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Feasibility of Using Wearable Sensors to Detect Agitation in Persons with Dementia

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ABSTRACT: BACKGROUND/METHOD: Wearable sensors have become increasingly accurate in measuring various aspects of health monitoring in humans. Persons with dementia (PWD) often experience problematic behavioral and psychological symptoms of dementia (BPSD). These behaviors can include kicking, hitting, biting, screaming, pushing and are stressful and dangerous for the PWD as well as for caregivers both formal paid caregivers and informal family caregivers. There are many proven methods to intervene during agitated behavior outburst and the earlier these methods are used the better the results. Such methods include redirection, one-on-one socialization, music therapy, pet assisted therapy, etc. These types of effective methods are preferred over routine or as needed medications to control the behaviors. The medications currently used have well documented adverse side effects, especially in aging adults.

This IRB approved study used a convenience sample of eight PWD who had a history of BPSD in an assisted living facility specializing in the care of PWD. We evaluated the use of off-the-shelf smart watch technology to measure limb movements, vocalizations, heart rate and location in a facility. The research goal was to determine the feasibility of using this technology to accurately measure patient data which in turn will allow clinicians to promptly detect agitation and provide early intervention. Output data from the watch was compared to data recorded by trained observers using the Cohen-Mansfield Agitation Inventory (CMAI). Data was collected in four-hour blocks of time over a two-day period.

RESULTS: All the participants wore the devices without difficulty. Observations were then compared to the information obtained from the smart watch technology. Limb movements and heart rate increases correlated well with observers' measurements of agitation. True positive

measures were greater than 60% (data streams from devices correlated with observations). The voice measures of tone, volume and words used did not correlate well due to background noise in this communal environment.

CONCLUSIONS: Data streams did correlate with observations. This technology could be useful in quickly identifying, and potentially anticipate, agitation in PWD. Further research is pending that will fine tune our software developed to measure the data streams and enhance accuracy. Also, improvements are being made in the ability to use voice recognition technology to capture the vocalizations associated with agitation. This technology can be used to quickly identify and prevent escalation of some BPSD by allowing early application of non-pharmacologic methods to treat agitation. Further study will also evaluate the impact this may have on the quality of life for caregivers and PWD.

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D2 Receptor Partial Agonists in Dual Disorders: Use of Aripiprazole in Psychotic Disorder and Comorbid Substance Use Disorder

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ABSTRACT: Objective: Dopaminergic mechanisms are involved in addiction but few effective drugs have been developed to treat it. Recent research has highlighted dopamine D2 receptor partial agonists, like aripiprazole, as a potential treatment for different types of substance dependence. In this study we investigate the use of both oral or long-acting injectable (LAI) aripiprazole in the treatment of dual disorders, specifically focusing on patients with psychotic disorder and comorbid substance use disorder.

METHOD: Retrospective mirror-image study was conducted at an adult psychiatry inpatient unit from a tertiary care center (Ramon y Cajal University Hospital, Madrid, Spain). Patients included were those with a comorbid psychotic disorder and substance-related disorders (excluding tobacco and caffeine), according to DSM-5 criteria, who started aripiprazole in 2017. The number of psychiatric acute inpatient admissions and psychiatric emergency room visits, six months before and after aripiprazole initiation, were obtained from patients'

records. Sociodemographic factors, average length of stay, antipsychotic polypharmacy, type of substance and change on clinical global impression (GCI) scale during hospitalization were also obtained. Data was analyzed using the IBM SPSS, v21. The Wilcoxon signed-rank test was used in the analysis.

RESULTS: 11 patients were included; 7 (63.6%) were males, the mean age was 40.37 (SD:13.23) years and the average length of stay was 11.27 (SD:7.53) days. LAI aripiprazole was prescribed in 7 (63.6%) patients (all of them receiving 400mg monthly) and oral aripiprazole was prescribed in 4 (36.4%) patients (mean daily dose = 16.25 mg; SD:10.30). Antipsychotic polypharmacy was observed in 6 (54.5%) patients: 4 with quetiapine (mean daily dose = 75 mg; SD:61.23), 1 with clotiapine 20 mg daily and 1 olanzapine 15 mg daily. There were 6 (54.5%) polysubstance users and the substances used were cannabis (63.7%), alcohol (36.4%), stimulants (27.3%), opioids (9.1%), hallucinogens (9.1%) and sedative-hypnotics (9.1%).

The mean of inpatient admissions before and after aripiprazole initiation was 1.00 (SD:1.00) and 0.18 (SD:0.60) ($p = 0.047$). The mean of emergency room visits before and after aripiprazole initiation was 1.64 (SD:1.85) and 0.36 (SD:0.67) ($p = 0.026$). With respect to CGI scale, the severity of illness score was 5.09 (SD:0.94) and the global improvement score was 2.00 (SD:0.63) ($p = 0.004$).

CONCLUSIONS: These results suggest that aripiprazole could be an effective treatment in psychotic patients with comorbid substance use disorders. However, the results should be taken with caution due to some limitations in our study: a small sample, the short period of time studied, the retrospective design and the inherent biases associated with this type of research. Preliminary investigations on the topic and the results of our study allow clinicians to be optimistic about the use of D2 receptor partial agonist in the treatment of dual disorders.

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What Treatment Would You Prefer if You Were Experiencing a Psychotic Episode? Survey of a Population of Psychiatrists

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ABSTRACT: Rate of treatment non-compliance in schizophrenia, like in other chronic diseases. Long-acting injectable (LAI) antipsychotics have proven to be more effective than orals in reducing the number of recurrences. Although the perception of LAIs has changed over the last few years with the introduction of new molecules, there might be prejudices regarding these formulations within the mental health professionals community. The exercise of imagining how and with which antipsychotic you would like to treat yourself or a close relative in case of suffering from schizophrenia, can help to emerge true prescription preferences.

The objective of the present work is to assess the psychiatrists antipsychotics prescribing preferences for schizophrenia, in the hypothetical case they were patients suffering a 2nd/3rd relapse. With this purpose, we performed an on-line survey in a sample of psychiatrists and trainees from Spain.

Results showed that election of LAIs were less frequent for in Self-prescription scenario, both for the 2nd and 3rd hypothetical recurrence. Also, psychiatrist who chose LAIs for their patients are more likely to choose orals for themselves ($p = 0.039$; $p < 0.001$ for 2nd and 3rd recurrence respectively). The most preferred LAI for both patients and self-prescription was aripiprazole once-monthly (60% and 87% respectively).

Interestingly, nearly 70% of psychiatrist choosing a LAI different form Aripiprazole, would change the prescription for themselves; and those choosing aripiprazole once-monthly for their patients were more likely to maintain it for themselves ($p < 0.001$). Practitioners changing from LAIs to orals in the self-treatment scenario perceive LAIs as a more coercive measure ($p < 0.01$), being the degree of coercitivity perceived the only variable associated with a change in prescription's decisions ($p = 0.002$). Curiously, LAIs associated coercitivity was significantly lower for oncologist vs psychiatrists ($p < 0.001$). The level of weight gain, metabolic problems, extrapyramidal symptomatology, sexual dysfunction, sedation and cognitive problems perceived by psychiatrists is significantly lower for Aripiprazole than for the rest of LAIs ($p < 0.01$ for all comparisons), with a comparable perceived efficacy (mean = 3.95 and 4 out of possible 5, $p = 0.7$). In light of our results, this is partially explained by a perception of LAIs as coercive measures, in contrast with perception of