Is clinical psychiatry about to get smarter? A commentary on 'Objective smartphone data as a potential diagnostic marker of bipolar disorder'

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With rapidly increasing functionality, affordability and ownership of mobile digital technologies, the field of mobile health (mHealth) has proliferated in recent years. There is a growing recognition of mHealth's tremendous potential to enrich care and management of a range of physical and mental health problems across the globe. A successful implementation of effective mHealth initiatives would also eliminate barriers such as financial hardships and poor access to care, for example in remote areas that may be hard to reach.

A number of studies, including SIMPle (Hidalgo-Mazzei et al., 2015) and CLIMB (Biagianti et al., 2016), have already established that the remote, active or passive, high frequency and real time data from mobile digital technologies, such as smartphones, offer unparalleled opportunities to address specific clinical challenges, identify unmet needs and deliver interventions in mental health disorders such as schizophrenia and bipolar disorder (BD). Faurholt-Jepsen et al. (in this issue) add yet another domain to mHealth by raising the possibility that mobile digital technologies capable of providing 'unbiased estimates of behavioural activities' may provide a diagnostic marker of BD.

Faurholt-Jepsen and colleagues examined whether automatically generated objective smart phone data collected over a 12 weeks period from adults with a clinical diagnosis of BD (n=29) differentiated them from healthy adults (n=37). They found an increase in the use of smart phone and communicative activities (the number of text messages sent and received per day, the duration of phone calls) during the euthymic, depressive, manic or mixed states (and overall) and a decrease in the amount of time the screen was 'on' per day during the euthymic and depressive states (and overall) in the BD group relative to the healthy control group.

So what do the findings of Faurholt-Jepsen et al.'s study actually mean for clinical psychiatry and mHealth initiatives? Can we really use smart phone data to diagnose BD? The

findings certainly offer a novel method for quantifying behavioural and communication patterns in relation to specific mood states in BD and appear promising in showing a difference in automatically generated smart phone data between the BD and healthy groups, with a high sensitivity (i.e. the probability of BD being identified in those with a BD diagnosis = .92). Specificity, however, was rather low (.39), and this should be considered a significant issue for any potential diagnostic marker. Furthermore, as discussed by Faurholt-Jepsen and colleagues themselves, the observed increase in some of the phone use parameters was possibly triggered by a change in the behaviours of others, and did not index a true BD-linked change in patients' behavioural activities. For example, a higher number of texts received or sent per day by BD patients, relative to healthy controls, may simply reflect the concerns of their relatives or carers. If so, this may or may not be seen for those with a probable BD diagnosis but still to be formally diagnosed.

It is obvious that further data from ongoing (Kessing et al., 2017) and future longitudinal studies, especially those that include at-risk groups, are required to robustly assess the utility of objective smart phone data as a potential diagnostic marker of BD before the smart phone parameters investigated by Faurholt-Jepsen et al. could potentially replace, or even meaningfully aid, the current interview-based diagnosis of BD. It is hoped that other phone data such the voice characteristics or speech patterns would add, especially to negative predictive value, and increase specificity of smart phone data as a diagnostic marker of BD. It is further hoped that by then the field in general would also be better equipped (for example with patient facing apps, capacity to achieve scalability and implementation and to deal effectively with confidentiality and trust issues) to realise full potential of mHealth and technology supported-self management and care in psychiatry (Biagianti et al., 2017).

Declaration of interest

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References

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