Review Article

Role of self-care in COVID-19 pandemic for people living with comorbidities of diabetes and hypertension

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Abstract

People living with comorbidities especially chronic non-communicable disease (NCDs) like diabetes and hypertension are at greater risk of acquiring severe form of Corona Virus Disease (COVID-19) infection known to be caused by Severe Acute Respiratory Syndrome-CoV –2 (SARS-CoV-2) due to underlying immunodeficiency. The government has taken various public health measures to reduce the risk of infection, such as physical distancing, Information Education and Communication (IEC) messages regarding hand-washing, usage of masks, and avoidance of unnecessary travel including lockdown to combat the spread of disease. However, nationwide lockdown due to COVID-19 pandemic has also confronted the existing health care system (clinician centric approach) for the management of diabetes and hypertension in India. Using secondary source of data from specific website and search engine a review was done for existing guidelines and literature focusing on the various components of self-care management (patient-centered care) and highlights the importance of self-care management education to cope up with twin pandemic of COVID-19 and NCDs. An attempt was also made to highlight the use of eHealth to manage diabetes and hypertension which may act as a bridge to fill the gap between primary care physician and patient's amid lockdown and help physician to deliver comprehensive care for people suffering from comorbidities.

Keywords: Comorbidities, COVID-19, diabetes, hypertension, SARS-CoV-2, self-care

Introduction

Corona Virus Disease (COVID-19) has recently emerged as a significant public health concern for the mankind. On March 11, 2020 Word Health Organization (WHO) tagged COVID-19 disease as a pandemic.[1] The overall case fatality rate of this virus disease is low, ranging from 2 to 6%[2] than case fatality rate of other viral diseases like Severe Acute Respiratory Syndrome (36%), Middle East Respiratory Syndrome (9%), and Ebola virus (90%).[3] The studies have shown that COVID-19 causes higher rate of complications and deaths particularly in elderly persons and person living with diabetes, hypertension, and cardiovascular disease (CVD) as compared to the general population.[4] A recently published meta-analysis has revealed that more than one-third of COVID-19 patients were having underlying comorbidities of which CVD (14.4%), hypertension (18.6%), and diabetes (11.9%) were most significant.[5] People with such comorbidities are immunodeficient, as a result they may be more prone to COVID-19-related complications as compared to others.[6–8]

In India, SARS-CoV-2 virus infected first case was detected on 30th January 2020 and since then cases of COVID-19 infection are increasing alarmingly. With 1.34 billion populations in India, the burden of chronic diseases and mortality rate was ever increasing. The statistics published by global burden of disease concluded

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that the mortality rate in India due to non-communicable diseases like CVDs, chronic obstructive pulmonary diseases, and diabetes mellitus (DM) was 10.9%, 28.1%, and 3.1%, respectively, till 2017.[9] Comorbidities such as diabetes and hypertension both require sustainable medical care and self-care practices so as to prevent or delay the chance of related complications and their subsequent impact on quality of life.[10]

Unfortunately, this pandemic has necessitated stringent precautionary measures to curb the disease and safeguard the health of the people, including nationwide lockdown to break the chain of disease transmission.

Barriers and Challenges amid lockdown situation

1. Since 24th March, 2020 nationwide lockdown imposed in India has generated major challenges for people living with diabetes (PLWD) and people living with hypertension (PLWHT).
2. The regular follow-up and self-care are the backbone of management of any chronic disease especially for PLWD and PLWHT for adequate glycemic and blood pressure control and to prevent complication due to high blood glucose or blood pressure.[10–12]
3. This has posed significant restrictions to routine hospital visits for regular follow-up thus affecting the management of diabetes and hypertension among people with these co-morbidities.

Lockdown has also affected the human behaviors in many ways.

1. It has resulted in stress binge eating and unnecessary snacking. Maintaining the prior healthy dietary regimen may difficult for the patients as they would likely consume whatever is available or served to them from limited resources.
2. It may be difficult for them adhere to the prescribed medications due to hindrances in the supply and unavailability.
3. Outdoor physical activities are limited leading to increase in sedentary time.
4. Stress and anxiety related to self-affliction during COVID-19 pandemic has created panic which may make difficult to follow usual daily routine, leading to inappropriate sleeping patterns. The unhealthy behaviors during lockdown might lead to uncontrolled diabetes and blood pressure which may further cause severe secondary complications.

