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Mild cognitive impairment among older adults with diabetes: A pilot study in San Juan, Puerto Rico

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OBJECTIVES/GOALS: Research on mild cognitive impairment (MCI) risk factors in type 2 diabetes mellitus (T2DM) is scarce; however, MCI is a concern in T2DM as it can adversely impact self-care behaviors. This study aims to estimate the proportion of MCI and describe its sociodemographic, clinical, psychosocial, and lifestyle characteristics in older adults with T2DM. METHODS/STUDY POPULATION: Cross-sectional pilot study of 60 adults (aged ≥50yrs) with a diagnosis of T2DM will be recruited at a diabetes center located in San Juan, Puerto Rico. Data on sociodemographic, clinical, psychosocial (depressive symptoms and social support), and lifestyle characteristics related to diabetes self-management (diabetes self-care activities and activities of daily living) will be collected through face-to-face interviews using validated questionnaires. Our primary outcome will be MCI assessed via the Spanish-language version of the Montreal Cognitive Assessment (MoCA-S). The proportion of adults with MCI (MoCA-S score<26) will be estimated, and the sociodemographic, lifestyle, psychosocial, and clinical characteristics of older adults will be compared across MCI status using bivariate analysis. RESULTS/ANTICIPATED RESULTS: Expected results include an estimate of the proportion of MCI among older adults with T2DM, which we hypothesize will be higher in our study than in Puerto Rico's older adult population (previously reported as 17%). Additionally, we will describe the sociodemographic, clinical, psychosocial, and lifestyle characteristics that significantly differ by MCI status in older adults with T2DM. We expect that those with MCI will be more likely to be females, have lower education and annual income, longer time with a diabetes diagnosis, worse psychosocial profiles (higher levels of depressive symptoms and lower levels of social support), and worse lifestyle profiles (poorer glycemic control and lower activities of daily living score) than those without MCI. DISCUSSION/SIGNIFICANCE: This pilot study is a first step to understanding MCI among older adults with T2DM in Puerto Rico, a Hispanic population with a higher prevalence of T2DM than their US non-Hispanic White counterparts. Its findings can guide the design and implementation of a larger epidemiological study aimed at understanding MCI risk factors among adults with T2DM.

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A Multifaceted Approach to Improving Fish Farming in Kenya's Lake Victoria Region

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OBJECTIVES/GOALS: This project adopts a multifaceted approach to improving aquaculture management practices in Kenya's Lake Victoria region by identifying fish pathogens, measuring algal toxin levels in commonly consumed fish, surveying fish farming practices, and educating the public. METHODS/STUDY POPULATION: Limited existing data on the state of floating cage culture in Kenya influenced our decision to begin this portion of the project with a brief literature review of potential Nile tilapia pathogens. Databases were screened for mention of disease in either wild or caged Nile tilapia, with emphasis given to those in Lake Victoria. Results were compiled into a spreadsheet and analyzed for frequently occurring pathogens. The next portion involved creating an interview style survey to assess current cage culture management practices in the region. Editing was done to ensure questions remained unbiased, non-leading, culturally sensitive, multilingual and relevant to the situation. Data went through a quality control screening and analysis was conducted through the R programming language. RESULTS/ANTICIPATED RESULTS: Beginning with mortality, of the 93 farms surveyed, data analysis revealed that there is a higher probability that farms will have a mortality of approximately 20%, over the course of a production cycle. For biosecurity and fish health practices, data shows that 97% of farms do not disinfect scooping nets or other fish handling materials when moving from one cage to another. During the 2022-2023 production cycle, 44% of farms experienced fish kills of over 50 fish. 73% of the 93 farms do not contact any organization when a fish kill occurs. In a qualitative answer, it also appears that many farm workers dispose of their dead fish within the lake, feed it to livestock or dogs, or eat it. Algae blooms have been experienced at 80% of the farms surveyed and 43% of farms say they have seen fish gasping at the surface for air. DISCUSSION/SIGNIFICANCE: While farms are implementing good management practices in the areas of cage design, stocking, and feeding practices, there is room for improvement in fish health, biosecurity, and managing algal blooms. The findings provide insight into the areas that should be considered when taking action to improve the welfare of the region.

Contemporary Research Challenges

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Unraveling the role of placental trophoblast cells in preeclampsia

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OBJECTIVES/GOALS: Changes associated with placental vasculature contribute to the progression of gestational hypertensive disease preeclampsia. Caudal-type homeobox-2 (CDX2) regulates trophoblast stem cell differentiation. In this study, we investigate the role of placental CDX2 cells in healthy pregnancy and in conditions of preeclampsia. METHODS/STUDY POPULATION: To understand the role of CDX2 cells, here we collected human placenta samples from the prospectively enrolled cohort and also the de-identified cohort (n=84). We studied CDX2 distribution, and function using a lentivirus-based approach. We studied the CDX2 expression and functional differences using transcriptomics and examined the function in invasion and vasculogenesis in the presence and absence of the new target genes we have discovered in our study. RESULTS/ANTICIPATED RESULTS: Analysis of healthy human placenta samples showed that CDX2-expressing cells were present in fetal