

76824 Auto\_Edited check.docx

## **Assisting individuals with diabetes in the COVID-19 pandemic period: Examining the role of religious factors and faith communities**

Eseadi C *et al.* The role of religious factors and faith communities in managing diabetes

Chiedu Eseadi, Osita Victor Ossai, Charity Neejide Onyishi, Leonard Chidi Ilechukwu

### **Abstract**

With the onset of the coronavirus disease 2019 (COVID-19) pandemic, diabetes management has become more challenging than it has ever been. Studies on the management of diabetes during this time are required. Unfortunately, the lack of information about the potential role of religious factors and faith communities in diabetes management during the COVID-19 era prevents us from fully understanding the issue of diabetes management during the COVID-19 pandemic period. People with chronic conditions like diabetes may benefit from some form of religious support from faith communities and their ability to cope could be fostered by some religious factors. It is unclear how religious factors and faith communities contribute to diabetes management. In this article, the authors examine how people with diabetes can be aided in the COVID-19 pandemic period from the perspective of religious factors and faith communities. Based on the studies identified, it appears that religious factors and faith communities plays an important role in managing diabetes among patients during the COVID-19 pandemic.

**Key Words:** COVID-19; Diabetes; Faith communities; Religious factors

Eseadi C, Ossai OV, Onyishi CN, Ilechukwu LC. Assisting individuals with diabetes in the COVID-19 pandemic period: Examining the role of religious factors and faith communities. *World J Clin Cases* 2022; In press

**Core Tip:** Diabetes is a common comorbidity among coronavirus disease 2019 (COVID-19) patients. At this time of COVID-19 pandemic, it is necessary to research the management of diabetes. In this article, the authors examine how people with diabetes can be aided in the COVID-19 pandemic from the perspective of religious factors and faith communities. Religious factors and faith communities play an important role in diabetes management during the COVID-19 pandemic, as suggested by the studies identified.

## INTRODUCTION

The prevalence of diabetes is increasing worldwide as one of the leading causes of morbidity and mortality<sup>[1]</sup>. Diabetes mellitus is a long-term condition in which blood sugar levels are out of balance because of insufficient insulin<sup>[2]</sup>. Diabetics with type 1 diabetes and those with type 2 diabetes (T2D) are the most common, but the condition can appear in many different forms<sup>[3]</sup>. Diabetes type 1 occurs when the immune system attacks insulin-producing B-cells in the pancreas; T2D results from insulin resistance and B-cell failure<sup>[4]</sup>. The worldwide prevalence of diabetes is high, with 9.3% of people having it and 463 million people affected<sup>[2,3]</sup>. According to prevalence data, diabetes and obesity accounted for 43.4 percent of all deaths worldwide in 2012, while human immunodeficiency virus/acquired immunodeficiency syndrome and tuberculosis combined accounted for 33.6 percents<sup>[5,6]</sup>. These long-term complications include obesity, hypertension, vasculopathy, inflammatory and hypercoagulable states, and cardiovascular disease<sup>[4,7]</sup>.

Diabetes mellitus patients in countries hardest hit by the pandemic have been associated with increased morbidity and mortality from coronavirus disease 2019 (COVID-19)<sup>[5,8]</sup>. People with chronic conditions such as high blood pressure, diabetes and heart disease may be at high risk for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections<sup>[5,9]</sup>. Consequently, diabetics have a higher chance of getting COVID-19 and a higher chance of getting sick or dying from it<sup>[10]</sup>. SARS-CoV-2 can affect the pancreas and endocrine pancreas in people with diabetes, making glycemic control more difficult<sup>[11]</sup>. The prevalence of diabetes in COVID-19 patients varies widely,

depending on the local area in which they reside, the age of the population in that area, and the severity of their disease<sup>[5,11]</sup>. The prevalence of diabetes was found to be 10.3% among patients with COVID-19, which is similar to the overall prevalence of diabetes in the general population<sup>[11,12]</sup>. Conversely, patients with diabetes had a much worse condition and a higher death rate associated with COVID-19 infections<sup>[13]</sup>. COVID-19 patients admitted to the intensive care unit had a 22% higher risk of death due to diabetes, according to Yang *et al*<sup>[14]</sup>. A study found that the overall mortality rate is 2.3%. Among diabetics, the mortality rate is 7.3% greater than that of the general population<sup>[15,16]</sup>.

