown psychosis or, on the other hand, predicting who will not transition to psychosis [10-13]. Furthermore, knowing that experiences are biologically embedded, defining the (biological) susceptibility of each AYA to its environment would move us towards a novel understanding of risk and disability, future functioning, and resilience [14-16]. Considering this, the resulting phenotype is the emergent outcome of a dynamic system of progressively changing functions and structures that continuously interact with each other and with the environment [17].

Furthermore, high risk AYAs represent an enormously heterogeneous group, and currently identified risk factors cannot distinguish individual trajectories. At the same time, no treatment modality has proved to prevent the development of full-blown psychosis. Early recognition and prediction of the risk trajectory over time are even more critical, considering that psychosis does not need to be a chronic disease if young individuals at heightened risk are detected early and preventive measures are put into place promptly [18-21]. However, if the distinct clinical pathways of AYAs at high risk for the development of psychosis are to be detected, predicted, and prevented and, consequently, personalized treatment modalities developed, then a paradigm shift is essential [22-24].

Description

New conceptual thinking will result in increasingly explanatory and predictive models [25,26] which may offer a more realistic image of the strengths and vulnerabilities of AYAs at CHR-P by stressing the dynamic nature of the underlying processes, which are context-sensitive, and, incidentally, tend to change over time. Abnormal phenotypic outcomes develop from modifications in basic procedures early in development (such as pruning, synaptogenesis, density of neurons, neuro/glia ratio) that are highly flexible, plastic, and open to extensive environmental influences [27,28]. Many individual predictive measures exist but little is known on how they relate to each other. The main challenge then is not to understand the role of each factor and context but the relationships and connections among them by constructing a dynamic network of interacting biological, genetic, behavioral, and psychosocial determinants to explain the individual variances of these young patients at heightened risk for psychosis. Using signs together with symptoms, objective indicators and behavioral symptoms, and screening indices would provide more quantitative measures of deficits, avoiding the exclusive use of clinical rating scales [29-31]. Furthermore, fractioning problems in various subtypes based on specific patterns of cognition, emotion,

***Address to Correspondence:** Johanna MC Blom, Department of Neuroscience and Neurotechnology, University of Modena and Reggio Emilia, Modena Italy, Tel: 0039-0592055373; E-mail: joan.blom@unimore.it*

Received: 01 March, 2022, Manuscript No. CSRP-22-59079; **Editor assigned:** 04 March, 2022, PreQC No. CSRP-22-59079 (PQ); **Reviewed:** 18 March, 2022, QC No. CSRP-22-59079; **Revised:** 30 April, 2022, Manuscript No. CSRP-22-59079 (R); **Published:** 09 May, 2022

and behavior variables together with a more ecological risk assessment will improve the understanding of individual risk [32,33]. Innovative digital health technologies offer such an approach when incorporated into existing infrastructures and enable the use of various data sources. AYAs are not usually involved in the early design and research concerning their present and future health. Still, they want a role that genuinely influences the development of treatments for their unmet needs/priorities. To accomplish this, we need to build a new and trusted ecosystem that will allow data collection *via* mobile phones, tablets, Ecological Momentary Assessments (EMA), and other digital technologies, enabling these young patients to participate from home, regardless of geographical location, with tools they are highly familiar with. One of the important questions to face now is how can maximize the benefits of DHT and innovative analyses while minimizing their risk [34-37].

Conclusion

A combination of network analysis with a digital approach and direct patient involvement in their health integrates the so-called P4 or precision medicine: predictive, preventive, personalized, and participatory. The latter is significant because it will increase the confidence of the adolescent to shift from a passive receiver of care to an active, responsible, and aware driver of their future wellbeing.

