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# Patient Reported Adverse Outcomes on Treatment of Type-2 Diabetes Mellitus and Co-Morbidities in South India

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**A B S T R A C T**

To evaluate patient reported adverse outcomes in type 2 diabetes mellitus with or without co-morbidities in South India. Mainly to contact the study subjects using mobile phones, to record patient reported adverse outcomes including ADR, AE and Unresolved Condition, to ensure medication adherence and to evaluate the role of active surveillance in reporting of events. This Pharmacovigilance study was a prospective Cohort study design with 3 follow ups on active surveillance to improve the passive reports form diabetic patients who are taking medicine from BGS GLOBAL hospital. We included ADR, AE's, unresolved problems and medication adherence in surveillance to conduct PROs. Data on 133 diabetic patients were included in the study and data were collected for first 3 months and followed by 3 active surveillance. Totally we our tem got 171 outcomes, (126) (73.68%) was through Active surveillance and (45) (26.31%) was through Passive surveillance. Active surveillance repots were received while an interventional enquiry as passive reports was received voluntarily. Many patients are interacted with us for asking counseling regarding diet, exercise and medial information in regular follow ups. They are totally 35, in which 9 diet, 6 exercise, 17 medical information and 3 other. We expected more passive reports from patients but very few are shown interest to report and share their medical information with medical staff. We can conclude that many of the patients in line of medical adherence are risk zone, can chance to exposure ADR. By the study our team says that, it's very difficult to improve and apply PROs system in developed areas like Bangalore, Hyderabad, and Chennai. Because patients don't bother about medical induced problems and they won't show any interest and responsibilities in reporting. Patients need to encourage and given value added basic information and tips in process of reporting in medical induced issues. In future we are planning to provide education to patients along with leaflets to improve patients reported outcomes system for better patient's medical improvement.

**Keywords:** Diabetes, Glibenclamide, patient reported outcomes, active surveillance, and passive surveillance

**A R T I C L E I N F O**

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## 1. Introduction

As per FDA, less than 10% of the ADRs are reported in USA. As per Monitoring Medicines by World Health Organization, very less adverse events are recognized. So patient reporting is of great value in identifying and reporting ADRs so that the preventable ADRs could be prevented more effectively and treatable ADRs could be managed more efficiently. Our study is focusing on patient reported outcomes of adverse events and we checked that the active surveillance of patient reported adverse outcomes did improve reporting of ADRs [1].

**Diabetes**

Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycemia) [2]. Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. Hyperglycemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels. The term "diabetes mellitus" describes a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. The effects of diabetes mellitus include long–term damage, dysfunction and failure of various organs (WHO 1999) [3].

**There are two main types of diabetes**

**Type 1:** Diabetes (T1B) usually develops in childhood and adolescence and patients require lifelong insulin injections for survival [3].

**Type 2:** Diabetes (T2B) usually develops in adulthood and is related to obesity, lack of physical activity, and unhealthy diets. This is the more common type of diabetes (representing 90% of diabetic cases worldwide) and treatment may involve lifestyle changes and weight loss alone, or oral medications or even insulin injections [3].

**Symptoms [3]**

a. Patients may have no symptoms at all or minimal symptoms for years before being diagnosed.
b. May have increased urinary frequency (polyuria), thirst (polydipsia), hunger (polyphagia), and unexplained weight loss.
c. May also experience numbness in extremities, pain in feet (disesthesias), and blurred vision.
d. May have recurrent or severe infections.
e. Patients may present with loss of consciousness or coma but this is less common than in T1D.

**Complications of diabetes**

a. Diabetic retinopathy (eye disease)
b. Nephropathy (kidney disease)
c. Neuropathy (nerve disease
d. Cardiovascular disease
e. Diabetic foot and Diabetic Keto-acidosis

**Non Pharmacological Management [3]**

**a.** Overall aim of treatment is symptom relief and prevention or delay of complications by targeting normal blood glucose levels.
b. Patients treated with diet/exercise or with addition of one or more categories of oral medications, with a combination of oral medications and insulin, or with insulin alone.
c. Glucometers to self-monitor blood glucose (with less frequency than with T1D).
d. Early detection and treatment of complications (at intervals recommended by national and international guidelines): eye exam, urine test, foot care, and specialist referral as needed.
e. Self-monitoring for signs/symptoms of hypoglycemia (such as hunger, palpitations, shakiness, sweating, drowsiness and dizziness) and hyperglycemia.
f. Patient education about diet, exercise, and foot care.