Some consequences of this pandemic include that people with diabetes have a harder time living a normal life in society, are more dependent on medical and nursing care, have fewer opportunities to socialize with friends and family, and have to adjust their lifestyle<sup>[4,17]</sup>. Unlike other diseases that only require medication, diabetes has a number of complex physiological, psychological, and social consequences that make it difficult to manage<sup>[17,18]</sup>. Managing diabetes is made easier by medication and lifestyle changes, such as reducing calorie intake or exercising more often<sup>[5]</sup>. However, psychological and spiritual supports are also crucial to managing diabetes<sup>[19,20]</sup>. The physical, mental, and spiritual effects of diabetes (especially physical and mental discomfort) are many (especially since diabetes can cause amputations)<sup>[17,20]</sup>.

A growing body of research has been conducted to find new ways to help diabetics, particularly for those who suffer from COVID-19-related complications<sup>[2,21]</sup>. Around the world, discussions have taken place regarding the role of religion and spirituality in the care of diabetic patients<sup>[18,22]</sup>. Also, since diabetes is a potentially fatal and long-term condition, patients must take an active role in their own treatment<sup>[23]</sup>. Considering faith communities' management methods, such as prayer and meditation, is highly recommended<sup>[24,25]</sup>. Unfortunately, the lack of information about the potential role of religious factors and faith communities in diabetes management during the COVID-19 era prevents us from fully understanding the issue of diabetes management during the COVID-19 pandemic period. The article adds to the body of knowledge in this field. In

this paper, we examine the role of religious factors and faith communities in assisting diabetics during the COVID-19 era.

### **LITERATURE SEARCH STRATEGY**

For the literature search, the authors utilized a variety of databases and sources including Google Scholar, PubMed MEDLINE, Proquest, Scopus, JSTOR and APA PsycNet to retrieve peer-reviewed journal articles, student dissertations, and books on diabetes management and COVID-19 pandemic. Search terms included COVID-19 and diabetes; COVID-19 and religion; diabetes and religion; and diabetes and faith communities. Qualitative and quantitative papers and materials published in English were searched for, appraised, selected and synthesized by the authors.

### **RESULTS AND DISCUSSION**

#### ***Relationship between diabetes and COVID-19***

COVID-19 and diabetes mellitus are correlated in a bidirectional manner, according to research<sup>[26]</sup>. Diabetes mellitus is a common comorbidity among COVID-19 patients<sup>[27]</sup>. Diabetes exacerbates disease severity and mortality, increasing the probability of infection with SARS-CoV-2<sup>[28]</sup>. COVID-19-associated complications and mortality are more common among people with diabetes mellitus<sup>[29,30]</sup>. Coronaviruses, which are human pathogens, interact with target cells *via* an angiotensin-converting enzyme whose expression may be increased in diabetics' epithelial cells and intestines, kidneys, and blood vessels<sup>[10]</sup>. COVID-19 infection and subsequent development of severe disease have been associated with individuals with T2D<sup>[31,32]</sup>. There is evidence that COVID-19 may increase the risk of hospitalization and mortality in individuals with T2D<sup>[31,33]</sup>. It has been determined that T2D is a sole risk factor for COVID-19 severity<sup>[34]</sup>. A higher incidence of severe COVID-19 infections in diabetes patients is attributed to the deregulated renin-angiotensin-aldosterone system, the deterioration of the inflammatory response, hypercoagulability, and physiological and structural changes that result from elevated blood sugar<sup>[35]</sup>. The impaired glucose control may lead to angiotensin-

converting enzyme-2 glycosylation, which may act as a portal for the transmission of SARS-CoV-2<sup>[36]</sup>. The authors found in another study that uncontrolled diabetes is a significant risk factor for COVID-19 patients, especially when it is associated with substantial blood glucose variability<sup>[15]</sup>. In a study of 52 intensive care patients in China, diabetes was present in 22% of the 32 non-survivors<sup>[37]</sup>. An analysis of COVID-19 using intensive care patients compared with non-intensive care patients found that the incidence of diabetes was twofold higher in intensive care patients<sup>[34]</sup>.