References

1. Fusar-Poli P, Bonoldi I and Yung AR. Predicting Psychosis: Meta-analysis of Transition Outcomes in Individuals at High Clinical Risk. *Arch Gen Psychiatry* 69 (2012): 220–229.
2. Fusar-Poli P, Salazar de Pablo G and Correll CU. Prevention of Psychosis: Advances in Detection, Prognosis, and Intervention. *JAMA Psychiatry* 77 (2020): 755–765.
3. Cannon TD, Cadenhead K and Cornblatt B. Prediction of Psychosis in Youth at High Clinical Risk: A Multisite Longitudinal Study in North America. *Arch Gen Psychiatry* 65 (2008): 28–37.
4. Westhoff MLS, Ladwig J and Heck j. Early Detection and Prevention of Schizophrenic Psychosis-A Review. *Brain Sci* 12 (2021): 11.
5. Van OS, Kenis G and Rutten BPF. The Environment and Schizophrenia. *Nature* 468 (2010): 203–212.
6. Giedd JN, Rapoport JL. Structural MRI of Pediatric Brain Development: What Have We Learned And Where Are We Going?*Neuron* 67 (2010): 728-734.
7. Gracia-Tabuenca Z, Beatriz Moreno M, Barrios FA and Alcauter S, et al. Development Of The Brain Functional Connectome Follows Puberty-Dependent Nonlinear Trajectories. *NeuroImage* 229 (2021): 1-9.
8. Sawyer SM, Azzopardi PS, Wickremarathne D, and Patton GC, et al. The Age of Adolescence. *Lancet Child Adolesc Health* 2 (2018): 223-228.
9. Worthington MA, Addington J, Bearden CE and Cadenhead KS, et al. Individualized Prediction of Prodromal Symptom Remission for Youth at Clinical High Risk for Psychosis. *Schizophr Bull* 48 (2022): 395-404.
10. Worthington MA, Cao H and Cannon TD. Discovery and Validation of Prediction Algorithms for Psychosis in Youths at Clinical High Risk. *Biol Psychiatry Cogn Neurosci Neuroimaging* 5 (2020): 738-747.
11. Addington J, Stowkowy J, Liu L and Cadenhead KS, et al. Clinical and Functional Characteristics Of Youth At Clinical High-Risk For Psychosis Who Do Not Transition To Psychosis. *Psychol Med* 49 (2019): 1670-1677.
12. Raballo A, Poletti M, Preti A and McGorry P, et al. Clinical High Risk For Psychosis In Children And Adolescents: A Meta-Analysis Of Transition Prevalences. *Schizophr Res* 243 (2020): 254-261.
13. Joa I, Bjornestad J, Johannessen JO and Langeveld J, et al. Early Detection of Ultra High Risk for Psychosis in a Norwegian Catchment Area: The Two-Year Follow-Up of the Prevention of Psychosis Study. *Front Psychiatry* 12 (2021): 573905.
14. Fusar-Poli P, Oliver D, Spada G and Patel R, et al. Real-World Implementation Of A Transdiagnostic Risk Calculator For The Automatic Detection Of Individuals At Risk Of Psychosis In Clinical Routine: Study Protocol. *Front Psychiatry* 10 (2019): 109.
15. Hartmann JA, Schmidt SJ, McGorry PD and Berger M, et al. Trajectories of Symptom Severity And Functioning Over A Three-Year Period In A Psychosis High-Risk Sample: A Secondary Analysis of The Neurapro trial. *Behav Res Ther* 124 (2020): 103527.
16. de Wit S, Schothorst PF, Oranje B and Ziermans TB, et al. Adolescents at ultra-high risk for psychosis: long-term outcome of individuals who recover from their at-risk state. *Eur Neuropsychopharmacol* 24 (2014): 865–73.
17. Kozak MJ and Cuthbert BN. The Nimh Research Domain Criteria Initiative: Background, Issues, and Pragmatics. *Psychophysiology* 53 (2016): 286–297.
18. Fonseca-Pedrero, Muñiz, Gacía-Portilla. Network Structure of Psychotic-Like Experiences in Adolescents: Links With Risk and Protective Factors. *Early Interv Psychiatry* 15 (2021): 595–605.
19. Fusar-Poli P. Extending the Benefits of Indicated Prevention To Improve Outcomes of First-Episode Psychosis. *JAMA Psychiatry* 74 (2017): 667–668.
20. Mei C, van der Gaag M, Nelson B and Smit F, et al. Preventive Interventions for Individuals At Ultra-High Risk for Psychosis: An Updated And Extended Meta-Analysis. *Clin Psychol Rev* 86 (2021): 102005.
21. Alvarez-Jimenez M, Koval P, Schmaal L and Bendall S, et al. The Horyzons Project: A Randomized Controlled Trial df A Novel Online Social Therapy To Maintain Treatment Effects From Specialist First-Episode Psychosis Services. *World Psychiatry* 20 (2021): 233-243.
22. Bassett DS, Xia CH and Satterthwaite TD. Understanding the Emergence of Neuropsychiatric Disorders With Network Neuroscience. *Biol Psychiatry Cogn Neurosci Neuroimaging* 3(2018): 742-753.
23. Pessoa L. A Network Model of the Emotional Brain. *Trends Cogn Sci* 21 (2017): 357–371.
24. Borsboom D, Cramer AOJ and Kalis A. Brain Disorders? Not really: Why Network Structures Block Reductionism In Psychopathology Research. *Behav Brain Sci* 42 (2019): 2–54.
25. Haslbeck JMB, Borsboom D and Waldorp LJ. Moderated Network Models. *Multivariate Behav Res* 56 (2021): 256–287.
26. Haslbeck JMB and Waldorp LJ. How well do Network Models Predict Observations? on the Importance Of Predictability In Network Models. *Behav Res Methods* 50 (2018): 853–861.
27. Borsboom D, Cramer AOJ and Kalis A. Brain disorders? Not really: Why Network Structures Block Reductionism In Psychopathology Research. *Behav Brain Sci* 42 (2019): 1–63.
28. Isvoranu AM, Guloksuz S, Epskamp S and van OsJ, et al. Toward Incorporating Genetic Risk Scores Into Symptom Networks Of Psychosis. *Psychol Med* 50 (2020): 636–643.
29. Murray RM, David AS and Ajnakina O. Prevention of psychosis: Moving On From The At-Risk Mental State to Universal Primary Prevention. *Psychol Med* 51 (2021): 223–227.
30. McGorry PD, Hartmann JA, Spooner R and Nelson B, et al. Beyond the "at Risk Mental State" Concept: Transitioning to Transdiagnostic Psychiatry. *World Psychiatry* 17 (2018): 133-142.
31. Poletti M and Raballo A. Before Schizophrenia: Schizophrenic Vulnerability in Developmental Age and Its Detection. Clin Neuropsychiatry 18 (2021): 293-295.

