Percentage of Subjects in Various TIR Categories

Results: TIR was compared between SG and CG using analysis of covariance model with TIR as the dependent variable, treatment as a fixed effect and BMI as a cofactor. There was no significant difference (p = 0.7305) in TIR between the groups. When taken together, 16.3% achieved a TIR >70% and 6.5% achieved a TIR >90% irrespective of physical activity. Percentage of patients in various TIR categories is shown(Fig.1)

Conclusions: Physical activity alone as an independent parameter may not have a significant role in improving TIR. The findings emphasize the fact that physical acvity should be combined with medical nutrition therapy and therapeutic interventions for better optimal outcomes in the management of diabetes.

OP108 / #323

Topic: *AS17-Big data and artificial intelligence based decision support systems*

ORAL PRESENTATIONS SESSION 8

PREVALENCE OF DIABETIC RETINOPATHY SCREENED BY ARTIFICIAL INTELLIGENCE BASED DEEP LEARNING ALGORITHM WITH HIGH SENSITIVITY: A MULTICENTRIC CROSS SECTIONAL STUDY FROM INDIA

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Background and Aims: The prevalence of diabetic retinopathy (DR) is increasing at an alarming rate in India. All diabetes patients need regular retina screening. The primary issue is the grading of fundus images by retina specialists, whose numbers are very scarce compared to the load of patients. Many patients are based in rural areas and cannot visit an ophthalmologist. Such limitations created interest in assessment of images using fully automated Artificial Intelligence based grading systems. The study aims to evaluate the effectiveness of a deep learning algorithm in screening of DR and assess the prevalence of DR screened at multiple centers across Kolkata, West Bengal, India.

Methods: It is a multicentric cross sectional study. A total of 725 diabetes patients were screened for DR using Artificial Intelligence based Diabetic Retinopathy Screening System (AIDRSS) developed by ARTELUS™. The AIDRSS graded fundus images based on the ICDR Scale (**DR0, DR1, DR2, DR3, DR4**). The fundus images captured were also assessed by retina specialist and reports were compared to evaluate the sensitivity and specificity of the AIDRSS.

Results: The **prevalence of DR** screened using AIDRSS was **27.17% (DR1 = 17.38%, DR2 = 9.52%, Referable DR : DR3 and DR4 = 0.27%)**. The AIDRSS performed well with overall **97% sensitivity** and **92% specificity**; and **100% sensitivity** in detecting referable DR when compared against fundus image reported by a retina specialist.

Conclusions: The study establishes a high prevalence of diabetic retinopathy. AIDRSS developed by ARTELUS™ has a high sensitivity and specificity and is an effective solution for routine screening and early detection of diabetic retinopathy in India.

OP109 / #470

Topic: *AS17-Big data and artificial intelligence based decision support systems*

ORAL PRESENTATIONS SESSION 8

DIABETES NOVEL SUBGROUP ASSESSMENT (DIANA)- ADVANCED MACHINE LEARNING-BASED TOOL TO CLASSIFY INDIVIDUALS WITH NEWLY DETECTED TYPE 2 DIABETES INTO SPECIFIC SUBGROUPS AND ASSESS DRUG RESPONSE

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Background and Aims: Machine learning (ML) has been applied to many aspects of medical health. In this study, we aimed to develop a tool to classify individuals with newly detected type 2 diabetes(T2D) into specific subgroups recently identified in Indians.

Methods: The DIAbetes Novel subgroup Assessment (DIANA) tool has been developed in R-Shiny. The tool has been trained and tested using unsupervised ML model (K-means clustering with k value of 4 using k-means function(max iteration = 10 000) in R V.3.6.0 in a dataset of 19,084 individuals with T2D (aged 10–97 years) with diabetes duration of <5 years at the time of first clinic visit. Age at onset of diabetes, BMI, waist circumference, Hba1c, serum triglycerides, serum high-density lipoprotein cholesterol, fasting and stimulated C-peptide were used in this ML approach. Distinctly labelled clusters were trained using supervised ML algorithms for prediction.

Results: Four novel subgroup clusters of T2D were identified using the tool: Severe Insulin Deficient Diabetes (SIDD), Insulin Resistant Obese Diabetes (IROD), Combined Insulin Resistant and Deficient Diabetes (CIRDD) and Mild Age-Related Diabetes (MARD). There was high concordance between the unsupervised and supervised ML approaches(Cohen's Kappa Statistic, 0.99) with 99% of prediction accuracy(83% accuracy if C-Peptide was not included in the model).

Conclusions: Identification of phenotypic subgroups of T2D using the DIANA tool, developed based on real world clinical data, could help clinicians understand aetiology of T2D and with the help of additional individualised prediction models, decide upon the most effective forms of therapy for the patient, an important first step towards precision/ personalised diabetes care.