Studies concerning Chinese, Italian, and American patients found that a non-critical form of the infection is present in 3 to 25% of cases<sup>[38,39]</sup>. In a meta-analysis of Chinese studies, the overall prevalence of diabetes was between 8% and 10% among COVID-19 patients<sup>[12]</sup>. Italian researchers have found that COVID-19 is prevalent in 8.9% of hospitalized patients in Europe<sup>[12]</sup>. Conversely, diabetes and its complications increase the risk of contracting a more severe strain of COVID-19 and may result in death<sup>[2,14]</sup>. Diabetes patients have a wide range of risk factors for infection, including hyperglycemia that causes immune dysfunction<sup>[40,41]</sup>.

As a result of severe SARS-CoV-2 infection and its associated inflammation, hyperglycemia can also occur either through a negative indirect effect on insulin target tissues or a direct toxic effect on pancreatic B-cells<sup>[42]</sup>. As a result of hyperglycemia, COVID-19's prognosis can be exacerbated<sup>[43,44]</sup>. In patients with impaired glucose regulation or diabetes mellitus, COVID-19 is frequently associated with glycemic disorders<sup>[45]</sup>. Patients with insulin dependence needing high doses of insulin have been associated with SARS-CoV-2 infection<sup>[45]</sup>. There is a possibility that diabetic patients are more likely to become infected due to a defect in innate immunity affecting phagocytosis, neutrophil chemotaxis, and cell-mediated immunity<sup>[21]</sup>. The development of complications related to diabetes like coagulation dysfunction, inflammatory tissue status, nephropathy, and cardiovascular disease is associated with predisposing factors<sup>[2,21]</sup>. The mortality rate for COVID-19 patients with diabetes was found to be three times higher than that of patients without diabetes according to a large epidemiological study of 72314 COVID-19 patients conducted in China<sup>[43]</sup>.

The mortality rate for COVID-19 is 0.7% to 10.8%<sup>[46,47]</sup>, so the relation between diabetes and COVID-19 may be detrimental. Advanced age populations and patients with comorbidities experience a decline in survival and complications<sup>[48]</sup>. People with chronic diseases, such as type 1 diabetes mellitus, are concerned about this negative trend<sup>[49]</sup>, as metabolic inflammation impairs the immune system, reducing its ability to fight infections. This results in a slowed healing process, resulting in a delayed recovery. According to literature<sup>[50]</sup>, COVID-19 is more likely to cause death among diabetes patients. Diabetes should be studied further as a prognostic risk factor or marker, as most patients with severe and critical COVID-19 infections have multiple comorbidities which have also been linked to an increased risk of COVID-19 infection or death<sup>[11,51]</sup>. The management of patients with diabetes who contract COVID-19 may require modification of the treatment plan to accommodate the possibility of adverse effects<sup>[52]</sup>.

Patients with COVID-19 who suffer from diabetes, which is a chronic condition, must both receive medical and therapeutic care. Religious factors and faith communities must be considered in the development of management strategies. In studies, adherence to religious doctrines in faith communities has been shown to be effective in managing diabetes<sup>[23,53]</sup>. Several religious doctrines and practices have been proven to improve acceptance and self-care behavior in diabetes and other psychologically threatening diseases<sup>[23]</sup>. Religious practices and doctrines in faith communities have assisted married people with T2D in managing their blood sugar levels<sup>[54]</sup>.