32. Jimeno N, Gomez-Pilar J, Poza J and Hornero RV, et al. Main Symptomatic Treatment Targets in Suspected and Early Psychosis: New Insights From Network Analysis. *Schizophr Bull* 46 (2020): 884–895.

33. Lindgren M, Kuvaja H, Jokela M and Therman S, et al. Predictive Validity of Psychosis Risk Models When Applied to Adolescent Psychiatric Patients. *Psychol Med* 24 (2021): 1-12.

34. Wies B, Landers C and Ienca M. Digital Mental Health for Young People: A Scoping Review of Ethical Promises and Challenges. *Front Digit Health* 3 (2021): 697072.

35. Allen N. Scrutinizing the Effects of Digital Technology on Mental Health. *Nature* 578 (2020): 226-227.

36. Hsin H, Fromer M and Peterson B. Transforming Psychiatry into Data-Driven Medicine with Digital Measurement Tools. *NPJ Digit Med* 1 (2018): 37.

37. Mantua V, Arango C, Balabanov P and Butlen-Ducuing F, et al. Digital Health Technologies in Clinical Trials For Central Nervous System Drugs: An Eu Regulatory Perspective. *Nat Rev Drug Discov* 20 (2021): 83-84.

How to cite this article: Blom JMC, et al. "Predicting the Pathways of Adolescents and Young Adults at High-Risk for Psychosis: Moving from Being Highly Vulnerable to Expressing Full-Scale Pathology using an Integrated Dynamic Network Approach Mapping Digitally Collected Ecologically Valid Data ." *Int J Econ Manag* 11 (2022) : 638.