The Aspect Of Medication Adherence Concerning The Patients Diagnosed With Type 2 Diabetes

Introduction

The aspect of medication adherence is vital for patients who have been diagnosed with type 2 diabetes, as oral hypoglycemic agents such as biguanides and sulfonylureas are extremely effective in ensuring a patient's diabetes is managed, providing the drug is taken correctly (Aloudah et al., 2018). The concept of adherence is a significant factor in ensuring that mortality and morbidity rates decline, as well as encouraging an increased number of patients to ultimately achieve good glycemic control (Polonsky and Henry, 2016).

Although medication adherence is a complicated process, there is evidence to support that it can be affected by factors such as ethnicity and age. Patients with type 2 diabetes are often aged 45 or older, are overweight, or they come from a family background of diabetes sufferers. Additionally, there are particular ethnic groups who are more prone to be affected by diabetes such as African, African-Caribbean and South-Asian family origin (Nice.org.uk, 2019). A report has highlighted that a patient's adherence to type 2 diabetic drugs can vary from a range between 36% and 93%, depending on the different populations they are a part of, thus confirming that there are many variables that can affect a patient's adherence to their medication which can further be explored (Aloudah et al., 2018).

Pharmacotherapy

There has been a significant amount of progression in the pharmacotherapy of type 2 diabetes. Many drugs are currently being developed, as well as increasing amounts of drugs that are near towards being approved (Rendell and Kirchain, 2000). However, it is important to consider that although there are many drugs that are readily available to treat a patient with type 2 diabetes, the drug selected by a prescriber should take into consideration factors such as safety, costs, side effects, patient preferences and effectiveness (Excellence, 2019). In addition, the patient's concurrent medication should also be accounted for, as health care professionals need to ensure that a patient's treatment regimen is well-tailored; especially if a patient has many health issues to begin with. Metformin is the drug most commonly used for the first line treatment of type 2 diabetes, provided that there are no contraindications and issues with tolerance (Tschöpe et al., 2013).

Compliance With Treatment Regimens

Poor medication adherence can have grave consequences for a health care service such as the National Health Service, as failure to comply with treatment regimens leads to more health care resources being utilised, which subsequently increases medical costs. Furthermore, poor medication adherence in type 2 diabetes has also been associated with an increase in death rates. The question is however, the reasoning as to why some patients are more likely to adhere to treatment better than others. A key contributor to this may be the matter of how complicated the treatment is for a patient as well the issue of convenience. There is no doubt that when the

treatment regimen is seen as more complex, medication adherence and persistence takes a decline. Additionally, due to the different background of the patients who are more likely to suffer from type 2 diabetes, it may be factors such as language barriers and lack of understanding which can result in poorer adherence.

In addition to this, recent studies have also shown that a potential confounder can occur due to differences in medication adherence between ethnic groups. An American study outlined that African American patients tend to have lower levels of adherence, as researchers gathered data on amount of exposure to metformin based on time and number of pills (Florez, 2014). As there was a lower documented adherence level for these patients compared to other groups, it supports the idea that there is a discrepancy in terms of how different types of patients adhere to a drug.

Side effects of Metformin MOA

The drug widely used to treat type 2 diabetes known as Metformin is an antihyperglycemic agent, which operates by improving a patient's tolerance to glucose. It is important to note that metformin has a different mechanism of action compared to other types of oral anytihyperglycemic agents. Its mechanism highlights that metformin lowers the amount of glucose absorbed from the intestine, as well as increasing glucose uptake and usage which subsequently improves insulin sensitivity. An advantage of metformin over sulfonylureas is that metformin does not cause hypoglycemia in patients; except in rare circumstances (Accessdata.fda.gov, 2020).

According to the BNF the dosing requirement for metformin is as follows:

The initial dosing requirement is 500mg one daily for a minimum of one week to be taken with breakfast. Thereafter, 500mg is to be taken twice daily for one week with breakfast and dinner, then 500mg to be taken three times daily for one week with breakfast lunch and dinner. The maximum allowance of metformin daily is 2g.

There are however side effects associated with taking metformin, which can also contribute to the factor of poor medication adherence. The most common side effects patients experience when administering the drug are: abdominal pain, decrease in appetite, diarrhoea, gastrointestinal disorder, nausea, alteration of taste and vomiting.

A very rare but severe side effect of Metformin is lactic acidosis. This occurs when there is a buildup of metformin in the body, and it is essential for a patient to be referred to a hospital immediately if they experience any symptoms of this condition. This includes: fruity smelling breath, confusion, jaundice and breathing difficulties (Healthline, 2020).

Furthermore, when addressing the issue of medication adherence between different ethnic groups, there are previous studies to suggest that some populations would not adhere to drugs due to the side effects listed. Data has been obtained from the University of Surrey which stated that patients on metformin had the poorest medication adherence compared to patients with type 2 diabetes on other drugs (MD Magazine, 2020). Researchers discovered that this was due to the adverse effects associated with metformin such as vomiting, nausea and diarrhoea.