**Exercise [4]**

a. Physical activity promotes weight reduction and improves insulin sensitivity, thus lowering blood glucose levels.
b. Together with dietary treatment, a programmed of regular physical activity and exercise should be considered for each person. Such a programmed must be tailored to the individual's health status and fitness.
c. People should, however, be educated about the potential risk of hypoglycemia and how to avoid it.

**Pharmacological Management**

The burden of diabetes is increasing globally, particularly in developing countries. The causes are a complex, but are in large part due to rapid increases in overweight, obesity and physical inactivity [5].

A. Oral hypoglycemic therapy
B. Insulin treatment

**Table 2:** Oral hypoglyemics

| S. No | Drugs | Daily Dose (mg) | Dosing shedule |
|---|---|---|---|
| 1 | **Sulhponylureas** Glibenclamide | **2.5-2.0** | **1-2** |
| 2 | **Biguanide** Metformin | **500-3000** | **2-3** |
| 3 | **Thiazolidinedione** Pioglitazone | **15-30** | **2** |

**Insulin:** Insulin – 30/70 & 40/50

**Patient-Reported Outcomes**

Patient-reported outcomes are any "Reports coming directly from patients about how they function or feel in relation to a health condition and its therapy, without interpretation of the patient's responses by a clinician, or anyone else" [10]. This guidance describes how the Food and Drug Administration (FDA) reviews and evaluates existing, modified, or newly created patient-reported outcome instruments used to support claims in approved medical product labeling [11]. A PRO instrument (i.e., a questionnaire plus the information and documentation that support its use) is a means to capture PRO data used to measure treatment benefit or risk in medical product clinical trials. PRO is an umbrella term that covers a whole range of potential types of measurement but is used specifically to refer to self-reports by the patient. PRO data may be collected via self-administered questionnaires completed by the patient themselves or via interviews. The latter will only qualify as a PRO where the interviewer is gaining the patient's views, not where the interviewer uses patient responses to make a professional assessment or judgment of the impact of the patient's condition. Thus, PROs are a means of gathering patient rather than clinical or other views on outcomes. This patients' perspective can play an important role in drug approval. This guidance does not address the use of PRO instruments for purposes beyond evaluation of claims made about a medical product in labeling. This guidance also does not address disease-specific issues. Guidance on clinical trial endpoints for specific diseases can be found on various FDA Web sites. PROs include any treatment or outcome evaluation obtained directly from patients through interviews, self-completed questionnaires, diaries or other data collection tools such as hand-held devices and web-based forms (US Food and Drug Administration 2006). Proxy reports from caregivers, health professionals, or parents and guardians (necessary in some conditions such as advanced cancer and cognitive impairment) cannot be considered PROs and should be considered as a separate category of outcomes [11].

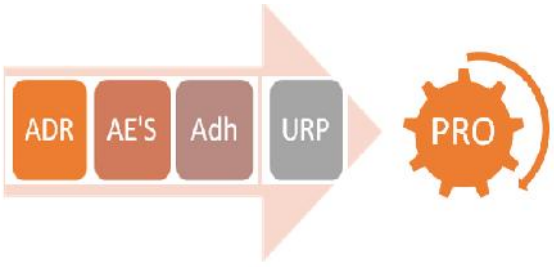


**Figure 1:** overview and concept of patient reported outcome

**Characteristic of PRO [**12]

A well-designed PRO questionnaire should assess either a single underlying characteristic or, where it addresses multiple characteristics, should be a number of scales that each address a single characteristic. These measurements "characteristics" are termed constructs and the questionnaires used to collect them, termed instruments, measures, scales or tools. A questionnaire that measures a single construct is described as unidimensional. Items (questions) in a unidimensional questionnaire can be added to provide a single scale score. However, it cannot be assumed that a questionnaire is unidimensional simply because the author intended it to be. This must be demonstrated empirically (for example, by confirmatory factor analysis or research analysis). A questionnaire that measures multiple constructs is termed multi-dimensional. A multi-dimensional questionnaire is used to provide a profile of scores; that is, each scale is scored and reported separately. It is possible to create an overall (single summary) score from a multi-dimensional measure using factor analysis or preference-based methods but some may see this as akin to adding apples and oranges together [12]. Questionnaires may be generic (designed to be used in any disease population and cover a broad aspect of the construct measured) or condition-targeted (developed specifically to measure those aspects of outcome that are of importance for a people with a particular medical condition).

The most commonly used PRO questionnaires assess one of the following constructs [11]:

a. Symptoms (impairments) and other aspects of well-being
b. Functioning (disability)
c. Health status
d. General health perceptions
e. Quality of life (QOL)
f. Health related quality of life (HRQOL)
g. Reports and Ratings of health care.

