

Role of Clinical Pharmacist in Diabetes Care during Corona Virus Pandemic

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Abstract

This review focus on the potential link between the type 2 diabetes mellitus (T2DM) and Coronavirus-19 (Covid-19). However, patients with T2DM during the Covid-19 infection display high incidence, disease severity, and mortality. The emerging COVID-19 infection pandemic, combined with the growing global diabetes burden, has raised major challenges for health care providers in delivering efficient and sustainable treatment to diabetes patients during the ongoing pandemic. Therefore, it is critical for health care professionals to recognize and adopt the prescribed improvements in the delivery of care, lifestyle adjustments, and pharmacotherapy to ensure patients receive adequate care.

Keywords: Covid-19; Diabetes; Health Care Professionals; Lifestyle Changes

Introduction

Novel coronavirus disease (COVID-19) has emerged as a global pandemic that has affected over 200 countries and has claimed thousands of lives to date. Although the overall mortality rate is low, in COVID-19 patients, diabetes mellitus (DM) has emerged as distinctive comorbidity associated with severe illness, acute respiratory distress syndrome and increased mortality. There may be a potential link between type 2 diabetes mellitus (T2DM) and Coronavirus-19 infection (Covid-19). Indeed, patients with T2DM show high prevalence, disease severity and mortality during infection with Covid-19 [1-4].

Desirable pathogenic mechanisms associate with T2DM and Covid-19 pneumonia

Concerning the pathogenesis of T2DM and Covid-19 pneumonia, we need to study in detail the pathogenic mechanisms of lung disease in T2DM patients [5]. The lung has a complex alveolar-capillary network, which T2DM may target [5]. T2DM does indeed cause microvascular damage in lung disease patients [5]. Patients with T2DM, however, often experience respiratory symptoms and are at elevated risk for multiple pulmonary diseases [5]. Looking at the molecular mechanisms implied in T2DM patients with microvascular injury, we must consider the over inflammation. Indeed, insulin resistance and altered homeostasis of glucose in patients with T2DM lead to alveolar-capillary micro-angiopathy and interstitial fibrosis by over-inflammation [5]. Several molecular pathways, triggered by over-inflammation, have been proposed to explain the micro-vascular disease and the consequent endothelial dysfunction and lung damage in patients with type 2 diabetes. Interleukin 6 (IL-6) is one such mechanism for these pro-inflammatory endothelial pathways of small vessels. IL-6 is a well-known biomarker for inflammation and metabolic dysfunction and has been proposed as a lung disease severity predictor [5]. In

particular, T2DM patients present with substantially higher plasma levels of IL-6 compared to non-T2DM patients [6,7] followed by a rise in other pro-inflammatory cytokines, such as interleukin 18 (IL-18) [6] and metalloproteinase 12 (MMP-12) [7]. To date, the chronic and systemic inflammation in T2DM patients is associated with abnormal clot formation [6]. Indeed, as compared to healthy samples, the coagulation profiles of T2DM samples are substantially more hyper-coagulable [6]. Thus, deregulated inflammatory circulating molecules in patients with T2DM may partly be responsible for a hypercoagulable condition and vascular dysfunction [6]. Intriguingly, the higher levels of interleukins and MMP-12 in T2DM patients are connected independently to many structural and functional indicators of pre-clinical cardiovascular organ damage [7]. In addition, targeting IL-6, a key molecule in the inflammatory cytokine network, maybe a novel therapeutic strategy for the syndrome of COVID-19-induced cytokine release [8]. Indeed, IL-6 could be expressed differently in ICU versus non-ICU patients, and IL-6 blockade biological agents could be evaluated for risk stratification and therapeutic impact monitoring [8]. Notably, Covid-19 pneumonia progression may cause thromboembolic events and decrease lung functionality [1-4]. All of these events are seen mainly in T2DM patients and are symptoms of microvascular endothelial dysfunction and damage [5]. To date, these effects may cause restrictive and obstructive impairment of the lung function in patients with T2DM, including reduction of forced expiratory volume in 1 s, forced vital capacity, lung diffusing capacity, and lung elastic recoil [5]. Therefore, it seems natural to speculate that this pathogenic disorder may explain the increasing pattern of cases, hospitalization, and mortality in Covid-19 infection patients with T2DM [1-4].

Challenges to diabetes self-management during the COVID-19 pandemic

Recent research from China during the COVID-19 pandemic found that elderly subjects with type 2 diabetes mellitus reported a decline in glycaemic regulation expressed as higher fasting blood glucose [9]. The impact of social distancing, quarantine, and lockdown on lifestyles would likely have led to worsening control of glucose. First, lockdown and social distancing meant for community containment would have restricted the people with DM's physical activities. Second, the restriction of food supplies during lockdown would have forced people with DM to adjust their food supplies. Dietary patterns formerly related to strong glycaemic regulation. Thirdly, it would have been difficult to procure anti-diabetic drugs and glucose strips in the midst of the continuing restrictions. Finally, patients with diabetes mellitus may not have been able to visit their physicians for regular follow-up clinics; thus, it would not have been possible to fine-tune anti-diabetic drugs.

