

UK study lifts the veil around brain fog

UK study links brain fog to cognitive decline, anxiety, depression, and migraines. Machine learning aids in identifying at-risk individuals.

BUDAPEST, HUNGARY, July 3, 2023 /EINPresswire.com/ -- Brain fog, a condition that has gained increased attention since the pandemic, is also associated with objectively worse cognitive performance, and higher levels of anxiety, depression, and migraines, as reported by a team in the UK.

The researchers systematically studied the associations between 29 variables with that of the self-reported presence of brain fog via univariate and machine learning methods. Data was collected through Mindstep, a validated smartphone application for remote data collection, in 25,796 users between 15 September and 18 November, 2022.

"We studied variables such as clinical comorbidities, lifestyle factors, symptoms, functional deficits, and cognitive scores," explained senior author Dr Mohammad Mahmud, a neurologist affiliated to the Department of Brain Sciences at Imperial College London and Mindstep.

Of the 25,000+ app users, 7,280 (28.2%) reported experiencing brain fog. Those respondents were 35.7 years old on average, and a slight majority of them were women. Participants also reported lower sleep quality among their comorbidities. Extreme gradient boosting algorithms achieved a training accuracy of 84% with cross-validated accuracy of 74%, and could be used in the future, authors suggest.

"With further prospective data, extreme gradient boosted algorithms show promise in identifying individuals at risk of subjective brain fog," said first author Dr Ali Alim-Marvasti, Consultant Neurologist affiliated with UCL Queen Square Institute of Neurology and Mindstep.

Unveiling part of the mystery

The study is an attempt to systematically describe brain fog, a task that remains challenging to date.

"As neurologists and researchers, we find our patients use the term brain fog variably to explain their difficulties with certain tasks," the co-authors said.

What the majority of scientists accept so far is that the condition is intermittent and can affect a wide demographic of people, including the young. "This is in contrast to neurodegenerative

dementia, which is far more common as we age," they said.

One of the best definitions from the literature, according to the authors, suggests that brain fog is the interaction of physiological, cognitive, and perceptual factors that cause a decreased ability to readily process information.

"This is congruent with our data. Our conclusion is that brain fog is best defined as a difficulty to focus and concentrate, and this may affect activities of daily living including completing paperwork, planning ahead, and mental arithmetic. These were the most commonly associated symptoms of brain fog."

Researchers found a close [link](#) between brain fog and migraine severity scores, history of concussions and long COVID-19. "It remains to be seen to what extent the mechanism behind these conditions resulting in brain fog may overlap with other conditions including that of neurodegenerative conditions, which are known to be accelerated by certain infections and inflammations."

As the term was popularised during the pandemic, it is not surprising that the strongest association in the dataset was indeed a history of long COVID-19, he added. Anxiety and depression were also associated with brain fog, but to a lesser extent. "It would be interesting to know if COVID-19 in particular has a propensity to result in symptoms of brain fog, or, as we suspect and other studies suggest, whether many infections can result in brain fog," Mahmud said.

"We have also clustered brain fog symptoms in an upcoming study in comparison with migraine and concussion. The next step would be to develop an accurate model that can monitor brain fog symptoms, then objectively determine the defining parameters, before finally being able to evaluate any interventions," Dr Alim-Marvasti concluded.

This press release is about the ePoster/ePresentation 'The Correlates of Subjective Brain Fog in 25796 UK Participants' presented at EAN 2023 ([link](#)). Interested members of the press can request access to the full study presented at the conference by contacting EAN. The full book of abstracts is publicly available [online here](#).

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