

Diabetes in other Asian countries such as Saudi Arabia (53%) [15,16], Jordan (72.4%) [17], Oman (21.5%), Turkey (32%), Bahrain (38%) and Taiwan (39%) [18-21] also shows a similar trend. In addition, studies reported higher tendency of HTN among UK Afro-Caribbean (82%) [22], UK Caucasian (74%), Italian (74.4%) and Spanish diabetes (73%) [23-25].

Few epidemiological studies asserting incidence rates of T2D and HTN have been carried out in various sectors of Karnataka. In the rural population of Davanagere, 18.3% of HTN has been reported, where males recorded a higher prevalence rate (19.1%) than females (17.5%) [26]. Heritability of HTN in families of Tumkur population was reported, wherein the young normotensive with a positive family history of HTN had significantly higher blood pressure [27]. In Karnataka, the prevalence of T2D has been observed to be 3.77% of Suttur population [28], 10.0% in Kolar population [29], 16% of the Udupi population [30] and 17.3% in Dharwad urban population [31]. The incidence of obesity among T2D of Mysore population was reported [32], while the awareness of diabetes and their attitude to patients of Bijapur have been reported [33]. But there is no known record of the prevalence of HTN among T2D or vice versa, implying how frequent HTN exacerbates T2D in southern India.

Currently, there are limited epidemiological studies edifying the relationship between T2D and HTN in Indian context. There is an ongoing debate regarding the consideration of high blood pressure over other metabolic components (conjointly involved in T2D and HTN), as a predictor of T2D in Indians. Further, social and cultural diversity in India necessitates the exploration of the mentioned relationship in various sections of this country. Therefore we hypothesize that the risk of incidence of T2D is higher in the subjects with HTN. The present study aims to assess the prevalence of HTN among T2D subjects and its contribution in the occurrence of T2D in Mysore population of Karnataka in South India.

## 2. Materials and Methods

### 2.1. Study Population

This case-control study was conducted among participants in the diabetes health check-up programs organized by Amrita Kripa Polyclinic and Lion's Club of Mysore (R) in Mysore district of Karnataka State, India, during 2010 to 2011 including both non-diabetes and diabetes patients, without any mental impairment.

### 2.2. Sample Size

A total of 654 subjects volunteered and gave consent to participate in the study, out of which 636 were included in the study. The subjects including 343 males and 293 females, aged between 30 - 80 years were enrolled for

the study. Subjects with abnormal renal or chronic liver dysfunction were excluded from the study.

### 2.3. Sampling Procedure

The study protocol was reviewed and approved by the Institutional Ethics Committee, Kolkata and also the Ethical Committee of University of Mysore. Informed consents were obtained from each participant in the study. The study was conducted according to the ethical guidelines for biomedical research on human populations ([http://icmr.nic.in/ethical\\_guidelines](http://icmr.nic.in/ethical_guidelines), ICMR 7). Each participant of the study was about 12 hours of fasting period before the collection of blood. 5 ml blood sample was collected in 10 ml BD vacutainer by a phlebotomist, stored at 4°C and transported to the laboratory immediately for further processing. Postprandial plasma glucose was measured after 2 hours of administering 75-grams of glucose to the subjects (OGTT, WHO, 1999).

### 2.4. Data Collection

**Questionnaire:** Data was collected on standardized questionnaire that included personal information, life-style, habitual behaviors (smoking and alcohol intake), clinical history of associated complications and blood pressure was recorded under the supervision of a physician.

**Anthropometry:** Height, weight, waist and hip circumference were measured by physical anthropologists using anthropometer (Holtaine, UK) and digital weighing machine (Tanita Corporation, Tokyo, Japan) as per WHO international manual [34]. Waist circumference (WC) was measured at the midpoint at the bottom of the rib cage and the top of the lateral border of the iliac crest during minimal respiration.

**Laboratory Examination:** Fasting plasma glucose (FPG), Glycated Haemoglobin (HbA1c), High-density lipoprotein (HDL), Low-density lipoprotein (LDL), Total Cholesterol (CHO), Triglycerides (TRIG), Creatinine (CRE), Blood urea nitrogen (BUN) and Postprandial glucose (PPG) were measured on Auto analyzer EM 360 (Transasia, ERBA Mannheim, Germany).

**Operational Definitions:** Body mass index (BMI) was calculated as weight in kilograms divided by the squared value of height in meters ( $\text{kg/m}^2$ ). BMI was categorized as normal ( $<25 \text{ kg/m}^2$ ), overweight ( $>25$  and  $<30 \text{ kg/m}^2$ ), and obese ( $>30 \text{ kg/m}^2$ ) [35]. Blood pressure (Systolic and Diastolic) of each subject was measured using a standardized sphygmomanometer (Elko, India), in supine position. An average of two readings of both systolic (SBP) and diastolic blood pressure (DBP) was taken. HTN was defined following the criteria of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7