Importance of self-care: - The definition given by WHO for self-care state it as: "the ability of individuals, families and communities to promote health, prevent disease, maintain health, and to cope with illness and disability with or without the support of a healthcare provider".[13] The reliable measures of self-care are the need of an hour to control blood glucose and blood pressure during COVID-19 pandemic situation because the major part of care in PLWD and PLWHT are taken care by the affected person himself or by his immediate family members. Self-care measures can help patients in long run not just during the COVID-19 pandemic.

Self-care in diabetes and hypertension: - American Diabetic Association (ADA) suggest seven essential self-care behaviors for people suffering from diabetes that are shown to have better outcome which include healthy eating, physical activity, healthy coping skills, self-monitoring of blood glucose (SMBG), compliance to the prescribed medications, good problem-solving skills, healthy coping skills, and risk-reduction behaviors.[10]

The Joint National Committee-7 (JNC-7) recommends six self-care activity for hypertension are adherence to medication, adoption of a low-salt diet, maintenance of ideal body weight by regular physical activity for 30 minutes most days of the week, limiting alcohol consumption, and refrain from tobacco use.[14]

These proposed recommendations are for self-care are also useful for clinicians and educators treating people living diabetes and hypertension. A meta-analysis and systematic review have shown that self-care behavior has positive correlation between self-care behavior with reduction of complications and improvement in quality of life.[15,16]

Role of primary care physician and Diabetes Self-Management Education (DSME)

For sustaining and maintaining a successful behavior change these self-care activities requires support of health care staff. Self-management support and education is defined as assistance provided by group of experts which comprises of general physicians, nutritionists, ophthalmologists, podiatrists, psychiatrists, public health expert endocrinologists, diabetes educators or primary health care physicians/worker to enhance an individual's self-efficacy in managing one or more chronic conditions.[17,18]

Primary care physicians represent the first tier of the Indian public health care system. By the nature of being closer to the communities, Primary Health Care facility and other primary care providers can significantly improve the situation.[19] Currently, disaster of COVID -19 pandemic and lockdown led to diversion of health care resources for containing the coronavirus disease (COVID-19) pandemic which has immensely undermined the accessibility and availability of essential health care services. Under these circumstances, the preparedness and information of primary care physicians for providing safe patient-centered care and meeting the current health needs of the population specially for people living with chronic diseases like diabetes, hypertension while preventing further transmission of coronavirus infection is very crucial. Because of the lockdown, for those with chronic illnesses, such as diabetes and hypertension, restricted access to drugs and services could be life-threatening.[20]

It is also evident that a large proportion of illiterate population exists with consequently poor health literacy which sabotage their ability for correct self-management of chronic illnesses like diabetes and hypertension.[21] Due to imposed stringent lockdown, there is a shift from traditional face to face

consultation to teleconsultation for primary health care providers. During teleconsultation due emphasis has to be given to self-care behaviors which are easy to adopt and helps in controlling high or low blood glucose levels and blood pressure in this COVID-19 pandemic situation.[20] Therefore, this review article recommendation will help in promoting patient efficacy for self-care management for people living with comorbidities of diabetes and hypertension in any emergent pandemic situation with the help of primary care physicians.

What primary care physician may recommend to improve self-care activities? - Nationwide lockdown and movement restriction makes it is mandatory for people with chronic ailments to follow set of self-care activities which can be easily followed within the confines of home with the support of their family members and primary care physicians. The self-care activities may prove boon during these difficult times.

The recommended self-care activities are as following: -

Dietary Precautions: - Stress, boredom, and sitting idle may lead to binge eating and ultimately consumption of unhealthy food that would have increased during the lockdown period. It is well-established fact that the dietary intervention with the help of telehealth significantly improves the diet quality, fruit and vegetable consumption, dietary fat, and sodium intake reduction.[20] Primary care physician may use telecommunication methods to address the dietary related issue in this high time through daily or weekly messages which should be sourced from authentic government and non-government organizations, such as WHO, ministry of health and family welfare, FSSAI or National InstituteNutrition, Hyderabad (NIN). The persons living with the diabetes and hypertension can follow below mentioned simple dietary measures framed using recommendations by various studies and guidelines[22–24]:

1. Person living with diabetes should consume food in small portion and meal should be divided into multiple small portions (4-5 meals) that is usually breakfast, before lunch snacks, lunch, evening snacks, and dinner. Do not skip meals. The wall clock plate method can be used to control portion size. This is effective way to control portion in which half of the plat should be vegetables, salads or fruits, one quarter should be cereals and another quarter can be included lentils, egg white or soya.[25]
2. Eat more fiber rich food which is easily available such as cucumber, carrot and radish. Total consumption of fiber per day should be 25-40 gm/day.
3. Consumption of table sugar should be limited. Non-caloric sweetener like saccharine (artificial sweetener) and stevia (natural sweetener) may be consumed.
4. Prepare food at home by using healthy cooking method like grilled, steamed, baked or boiled rather than deep frying.
5. Avoid packaged foods, sugary drinks, soft drinks, bread, and ketchups. It is the simplest way to limit excess calories intake.
6. Consumption of fruit juice or aerated beverages should replace with the simple drinking water and keep well hydrated all time.
7. Reduce salt intake to less than 5 gm/day. This help to control blood pressure. Use less salt while cooking. Avoid food that contains extra salt like canned food, pickle, sauce, etc.
8. Total energy intake from fat should be limited to 20-30% per day. Avoid usage of saturated fat and trans fat food (Vanaspati, dalda, ghee) while cooking. Oils containing unsaturated or polyunsaturated fatty acid (mustard oil, sunflower oil, cotton seed oil, ground nut, and safflower oil) should be consumed. Ideally, use of mixture of two or more different type of oils is encouraged, not exceeding three table spoons per day.
9. Double toned or skimmed milk should be consumed.
10. Restriction of alcohol is important.
11. Smoking should be avoided strictly.

Physical activity: - In a simple term **physical activity** results in energy utilization by all movements of the body, whereas exercise is structured and organized form of physical activity. Lockdown due to the pandemic has restricted the recommended exercises of people with diabetes and hypertension. It is preferable to engage in alternative of specifically recommended exercises that can be practiced safely inside home to include combination of both aerobic and resistance exercises for maintain optimum weight and glycemic control. Physical activity related recommendation are:

1. ADA recommends 150 minutes per week or 30 min/day of adequate physical activity, such as walking/jogging. Limitation of outdoor physical activity during lockdown would require walk on roof top or lawn of home garden. Using stationary equipment like treadmill and stationary cycling as substitute of running or jogging. "Muscle building activities," such as weight lifting, at least 2 days a week are also advisable for adults.
2. It is said that sitting is the new smoking. Prolong sitting should be heckled on every 30 mins with the session of light physical activity like stretching of leg or hand at home or in offices.[26]
3. Strengthening physical activity can be performed for 15 min/day by using readily available household stuff like chair and table in which they can perform push-ups, squats, crunches, and even small bags/pouches filled with objects can be used for resistance exercise.[27] It should be done in supervision of family members or only can be performed by adults who are able to do these activities.
4. Engaging in more unstructured daily physical activities, such as household tasks, gardening, stair climbing, and chair starching's are recommended as part of a whole-day approach.
5. Flexibility exercise and balance activities should also be included to improve the range of motion around joints to improve gait and prevent falls in older adults for 2--3 times in week by yoga.
6. Telemedicine or teleconsultation by primary health care providers could help individualize the structure of physical activity program. They can also guide and motivate patients

by sharing videos of physically activity and success stories of other patients. Tailor made physical activity would be preferred especially for patients with history of hypoglycemia and heart disease.

Medication Adherence: - WHO has given the term "adherence" to use in chronic illnesses as "the extent to which a person's behavior—taking medication, following diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a health care provider".[28] People with diabetes and hypertension generally take two or more medication pills. A systematic review has been concluded that decreasing adherence related to polytherapy and multiple daily dosing.[29]

1. Pill counts method may be effective to remember the daily pills and can also take help of family members.
2. To ensure continuity of medication adherence prescribed medication refill should start 2 weeks prior to medications dry up.
3. PLWD and PLWHT should avoid self-medication for any other health issues without doctor consultations or prescriptions.
4. Primary care physician through teleconsultation could ensure that person living with these comorbidities should be informed about the contraindications of medications to prevent the wrongful use of non-prescribed medicine. They can also help them to order medicine from online platform amidst lockdown.