Measures of symptoms may focus on a range of impairments or on a specific impairment such as depression or pain. Measures of functioning assess activities such as personal care, activities of daily living and locomotors activities. Health-related quality of life instruments are generally multi-dimensional questionnaires assessing a combination of aspects of impairments and/or disability and reflect a patient's health status. In contrast, QOL goes beyond impairment and disability by asking about the patient's ability to fulfill their needs and also about their emotional response to their restrictions [12].

**Reasons to Measure PRO's [**11,12]

There are several important features of self-reported measures in medicine and public health:

- They are used increasingly to help determine whether treatments are doing more good than harm;
- These outcomes are assessed and often compared to treatment measurements that remain the primary end-points for most drug therapies and for many clinicians, because they are familiar through long or repeated use.
- Epidemiological investigations and population surveys incorporate self-reported outcomes to compare populations and to describe the status of different populations. Sometimes these are called quality of life indicators, although more frequently the term health status indicators best describes the content of these measures.

- There have been several methodological advances in the science of developing measures of patient reported health. These advances have been reflected in the measure development process of the Patient-Reported Outcomes Measurement Information System (PROMIS) network, funded by the Roadmap Initiative of the National Institutes of Health and the National Cancer Institute.

**Patient Counseling [4, 9]**

**Table 1:** Patient education and counseling for Diabetic mellitus

| **Education and Counseling** | |
|---|---|
| **Category** | **Recommendation** |
| Education and self-management principles<br>This includes<br>a. Diabetes disease process and treatment options<br>b. Nutritional management<br>c. Physical activity<br>d. Medications<br>e. Monitoring<br>f. Acute complications<br>g. Chronic complications<br>h. Goal setting and problem solving<br>i. Psychosocial adjustment<br>j. Preconception care, pregnancy and gestational diabetes management | **Medical Nutrition Therapy (MNT):** People with diabetes should receive individualized MNT as needed to achieve treatment goals, preferably provided by a registered dietitian. (B)<br>**Physical Activity:** A regular physical activity program, adapted to any complications, is recommended for all patients with diabetes who are capable of participating. Patients may need a pre-exercise stress test. (B)<br>**Self-Monitoring Blood Glucose (SMBG):** Instruct the patient in SMBG and routinely evaluate the patient's technique and ability to use data to adjust therapy. (E)<br>**Foot Care:** Patients with diabetes and high-risk foot conditions should be educated regarding their risk factors and appropriate management. (E)<br>Women with diabetes who are contemplating pregnancy should be evaluated and, if indicated, treated for diabetic retinopathy, nephropathy, neuropathy and cardiovascular disease. Recommend the Sweet Success Program at Sierra Nevada Memorial Hospital.(E) |
| **Smoking Cessation Counseling** | **Advise all patients not to smoke. (A)**<br>Include smoking cessation counseling and other forms of treatment as a routine component of diabetes care. (B) This can be accomplished by assessing the smoking status and history, and counseling on smoking prevention and cessation. (E) |

## 2. Materials and Methods

**Study Design:**

This Pharmacovigilance study was a prospective Cohort study design with 3 follow ups on active surveillance.

**Active surveillance**

Making the patient report the adverse outcomes with the treatment by contacting them through phone or direct on regular intervals while they are on medicines. Patient adherence was measured to assure that they had taken the medicines.

**ADR**: With WHO Probability score one or more

**AE**: WHO Probability score is zero

**Unresolved:** The disease conditions which did not respond to the treatment (ineffectiveness of the medicines).

**Patient Adherence**: Patients not taking medicines properly may be due to negligence (n), financial burden (n), frustration or dissatisfaction (n).

**Study Procedure:**

We involved all diabetic type 2 patients who are under medication of Metformin, Glibenclamide, Pioglitazone, and Insulin and collected all medical, medication and personal data of all patients. All those patients were followed three times in whole study with regular intervals [14]. For every follow-up they are collected all the relevant data about their medical and medication information by guidance of questioners and UMC Causality assessment criteria scale to detect and analyze ADR, AE's, Unresolved medical problems, Medication adherence.

