

## Lewy Bodies - The Common Culprit of Dementia and Suicide

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**Abstract**

*Dementia is a complex disorder of the physique and psyche. Globally, the rate of dementia has been increasing and has been posing threat towards public health management. Suicide is taking of one's life by oneself. Global rate of suicide has also been soaring and is intriguing public concern. A novel concern of suicide and dementia through their common neuro-biochemical perpetrator, the lewy bodies (LB), has been put forward in this article. Outcomes of this article would be of immense importance in understanding and formulating strategies against dementia and suicide, the notorious neuro-psychological interplay.*

**Keywords:** Alzheimer's disease, dementia, Lewy body, neuroscience, psychology, suicide.

**Introduction**

Dementia, an umbrella term that demonstrates the features of forgetfulness along with mood disorder, has recently been implicated with suicide (Conejero et al., 2018). Suicide is the ultimate demonstration of a person's different notion towards life and society, rooted from multifarious causes and concerns (Psychology Today, (n.d)). According to the world health organization (WHO), more than 700,000 people die by suicide per annum globally (World Health Organization [WHO], 2023). Neuro-biochemical approaches towards understanding of suicide correlated altered neuronal circuitry, production and deposition of neurotransmitters, neurotransmission and post-transmission features (Rahman et al., 2024). Though intriguing, the neuro-biochemical underpinning of correlating dementia with suicide has not been fully delved out. Thus, the present study has been aimed to deduce the "neuro-biochemical common link" between dementia and suicide.

**Lewy Bodies – The Culprit Inside the Brain**

Lewy bodies (LB) are the abnormal aggregates of the protein  $\alpha$ -synuclein inside the neurons (Simon et al., 2021). LBs are like intruders inside the neurons that disturb neuronal cytoskeleton, structure and function (Orlović et al., 2020). LBs displace the location of the neuronal components and disrupt neuronal communication, even survival (Zhu et al., 2022). LBs coincide with other proteinaceous culprits of the neurons such as neurofibrillary tangles (NFTs), the second-most causative agent of Alzheimer's disease (AD) (Orlović et al., 2020; Zhu et al., 2022; Prasad et al., 2023). LBs have been linked with heightened cortical atrophy and excessive white matter intensity in the AD and DLB brains (Orlović et al., 2020; Zhu

et al., 2022; Prasad et al., 2023). LBs hamper the normal DNA mis-match repair processes and thus impedes cellular longevity and triggers mutation and neuronal death (Prasad et al., 2023). These features are evident from the findings that the LB-driven dementia patients show comparatively shortened  $\alpha$ -synuclein. Besides  $\alpha$ -synuclein, the "14-3-3 group of proteins" also aid in formation and causation of the abnormalities associated with LBs (Abdi et al., 2024). Interestingly, LBs manifest some characteristics of proteinaceous infectious particles (prions) and prion-type of diseases (Saint-Aubert et al., 2016). The most featured abnormality associated with LBs is dementia (Prasad et al., 2023; Abdi et al., 2024; Saint-Aubert et al., 2016; Bentley et al., 2021; Kane et al., 2018). As dementia is an important hallmark of AD, to distinguish the LB-driven dementia from that of AD, the term "Lewy body dementia (LBD) or dementia associated with Lewy body (DLB)" are utilized in neuro-psychological paradigm (Prasad et al., 2023; Abdi et al., 2024; Saint-Aubert et al., 2016; Bentley et al., 2021; Kane et al., 2018). DLB mostly affects the brain regions involved in thinking, memorizing and movement (Prasad et al., 2023; Abdi et al., 2024; Saint-Aubert et al., 2016; Bentley et al., 2021; Kane et al., 2018). DLB also declines mental abilities of the current world and introduces hallucinogenic interpretation thus making the affected person schizophrenic (Prasad et al., 2023; Abdi et al., 2024; Saint-Aubert et al., 2016; Bentley et al., 2021; Kane et al., 2018). LB-mediated neuro-muscular disturbances lead towards Parkinson's disease (PD) type of symptoms including muscular rigidity, slowness in movement, tremor and confusion (Prasad et al., 2023; Abdi et al., 2024; Saint-Aubert et al., 2016; Bentley et al., 2021; Kane et al.,

2018). LBs also affect the autonomic nervous system (ANS) that results in abnormality in heart rate and blood pressure, loss of control over bowel and bladder, dizziness, sweating and nausea (Prasad et al., 2023; Abdi et al., 2024; Saint-Aubert et al., 2016; Bentley et al., 2021; Kane et al., 2018). LBs also affect the sleeping pattern, especially the rapid eye movement (REM) phase of sleep gets disturbed and at severe stages, sleep apnea occurs (Prasad et al., 2023; Abdi et al., 2024; Saint-Aubert et al., 2016; Bentley et al., 2021; Kane et al., 2018). Drowsiness, frequent and long napping period during day time, attention deficiency and loss of motivation are most common hallmarks of LBD. In addition to the patterns of dementia, the young-onset dementia has specially been implicated with the LBs (Aiba et al., 2019).

### Lewy Bodies – The Steering Coach Towards Suicide

Suicide has become a global crisis (Conejero et al., 2018; Psychology Today; World Health Organization [WHO], 2023). People from all walks of life have alarmingly been affected with this anti-life sentiment. Since pre-historic time, suicide has been considered as a heinous act and has never been welcomed in any society. Yet, this self-destruction process goes in parallel with the development of civilization. Even, ups and downs; imbalance between the hope and gain of the materialistic lives; sky-rocketing hopes and aspirations of modern world have only worsened the suicidal rate globally. In this statistics, the names of the celebrities have increasingly been included (Williams, 2016). Neuropsychological concerns towards ever increasing suicidal rates especially towards the celebrities highlight their “personal unhappiness” in the back stage of their “on screen happy, lovely, lively, comedic show-ups” (Conejero et al., 2018; Hartzell et al., 2018; An et al., 2019; Kułak-Bejda et al., 2021). Our strive through the life styles, behavioral assessments, neuro-biochemical alteration and psychological scrutiny of the persons committing suicide mark the “Lewy bodies as the terrorist provoking suicidal behavior and suicide” (Armstrong et al., 2021; Armstrong et al., 2021; Choi et al., 2021; Alipour-Haris et al., 2022; Mo et al., 2023; Moore et al., 2021; Naismith et al., 2022; Mo et al., 2023).

### Conclusion

Lewy bodies (LB) is the common perpetrator of both dementia and suicide. As global burden of dementia and suicide has been increasing alarmingly, time is up to formulate strategies to withstand these two public nuisance. Attention towards LB management would aid highly in strategizing dementia and suicide mitigation process. Thus, effective neuro-biochemical and neuro-psychological concern towards LB management seem pertinent in eradicating global dementia and suicide crises.

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