Self-monitoring of **Blood Glucose and Blood Pressure** –

Self-Blood Pressure Monitoring[14,30,31]: -

1. Digital blood pressure machines may be used to self-monitor the blood pressure.
2. American Society of Hypertension (ASH) guideline suggests that main goal of the treatment for all hypertensive patients should be below <140/90 mmHg.
3. Patients may be taught appropriate procedure for BP measurement. Sit down and relax for about 3 min before taking a reading. The purpose is to make the circulatory system comes to rest. The upper arm used for the measurement should be placed on a table, at about the same height as the heart, while the reading is being taken.
4. Three readings of blood pressure should be taken at intervals of 1 minute or longer, and the average of the three recorded, especially in early morning and evening.

Self-Blood Glucose Monitoring: - The SMBG is the most convenient way that can help people living with diabetes in tracking blood glucose fluctuation and also act as a record for making day-to-day self-decisions or through teleconsultation.

1. Educate patients about the ADA recommendation of the value range of pre-prandial blood glucose level from 70 to 130 mg/dl, and for peak postprandial blood glucose levels at <180 mg/dl. Patients are to be encouraged to record their SMBG values in a log book.[32,33]
2. The frequency of SMBG varies from person to person but ideal monitoring frequency recommended by ADA at least four times in a day, most commonly during fasting, before meal, after meal, and before bedtime for person who are on insulin therapy. However, patients on oral hypoglycemic agent can measure blood glucose level once or twice in a week. The SMBG readings will help them to adjust their medicine and insulin regimen more accurately.
3. Availability of glucose strips and digital blood pressure measuring instruments could be difficult amid lockdown. Also, it can be cumbersome to procure for the elderly people living alone or the patients residing in remote locations. Online pharmacy is an appropriate solution during this pandemic situation.

Primary care physician can help the person living with diabetes in proper monitoring of blood glucose measurement and motivation for optimum blood glucose control which may keep them away from various infections including COVID-19. They can also provide support to the poor patients' blood glucose test facility at door step with the help of ANM or ASHA.

Apart from it, foot care for the PLWD is utmost essential among all the self-care activities which is generally ignored by most of the patients.[34,35]

Foot care for patient living with Diabetes: - Foot care is most important part of diabetes self-care activity in people living with diabetes as it is associated with considerable morbidity and mortality.[36,37] Foot care instructions need to be indigenized in accordance with prevailing socio-cultural milieu and beliefs especially in India.[38] Primary care physician being the first point of contact can encourage patients to practice self-care of feet in simple language by following below measures.

Check feet daily at regular intervals especially after bath, before and after wearing footwear and also before going to sleep for any color changes, cut, swellings, and blisters. If not possible to see the bottom of the feet, then they can take help of mirror or family members like spouse, parents or siblings. Even a small blister, cuts, or scratches can lead to infection if ignored.

1. Clean your feet regularly with soap and lukewarm water and dry with soft cotton towel or cloth especially between toes. Apply moisturizer on feet only and do not apply in-between the toes.
2. Always trim nails straight and edge of nail should be shaped through filer. Never use blade or any other sharp material like scissors, knives to trim the nail.
3. Always wear well-fitted shoes or footwear. Shoes should be checked before wearing them and also make sure that the inner surface is free from un-necessary objects. Protection to feet from extreme hot and cold temperatures should be provided.

4. Make sure to keep the regular flow of blood toward your feet. While sitting feet should be put in upright position. Move your ankles up and down for 5 min and wiggle your toes two or three times a day. Try not to sit crossed legs for long period of time.
5. Do not walk bare foot inside or outside of home. Don't use plastic flip flop and narrow toed shoes.
6. If smoker, quit smoking it will help to minimize the chances of having neuropathy.

Stress Management

The (COVID-19) pandemic has been an unprecedented stressful time for everyone around the world. Life in the lockdown has had been full of struggles, that has required drastic change in the lifestyle of the PLWD and PLWHT that has triggered anxiety and fear. For the management of their chronic illness like diabetes and hypertension it is essential to practice self-care in these trying times.