Impact of Covid-19 on psychological health of the people with diabetes

The COVID-19 pandemic has negatively impacted people's psychological well-being across the globe. The intense fear of contracting the virus unknowingly, the uncertainty of being shut out. The psychological health of the people is dramatically impaired inside the rooms and not being able to reach their nearest and precious ones. In addition, the abrupt and almost endless influx of news stories about an Outbreaks can cause people to feel worried [10] contributed to chronic hyperglycaemia (and possibly regular episodes of hypoglycaemia) Individuals with diabetes mellitus appear to have varying degrees of negative feelings, such as depression and anxiety [11,12], which will obviously get worse during an outbreak. In effect, unhealthy emotions will impair glycaemic regulation among people with diabetes in the midst of the COVID-19 pandemics [13,14]. Similar will be the case of Indian people with DM. Therefore, optimal diabetes treatment can only be accomplished in the midst of the current pandemic by implementing a comprehensive approach to diabetes self-management practices that include a multidisciplinary team of general practitioners, endocrinologists, diabetes educators, nutritionists, ophthalmologists, podiatrists, and psychiatrists. Above all in this didactic approach to diabetes self-care, patients with diabetes will play a major role. Here, we analysed the self-care activities of diabetes that can be followed by patients and supported by doctors in the midst of the current pandemic.

Support of clinical pharmacists to the people with diabetes during covid-19 pandemic

Medication adherence

Pharmacy practitioners are crucial in planning for an appropriate response to the COVID-19 pandemic [15]. The following advice that helps pharmacists provide successful treatment to diabetes patients during and after the COVID-19 period:

- **Suitable medical supply:** Pharmacists need to work proactively to ensure that their patients receive sufficient and safe supplies of medicines [16]. Accordingly, pharmacy departments are required to expand the reach of remote mobile services, drive-through services, and home delivery services to reduce patients' need for regular pharmacy visits [17]. Therefore, maximizing the supply of medicinal products is important for pharmacists to reduce the amount of surplus medicinal products that may unnecessarily compromise drug storage and potentially affect the quality of drug use [18].
- **Tele pharmacy guidance and supervision:** In the age of general face-to-face contact constraints, it will be admirable for pharmacists to demonstrate their empathy, concern, and ability to remotely assist patients with questions related to their medicine. Tele pharmacy is the remote delivery of pharmacy services by trained pharmacy staff, as established by the American Society of Hospital Pharmacists (ASHP) [19]. Being one of the most available members of the health care team, remote consultation programs are projected to be greatly extended in pharmacy settings. Since there is evidence to support the use of technology-based approaches to facilitate diabetes self-management, new models of remote value-added services in diabetes care will be increasingly needed [20]. As such, the expanded implementation of technology solutions will be anticipated to include a way to ensure successful patient monitoring systems.
- **Integrating new findings into clinical practice:** The current pandemic has resulted in the introduction of emerging and rapidly changing evidence relating to COVID-19 and its control. Many potential therapies are currently being tested for their potential effectiveness against the virus, with the introduction of many more expected. In addition, a number of medications that were previously deemed successful with positive results were found unsuccessful following the completion of new trials [21]. Consequently, health-care practitioners, including pharmacists, are expected to determine, track, and incorporate the revised information immediately into their patient-related treatment.
- **Support services in clinical pharmacy:** Research shows that the role of pharmacists in diabetes care has had a positive impact on clinical and humanistic outcomes for patients [22]. However, pharmacists are expected to provide their patients with ongoing and extended assistance during the COVID-19 pandemic in order to ensure better adherence to diabetes pharmacotherapy in order to achieve better glycaemic containment [23].

Dietary advice

Any dietary advice should start with determining an estimated daily total calorie intake that is needed. The total daily calorie intake expected of obese and non-obese patients in a sedentary lifestyle is 20 kcal/kg and the ideal body weight is 22 - 25 kcal/kg, respectively. An ordinary Indian as a clear example Ideally, 165 cm tall man would weigh 62 kg and need 1850 kcal to maintain a healthy weight on the assumption that he leads a sedentary lifestyle [24]:

- The daily consumption of carbohydrates should be approximately 50 - 60 percent of the total calorie intake; e.g. carbohydrates should be 225 - 270 g/day for an average Indian man living a sedentary lifestyle [24]. Complex carbohydrates should be preferred over refined carbohydrates and their products (for example, whole grain [roti] bread over white [maida] bread). Millets (bajra, ragi, jowar) may be taken for granted. Overall dietary fiber should be 25 - 40 g/day in daily diet. Whole grains, cereals, beans, fruits, and vegetables contain high dietary fibre. Strictly avoid the consumption of sugar-sweetened food products such as fruit juice, aerated drinks, and sugar syrups [26]. Fats should have a minimum intake of no more than 30 percent of total calorie/day and saturated fat (Vanaspati, dalda, ghee) [24]. Focus should be on low fat (double toned) milk. For cooking three teaspoons of oil, a day would preferably be used. Preferred cooking oil would be a combination of two or more vegetable oils (one of which is groundnut/sesame/rice bran/cottonseed/palm olein/olive oil and another mustard/canola/sunflower/safflower oil) [24].
- The consumption of protein in a typical Indian vegetarian diet should be 1 g/kg/day, considering the consistency of the protein. Nonetheless, in those with diabetic nephropathy and macro albuminuria (0.8 g/kg/day) the protein intake needs to be reduced [27]. Recommended protein sources for a vegetarian would be corn, peas, and low-fat dairy products while egg white would be in

a non-vegetarian and freshwater fish and lean poultry, if available. It is necessary to avoid red meat. Salt consumption should be less than 5g of sodium chloride/day and it should be avoided the age-old Indian tradition of adding extra salt at the dining table.

- The diabetes plate method is an easy but efficient way to provide a visual guide to the calorie portion in a food plate, keeping in mind the overall calorie intake/day and the Indian diet. Half the plate will consist of a curry of vegetables (e.g. cauliflower, brinjal, etc). The plates will consist of one fifth proteins in white dal/soya/egg type and fresh-ish/lean poultry, if available. The remaining quarter of the plate will consist of complex cereal carbohydrates (roti made of whole wheat/bajra/ragi, brown rice, etc).
- Indians' never-ending desire to drink tea (with added sugar) should be curbed (especially while at home). The intake of tea should be minimal, and no added sugar, too. Where available, artificial sweeteners may be used in moderation [24]. Similarly, the practice of eating snacks (like fritters) should be firmly discouraged at any time tea is taken.
- In addition, patients may benefit from maintaining daily touch with a nutritionist via online consultations. Telehealth Dietary interventions aimed at dietary habits have been shown to increase dietary consistency, consumption of fruits and vegetables, and dietary intake of sodium [28].
- It is necessary to avoid the unhealthy habits of smoking, drinking, and betel chewing.

Physical activity

Physical exercise is a part of daily exercise Self-care for diabetes; however, lockdown will restrict outdoor treatment Physical activities of DM-persons. So, they should inform yourself about alternative physical activity services can be conducted within safe domestic confines:

- A minimum of 60 minutes of physical exercise/day will be ideal could be divided into aerobics, work-related activities, and musculoskeletal activity [25].
- At least moderate-intensity physical exercise the goal will be 30 min./day. This could include breakthrough Walking (to the degree with which a person finds himself Difficult but not impossible to speak) at the rooftop or on the lawn. If Treadmills available could be used. Other aerobic remedies Activities such as stop-over jogging, stationary riding and we should turn to gardening. Total Aerobic Period The operation may be accumulated in limited intervals of 10 - 15 minutes, twice a day, or three days.
- Physical exercise in relation to function, such as ascending stairs, Household duties, will be around 15 minutes a day. Last but not least, 15 min/day can be used to improve the muscle Activities that may require workouts on body weight (Such as push-ups, squats, sit-ups, crunches, and forward pushes, Flexes) and exercise of resistance in lightweight lifting form. In the absence of accessories for home fitness, quickly Household things available, such as seals half-filled with water or you could also use small bags packed with items.
- Joint stability and relaxation exercises such as yoga may be a part of a plan.

Intensity and kind of physical activity should be adapted to the skill and fitness level of a person. In patients with coexisting cardiac failure and a history of hypoglycaemia, caution should be practiced. Doctors may help patients choose the form and quality of physical activity and direct them by sharing Preview video exercises and reinforce the need to stay physically involved at every online contact.

Conclusion

Patients with diabetes mellitus may not have been able to visit their physicians for regular follow-up clinics; thus, it would not have been possible to fine-tune anti-diabetic drugs. Covid-19 impact on the dietary pattern, mental health of diabetes individuals to tackle all these negative outcomes. Pharmacists can effectively contribute to the overall optimization of diabetes care through safe and optimized medication supply, tele pharmacy counselling about diet and physical activity, remote monitoring, and provision of clinical pharmaco-

therapy services. Support of general physicians, endocrinologists, diabetes educators, nutritionists, ophthalmologists, podiatrists, and psychiatrists is essential in diabetes care amid the ongoing COVID-19 pandemic.

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