Another class of drugs used to treat type 2 diabetes is known as sulphonylureas. Their mechanism of action is such that it stimulates insulin production in the pancreas, which subsequently increases insulin's effectiveness in the body, therefore ensuring the maintenance of one's blood sugar levels. An example of a type of drug from this class is gliclazide, however it is important to note that it lead to the blood sugar level reducing considerably, so it is advised for a patient to carry sweets to help when this occurs (nhs.uk, 2020).

Toxic Effects and complications of untreated diabetes

There are two types of complications which can arise from diabetes if untreated; chronic or acute. Complications which are acute can happen spontaneously and can lead to other complications, whereas chronic complications are long-term issues which can be developed over time and can have a detrimental effect to one's health if they are overlooked (UK et al., 2020).

An example of one of the chronic complications of diabetes is nephropathy, which is more commonly known as kidney disease. The cause of the disease is damage to the small blood vessels. This damage leads to the vessels malfunctioning, which ultimately results in the kidneys working inefficiently. An important factor which can aid the prevention of kidney disease as well as other complications diabetes can cause, is ensuring blood glucose levels are very well maintained. This disease can be developed in any individual over a period of time, however it more commonly affects those with high blood pressure, therefore it's essential that a patient's blood pressure should be monitored and controlled.

Studies carried out in the UK have suggested that in South Asians, blood pressures are considerably high in comparison to white populations (Agyemang and Bhopal, 2002). This notion may come from the aspect that heart disease and strokes are primary causes of death in the UK's South Asian populations in comparison to white populations. Therefore, it is essential that hypertension needs to be closely monitored and managed in South Asian populations, to limit mortality rates.

For patients with diabetes and hypertension, a common form of treatment is by the use of ACE inhibitors. Their mechanism of action is advantageous as not only do they operate by lowering one's blood pressure, but they also help in the protection of the kidneys from further harm (UK et al., 2020). Although these medications are normally utilised by those patients with hypertension, they can also be taken by those with a normal blood pressure due to their nature of protecting the kidneys.

Due to the fact that South Asians are an ethnic group who are more prone to suffer from both type 2 diabetes and hypertension, this may suggest the reason for poor medication adherence. When treatment regimens become increasingly complex, or there is more effort required from the patient to adapt to a certain medication taking behaviour it can ultimately lead to a reduced level of adherence; ultimately limiting the glycemic control that is intended to be achieved. When comparing this scenario to patients from a white background in the UK, there may be better levels of adherence due to less complex treatment regimens due to less health complications, or the fact that there would be no limitation to a patient from a white background's understanding due to the absence of variables such as language barriers.

Trends in the prescribing of medicines for the treatment and monitoring of diabetes

Studies have discovered that the treatment and patterns of prescribing for type 2 diabetes have altered substantially in the UK since 2000, in order to adapt to new therapies and adhere to the changes within the clinical guidelines (The Diabetes Times, 2020).

Researchers from the London School of Hygiene and Tropical Medicine have discovered that there have been several new classes of drugs developed (The Diabetes Times, 2020).

A study carried out by BMJ Open hoped to highlight how the choice in therapy at the start of type 2 diabetic treatment, and initial stage of an increased treatment regimen have modified over the years.

The findings of the study showed that 73% of the research population were initiated on metformin, in comparison to a mere 15% on sulfonylurea. However, an important discovery from the data obtained suggested that although sulphonylureas dominated in 2000 at the primary stage of an intensification of treatment, this fell considerably by 2017 to only 30%, due to the fact that there were newer classes of drugs being utilised instead.

Additionally, an important concept to consider is that prescribing patterns differ depending on the country. For example, a study found that dipeptidyl peptidase-4 inhibitors and sodium/glucose cotransporter-2 inhibitors are more readily prescribed in Wales and Northern Ireland than Scotland or Wales.

This idea is important when exploring reasons for adherence in different ethnic groups, as populations such as South Asians may adhere to a certain drug more readily than others, and due to the idea that trends in prescribing differ according to location, this may be another variable to take into account when explaining poor medication adherence in certain populations over others.

Additionally, findings from a report published by the NHS also highlighted the patterns in prescribing of medication for type 2 diabetes in the UK between the years 2008-2009 to 2018-2019 (Kamat, 2020). The major findings suggested that the average cost of drugs for a single patient with diabetes between 2018-2019 was £327.78, and the Net cost of prescribing for medication administered in diabetes was £1075 million between the years 2018 to 2019. As this is a substantial cost for the NHS to cover per patient as well as a whole, it is important to consider the effects that non-adherence to medication for type 2 diabetes can have to the economy and for a health care service such as the NHS. A patient not taking their medication prescribed incurs a loss to this health care system, as the money funded towards their treatment regime is ultimately being wasted, whereas instead those funds could potentially be utilised to help treatment for another patient with a different health condition such as cancer.

Conclusion:

To conclude, although there are some statistics to suggest that medication adherence may be affected by variables such as ethnicity, the data is still inconclusive.