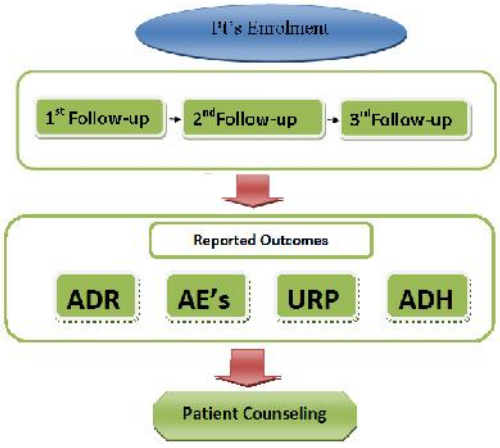


**Figure 2:** Study design

**Method of Follow up:**

**1st Follow-Up:** At time of enrolment

**2nd Follow-Up:** After **15 days** of 1st follow-up

**3rd Follow-Up:** After 15 days of 2nd follow up


**Figure 3:** Methods to find and access patient reported outcomes

**Selection of Location:**

**BGS Global Hopitals:** Tertiary care, referral hospital, at Bangalore, Hyderabad, Chennai in South India.

**Study Location:** BGS Global Hospitals**,** at Bangalore, Hyderabad, Chennai.

**Inclusion Criteria:** All in patients and out Patient who are diagnosed as Diabetic type-II.

Continuing anti diabetic drugs (*Metformin, Glibenclamide, Insulin, and Pioglitazone*) for their diabetes management.

a. All patients of above 18 years old.
b. Who regularly visit hospital for their regular checkup of disease.
c. Diabetic with Co-morbidity also involved in this study procedure.

**Exclusion Criteria:**

a. Those stop taking any of the anti-diabetic medicines under study.
b. Those who die and terminally end of disease
c. Those who are not in contact,
d. Those who were not willing to discuss in calls,
e. Those who have communication problems,
f. Patient with Pregnancy.

**Study Period:** Six months of study from September 2014 – February 2015 including planning, methodology, development, data collation, analysis and writing.

**Study population:**

a. Out patients who are newly or already diagnosed as Diabetic type-II and taking medicines through BGS Global Hospitals, Bangalore, Hyderabad, Chennai., South India. - were enrolled in the study.
b. In these 6 months we did 3 follow-ups and provided necessary counseling for the benefit of the patient. Please see inclusion and exclusion criteria for more details.

**Data collection:**

- We collect data from through direct patient interview and telephone interview.
- We collect data regarding medical, medication history, and contact details from patients.
- Data was collected using a self-designed and validated data collection form in English.

**Outcomes:** Development of ADR, AE's with use of anti-diabetic drugs, identification medication adherence and unresolved disease condition of patient even after usage of anti-diabetic drugs in DM type 2.

**Exposures:** Diabetic patients who are using and have medical related problems regarding "Metformin, Glibenclamide, Insulin, and Pioglitazone / 100 IP or OP patients.

**Data Analysis:**

WHO UMC Causality assessment criteria scale to detect and analyze ADR of patient and drug individualized specific information form Clinical Pharmacology database and patient adherence an be done by Pill Count Method. We collected all the value data by Pill Count Method.

$$\% \text{ Adherence} = \frac{\text{Dispensed} - \text{Remaining}}{\text{Expected to be taken}} \times 100 = \%$$

The calculations for pill count is as follows; Data processing was done using Microsoft excel, software's, statically significance was calculated.

**Bias:**

a. Mis consumptions about ADR causing reporting bias
b. Un awareness about disease, treatments and outcomes
**c.** Those who consumes other medicines by other consultation and show low adherence to overall treatments including exercise and diet.

**Research Hypothesis:**

Active surveillance increases patient reporting.

## 3. Results and Discussion

**Age and Sex classification:** We calculated all the patients according to their Age and Sex, and some of the patients who are not interested to involve in active surveillance and not interested to communicate. Totally we got 133 patients in which 108 patients are participated in active surveillance (male are totally 64 and females are 69) and 25 patients are hesitated to participate in active surveillance.

**Table 3:** Demographics of Study Population

| AGE | SEX | | Total |
|---|---|---|---|
| | Male | Female | |
| 20 + | 5 | 4 | 9 |
| 30 + | 12 | 18 | 30 |
| 40 + | 9 | 12 | 21 |
| 50 + | 13 | 6 | 19 |
| 60 + | 6 | 8 | 14 |
| 70 + | 8 | 5 | 13 |
| 80 + | 2 | - | 2 |
| Others | 9 | 16 | 25 |
| Total | 64 | 69 | 133 |

**Patients with Co morbidity:**

We got nearly 131 patients in which nearly half of the patients are suffering from other diseases like DKA (6), Ulcerative colitis (1), Gastro Enteritis (3), B/L consolidation (2), Polynephritis (2), uncontrolled Diabetes (20), LRTI/URTI (2), Anemia (3), Jaundice (2), Diabetic foot (5) and Hypertension (12). We also listed outpatient having insufficient knowledge, patients require counseling regarding diet and dugs and mediation adherence. By the Observational study we can say that, majorly uncontrolled Diabetic Mellitus and Hypertension are commonly occurring in Type II Diabetic mellitus patients.