Primary care physician can educate them to use simple measures to cope with stress during COVID-19 pandemic that are as follows[39,40]: -

1. REACH OUT and stay connected: - During such crisis it is normal to panic, feel sad or stressed, scared or angry. One should try talking to people they trust. Contact your doctor, friends, and family frequently.
2. Gather and concentrate on authentic information only that will help you with reasonable precautions to be taken. Follow a credible source such as WHO website or, a local or state public health agency.
3. Reduce the duration you and your family may spend watching or listening to media coverage that you feel makes you upset.
4. Have adequate sleep time and exercise. Listen to guided meditations before bed or early in the morning.
5. Pause breathe: - Practice deep breathing exercises as they were found to be effective[41] to relax the body and to take thought from negativity, e.g., deep inhale for 4 s, hold the breath for 4 s, and exhale for 4 s.
6. Choose a book to read with loved ones and hold discussions over the phone.
7. Primary care physician can help them through teleconsultations and talk about their feelings, concerns, and questions in simple and familiar language.

Hypoglycemia Management[42]: -

1. Avoid too much insulin or oral antidiabetic medication which can increase insulin secretion without consultation from physician.
2. Avoid skipping or delayed meals.
3. Medication should be taken well on time.
4. Avoid excessive, unplanned, and non-supervised exercises.
5. Avoid binge alcohol intake.
6. Patients could be advised to stock up sweet candies or commercially available glucose packet (like Glucon-D) at home.

Importance of eHealth in self-care management

Information and Information Communication technology (ICT) telemedicine is not a new thing, but this pandemic has turned it into new tool for providing continued access and care to those with chronic medical problem. Measures like telemedicine help patients with non-critical ailments to seek consultation and treatment through electronic platforms.[43,44]

Mobile technology is an excellent platform for better chronic disease self-care because of its wider usages across all socioeconomic strata. It is a low cost technology and can be very useful in low-and-middle income countries like India. It can be efficient bridge between patient, community health worker, and physicians in COVID-19 pandemic.[45–48] For primary care physician e-sanjeevani initiative by government of India to run Out Patients clinic for teleconsultation purpose will help to boost monitor and advice of self-care for people living with diabetes and hypertension in village or hard to reach area.

This century is an era of artificial intelligence which is changing our life very fast including our health care system. Through research studies it has been well established that AI also support PLWD and PLWHT by making their efforts more efficient through tailor made solutions and disease management technologies.[49–51]

Barriers in Adherence to Self-Care

The role of primary care physician and field healthcare providers in self-care of PLWD and PLWHT has been well recognized. But also there are lots of roadblock which are proved in various studies from developing countries that are related to socio-demographic and cultural barriers like un-availability and high cost of drugs, satisfaction rate with the medical care provided, severity of symptoms, inequitable distribution of health services between urban and rural areas.[21] A review study which looked into roadblocks from provider perspective pointed out various barriers such as affordability by the patient, self-belief that medications may not cure the condition and lack of motivation to change in behavior for self-care.[52] These roadblocks can be addressed by establishing good doctor patient's relationship during teleconsultations by providing adequate time to each patients to ally his fears and encourage him for adapting the healthy life styles.

Conclusion

COVID-19 poses an additional burden for self-care to people with pre-existing chronic medical conditions (like diabetes, hypertension, heart disease, or cancer). The necessary elements of self-care include dietary precaution, medication adherence,

home based exercises, self-monitoring of blood glucose and blood pressure, reduce salt intake, self-foot examination, and stress management. Primary care physician and other grass root health worker efforts are more likely to ensure adherence to self-care amid of COVID -19 pandemic. The need of the hour is to deal with challenges and barriers of self-care managements through continuous education and support by primary care physician-based approach. Teleconsultation will likely to be helpful for now and for longer duration for close contact and better understanding between patients and primary care physician.

Take home messages: -

1. Education and promotion of self-care practices is very important among people living with comorbidities of diabetes and hypertension in the current ongoing COVID-19 pandemic.
2. Meticulous self-care practices during COVID-19 pandemic are the key for people living with comorbidities of diabetes and hypertension so as to prevent or delay both short-term and long-term complications.
3. Primary care physicians being the first point-of-contact health care professionals play a crucial role in resource limited settings for people living with comorbidities to optimum control of blood sugar and blood pressure amid COVID-19 pandemic as they are first point of contact for most of the patients.
4. Primary care physician can utilize teleconsultation or telehealth mode to monitor and advice the people living with diabetes and hypertension amid lockdown in ongoing COVID-19 pandemic.
5. Teleconsultation is emerging as boon for both doctor and patients which provides proper social distancing and less virus exposure with overall good care.

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Conflicts of interest

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