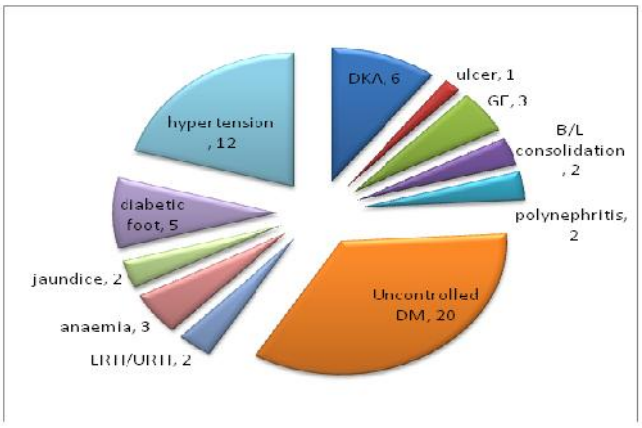


**Figure 4:** Comorbities and Uncontrolled Diabetics in Diabetic Patients

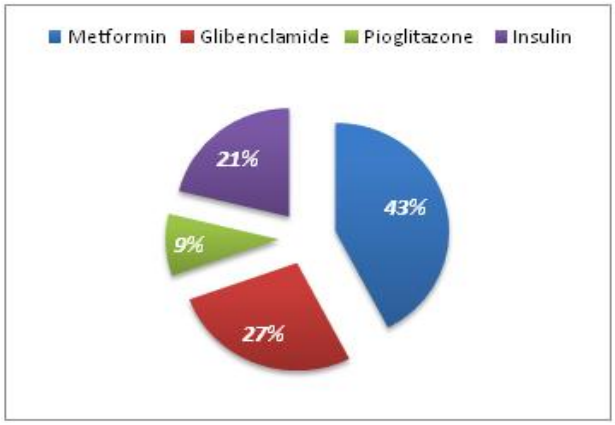


**Figure 5:** Percentage of Anti-Diabetic Medicine use in Study Population

**Medicines:**

We are included only Metformin, Glibelcamide, Pioglitazone and Insulin in our study and we got gross graph of drugs usage in developed hospital and developed areas. By this we can say that every patient is commonly using Metformin tablets, Females are more advised to take insulin than tablets and Pioglitazone are low use in diabetic type 2 patients while compared to others drugs.

**Table 4:** Demographics of Study Population

| Drugs | Sex | | Total |
|---|---|---|---|
| | Male | Female | |
| Metformin | 50 | 50 | 100 |
| Glibelcamide | 30 | 34 | 64 |
| Pioglitazone | 14 | 8 | 22 |
| Insulin | 19 | 31 | 50 |

**Rating of drugs on Prescription**

We go totally 133 prescriptions, in which Metformin 100 (75.18%), Glibelcamide 64 (48.09%), Pioglitazone 22 (16.5%) and Insulin 50 (37.5%) are noticed totally. By the observing rating of prescriptions, Metformin are seen to be more and Pioglitazone are seen to be poor in prescribing.

**Mediation Adherence [**22]

In the first follow-ups the percentage of medication adherence was (27) (25%), followed by (23) (21.2%) in second follow-ups and (12) (11.11%) in third follow-up.

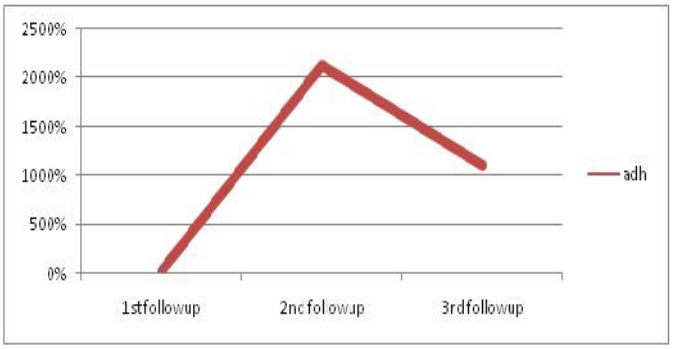


**Figure 6:** Medication Adherence in Study Population

**Patients' reports drug usage of drugs**

As per 3 follow-ups we got many reports from patients who are receiving drugs of Metformin, Glibelcamide, Pioglitazone and Insulin. We got many reports often and got many doubts from the patients regarding medication therapy.

**Table 5:** Clinical Categorization of PRO's

| Drugs | Metformin | Glibelcamide | Pioglitazone | Insulin | Total |
|---|---|---|---|---|---|
| Nausea/Vomit | 5 | 4 | - | 3 | 12 |
| Dec. Body weight | 2 | - | - | 4 | 6 |
| Weakness | 6 | 2 | - | 3 | 11 |
| Skin rash | 1 | - | - | 3 | 4 |
| Inc. Hunger/Thrust | 8 | 4 | 1 | 6 | 19 |
| Shortness of Breath | 6 | 3 | - | 3 | 12 |
| Weight gain | 1 | 1 | - | 1 | 3 |
| Inc. Urine | 10 | 6 | - | - | 16 |
| Night Urine | 2 | 2 | - | 2 | 6 |
| Joints / Body Pains | 2 | 2 | - | 2 | 6 |
| Insomnia | 1 | - | - | 1 | 2 |
| Blurred vision | 2 | 1 | - | 2 | 5 |
| Allergic reaction | - | - | - | 4 | 4 |
| Black spot | - | - | - | 6 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Dizziness | 5 | 5 | - | 8 | 18 |
| Headache | 3 | 2 | - | 3 | 8 |
| Muscle tight/ | 6 | 3 | - | 3 | 12 |
| Hypoglycemia | 3 | 2 | 1 | 5 | 11 |
| Total | 60 | 37 | 2 | 59 | 171 |

Totally number of repot was 171 in number, in which 126 from active surveillance (1st-63, 2nd-45, 3rd 18) and 43 from Passive surveillance (1st- 30, 2nd-11, 3rd-3).From the 3 follow ups, we got total reports form Metformin 60, Glibelcamide 37, Pioglitazone 2 and insulin 59 in countable number.

**Causality of Adverse Outcomes:**

We done ADR monitoring through WHO UMC causality categories

**Table 6:** causal categorization of PROs

| WHO UMC | Oral Hypoglycemic | Insulin | Total | PROs |
|---|---|---|---|---|
| Certain | 5 | 8 | 13 | ADRs 91 |
| Probable / Likely | 24 | 18 | 42 | |
| Possible | 12 | 24 | 36 | |
| Unlikely | 16 | 12 | 28 | AE 28 |
| Conditional/Unclassified | 12 | 12 | 24 | URP 52 |
| Unassessable /Unclassifiable | 20 | 8 | 28 | |

**Active & Passive Surveillance**

Here we have main role and theme of ours project. We have considered active surveillance in Age, Gender, Drug category and required counseling information for each and every follow-up.

**Table 7:** adverse outcomes in gender groups in 1st follow ups

| Age | Participants | Males | Females | Total reports |
|---|---|---|---|---|
| AS | **108** | **36** | **27** | **63** |
| PS | **12** | **22** | **8** | **30** |

**Table 8:** Adverse Outcomes in gender groups in 2nd follow ups

| Age | Participants | Males | Females | Total reports |
|---|---|---|---|---|
| AS | **102** | **27** | **18** | **45** |
| PS | **9** | **9** | **2** | **11** |

**Table 9:** Adverse Outcomes in Gender Groups in 3rd follow ups

| Age | Participants | Males | Females | Total reports |
|---|---|---|---|---|
| AS | **90** | **12** | **6** | **18** |
| PS | **3** | **3** | **0** | **3** |

**Passive Surveillance**

In passive surveillance when comparing with geriatrics, Adults are more interacted with us for asking information regarding drug information and explain their personal drug experience through Mobile phones.

**Table 10:** Adverse Outcomes in Adults and Geriatric

| Surveillance | Adult | | Geriatric | | Total |
|---|---|---|---|---|---|
| | Number | Parentage | Number | Parentage | |
| AS | 86 | 79.6% | 22 | 20.3% | 108 |
| PS | 11 | 91.6% | 1 | 8.3% | 12 |

**Active and Passive Surveillance**

Out of the 171 total adverse outcomes, (126) (73.68%) was through Active surveillance and (45) (26.31%) was through Passive surveillance. Active surveillance repots were received while an interventional enquiry as passive reports was received voluntarily. Number of patients interviewed in active surveillance 1st follow up was (63), followed by interviews in 2d and 3rd follow ups (45) & (18) respectively. Number of patients interviewed in passive

surveillance 1st follow up was (25), followed by interviews in 2d and 3rd follow ups (16) & (5) respectively.

**Table 11:** repots of active surveillance in 3 follow-ups

| Active Surveillance | | | |
|---|---|---|---|
| **Follow ups** | **Number of Interviewed** | **Reports** | **% Reports** |
| 1st Follow-up | 108 (M*-70&F*-38) | 63 | 50 % |
| 2nd Follow-up | 102(M*-62&F*-40) | 45 | 35.71 % |
| 3rd Follow-up | 90(M*-58&F*-33) | 18 | 14.28 % |
| Total of Reports | | 126 | 100% |

**M*–males and F* – females**

**Table 12:** Repots of active passive in 3 follow-ups

| Passive Surveillance | | | |
|---|---|---|---|
| Follow ups | **Number of Interviewed** | **Reports** | **% Reports** |
| 1st Follow-up | **12** | **25** | **55.55 %** |
| 2nd Follow-up | **9** | **16** | **35.55 %** |
| 3rd Follow-up | **2** | **5** | **11.2 %** |
| Total of Reports | | **45** | **100 %** |

**Patient Counseling**

Many patients are interacted with us for asking counseling regarding diet, exercise and medical information in regular follow ups. They are totally 35, in which 9 diet, 6 exercise, 17 medical information and 3 other.

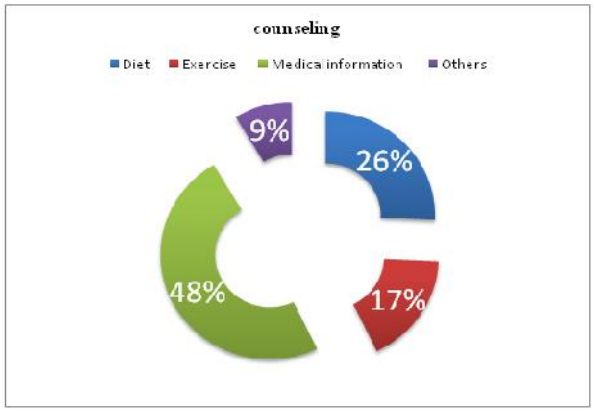


**Figure 7:** Graphical Representation of Details of Patients who require counseling

**Discussion**

**Adherence to protocol**

Our team was done a *Pharmacovigilance* work in Bangalore, Hyderabad, and Chennai. Bythe total diabetic prescriptions from BGS Global Hospitals, we found that *Metformin* is most commonly used drug and *Pioglitazone* is poorly used when compared to other oral hypoglycemic medicines. All these drugs are prescribed on the basis of formulary BGS Global Hospitals medicines in 2014 essential guidelines. In the view of percentages Metformin 43%, Glibelcamide 27%, Pioglitazone 9% and Insulin 21% in total 133 patients. In BGS Global Hospitals insulin is preferred for those who are tolerated and resistant to the oral hypoglycemic, day to day there is an increase in number of users of insulin. In our total study met 25 patients, who are not interested to discuss their medical problems and their disease details, in 16 females and males are 9 in number. By the comparison females are with insufficient knowledge and showing very low interest to communicate.

**Patients reported outcome**

It's a proved fact that by the involving patient reported outcome we can improve disease status of every patient regarding medication therapy. Similar studies were conducted in India, one of that kind is "Improvements in Patient-Reported Outcomes Associated with an Intervention to Enhance Quality of Care for Developed Patients with Type 2 Diabetes". All the previous studies says that by collecting patients experience and reported outcome, they are able to identify early adverse reaction, early complications of disease [14].

In our study also we encouraged all the diabetic patients to report their experience and disease status. By helping them we did 3 active surveillance for every patient to make habituate of reporting. Further we expected reports for them. We got totally 171 differently categorized reports from 108 patents in total 3 follow-ups with including active and passive surveillance form diabetic type 2 patients. We received many reports like nausea, vomit, decreased body weight, weakness, skin rash, increased hunger, increased thrust, shortness of breath, weight gain increased urine, night sweat, joints pains, insomnia, blurred vision, allergic reaction, black spot on site of injection dizziness, headache, muscle tight, numbness and hypoglycemia. In totally 171 reports 126 from active surveillance and 45 from passive surveillance. Totally we have greater reports of Increased Hunger/Thrust, Dizziness and Increased Urine and very few reports from Insomnia, skin rash by comparison of others reports in oust study.

**Diabetic co morbidities**

We got nearly 131 patients in which nearly half of the patients are suffering from other diseases like DKA (6), Ulcerative colitis (1), Gastro Enteritis (3), B/L consolidation (2), Polynephritis (2), uncontrolled Diabetes (20), LRTI / URTI (2), Anemia (3), Jaundice (2), Diabetic

foot (5) and Hypertension (12). We also listed outpatient having insufficient knowledge, patients require counseling regarding diet and dugs and mediation adherence. By the Observational study we can say that, majorly uncontrolled Diabetic Mellitus and Hypertension are commonly occurring in Type II Diabetic mellitus patients.

**Mediation adherence**

In the first follow-ups the percentage of medication adherence was (27) (25%), followed by (23) (21.2%) in second follow-ups and (12) (11.11%) in third follow-up.

**Causality of adverse outcome**

Basis of reports and outcomes we applied *WHO UMC* causality assessment scale to study. By regular follow-ups and frequent questions, we categorized all the reports and concluded that totally in 171 patient reports 91 reports of Risk, 28 reports of AEs and 52 of unresolved problems.

**Active and passive surveillance**

PROs are very poor and in country and very rarely advised for patients also. But in generally PRO contribute good Pharmacovigilance and improve patient's mediation therapy by improving reporting system in Country [21]. My study procedure make the patients also to take part of the accurately in mediation therapy and improve patient reporting system to become real state holder. In developed countries patient have high available of consumer right and right have information about their buying medicine. As per Pharmacovigilance patient reporting system implies good Pharmacovigilance studies. In developed countries have patient reported through online and report up to date for example Med Effect – Canada, Med watch – USA, Blucard- Australia, yellow card system in UK, Monitoring medicine system in WHO and WHO UMC and vigibase drug data base [29,30].

Some online database system help more reporting voluntary. Improving patient knowledge will go through easiness and accessing of online databases will help more people in reporting. In our study we did both active and passive surveillance respectively with regular 3 follow ups. By this surveillance, we concluded that patients are showing much interest and giving reports in active surveillance in active surveillance when compared with passive surveillance. But some females are hesitating to discuss their medical history and their medical problems. In case of passive surveillance by 3 follow-ups, we received very few reports from diabetic patients, in such many of them asking for medical information and few people are asking about exercise. Comparison of adverse outcome of adult's and geriatric also says that adults are showing much interest to communicate and to know about their disease related medical information.

**Patient counseling**

In developed cities like Bangalore, Hyderabad, Chennai are many of the patients are with insufficient knowledge and need to be counseled and in that newly diagnosed diabetic patients are showing much interested to take counseling steps from us. Totally we had 35 patients who request us for counseling, in which 48% of medical information, 17% of exercise, 26% of diet and 9% of asking other information.

**Limitations of the study**

All the patients who are taking diabetic medicine in developed cities likes Bangalore, Hyderabad, Chennai areas are having insufficient knowledge to express and report their disease details and they are not even to cooperative with our team to conduct PROs in some cases. These are specially seen in the females. It's very difficult to follow some patient, especially that are gone for changing their personal contact details and not able to contact with us regularly. However the study gives a picture about the various patient outcomes that the patients reported of the study site. This can be used as a baseline data for future studies where in the study design can be such that the limitations of this study can be overcome.

**Future step in Patient reported outcome**

Improving the patient reported outcomes is a complex process in India, especially in developed areas like Bangalore, Hyderabad, Chennai.. Getting the good partial experience and basics right including improving PROs assessment, patient knowledge and attitudes, ensuring that all stuff has adequate training and improving the use of the clinical guidelines in practice would be a good start. Various steps that can improve the PROs are

a. Please encourage every patient to report their medical experience and accept all the value added information from patient reports.
b. Patient must understand and should make a habit of reporting their medical experience with medical staff with valuable witness.
c. Health care professionals should also understand how difficult patients fin this to do but having an understanding of this, can then encourage patents through open communication and comparison.
d. Pharmacists have to assess reports regularly and convey the results to physician / health care professional's team and administer the prescribed mediation and review its effects.
e. Communication and collaboration and cooperation between healthcare professionals are necessary to optimize PROS assessment and managements.

## 4. Conclusion

Adherence to protocol is marginal. Depending on the patient necessary and education we received reports from the 108 patients out of 133 patients, by that we concluded that patients are showing much interest and giving reports in active surveillance when compared with passive surveillance. But some females are hesitating to discuss their medical history and their medical problems. In case of passive surveillance by 3 follow-ups, we received very few reports from diabetic patients, in such many of them asking for medical information and few people are asking about exercise. Comparison of adverse outcome of adult's and geriatric also says that adults are showing much interest to communicate and to know about their disease related medical information.

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