### ***Role of religious factors in diabetes management during COVID-19 period***

Research has found that religious practices can be useful in managing diabetes<sup>[55]</sup>. Several religious practices such as praying, meditation, singing, wearing talismans, reading the Koran, reciting Bible verses, or even belonging to a faith-based community can improve the health of persons with chronic diseases and illnesses, according to research<sup>[56]</sup>. Religious practices are fundamental and critical in the diabetes management especially in the COVID-19 period. Individuals' physical and mental health benefit significantly from religious factors such as prayers, meditation, and prayers<sup>[17,25,57]</sup>. Several religious

factors, such as religious practices and religious values, may make an impact on patients with serious health conditions, such as diabetes and complications due to COVID-19<sup>[58,59]</sup>. Religious practices can help with depression, desolation and hopelessness and other psychological challenges associated with diabetes in the pandemic period. Religious practices are the levels of engagement in and compliance to a religion's teachings and organized activities; it involves factors such as religious orientation, commitment, and affiliations<sup>[60]</sup>.

Religious orientation includes beliefs about the existence and nature of God or gods, religious moral prescriptions, and collective and individual mysticism<sup>[60]</sup>. There are two types of religious orientations that people can have: intrinsic and extrinsic orientations<sup>[61]</sup>. Intrinsic religious orientation is a personal, non-instrumental motivation for religion that is characterized by strict adherence to religious doctrine, integration of religion into everyday life, and trying to seek deep significance *via* religious activities orientations<sup>[61]</sup>. Research indicates that people with intrinsic religious orientation experience greater subjective well-being than people who are extrinsically oriented<sup>[62]</sup>.

Religion is a goal or end in and of itself for those with an intrinsic religious orientation, rather than being a means to achieving safety and comfort<sup>[61]</sup>. Despite the fact that an intrinsic religious orientation is associated with feelings of anxiety and distress, it is also associated with feelings of well-being and happiness<sup>[63–66]</sup>. In contrast, extrinsically religious people use religion as a means of connecting with others or expressing sympathy<sup>[61]</sup>. Negative emotions<sup>[67]</sup> such as anxiety, guilt<sup>[68]</sup>, depression<sup>[69]</sup>, and shame<sup>[70]</sup> have been associated with individuals' external religious orientation. Findings point to the importance of religious commitment in an individual's overall well-being<sup>[71,72]</sup>. Religious commitment refers to how involved a person is in their religion<sup>[60]</sup>. An individual's commitment to and application of religious values, beliefs, and practices in their daily lives can be defined as their religious commitment. The interaction between people's religious awareness and participation is termed "religious commitment." It is a way to find out how deeply a person believes in his or her religion.



Individuals who identify themselves as members of one or more religious groups, such as the Methodists, are referred to as members of a "religious affiliation." Religions like Judaism, Islam, and Christianity are practiced by some people. Health-related behaviors and guidelines adhered to by religious adherents are influenced by their affiliations' religious beliefs, practices and doctrines<sup>[73]</sup>. Patients can benefit from religious practices in a variety of ways, including comfort, increased knowledge about their disease<sup>[74-76]</sup>, and increased adherence to treatment, all of which can lead to better self-care and the prevention of chronic conditions<sup>[77,78]</sup>.

Those with chronic health conditions like diabetes mellitus can benefit from religious activities<sup>[79]</sup>, which can help them accept and cope with the reality of living with an incurable disease<sup>[80]</sup>. People often turn to faith communities for meaning, hope, comfort, and inner peace when confronted with stressful and unstable situations, such as a long-term illness like diabetes. The physical and emotional well-being of those who follow a religious path is also considered to be enhanced<sup>[81,82]</sup>. An increasing number of studies<sup>[83,84]</sup> have shown that these three practices can be effective coping mechanisms for both physical and mental health issues, especially in the context of chronic illness<sup>[85]</sup>. This is known as spiritual-religious coping when religious ideas, attitudes, or practices are used to alleviate emotional stress caused by life events beyond one's control<sup>[86]</sup>. Having a purpose gives suffering meaning and makes it easier to bear. Some previous studies<sup>[87,88]</sup> looked at religious activities and T2D patients' management. Health outcomes like diabetes management, coping skills, wellness, emotional stress, health-related quality of life and glycemic control have been linked to these variables<sup>[18,89]</sup>. It has been found that religious practices have a positive impact on the quality of life of people with chronic conditions, as well as on their outlook on life<sup>[90]</sup>. Emotional well-being can be enhanced by a person's religious or spiritual beliefs<sup>[17,91]</sup>. Diabetes management is viewed as a daily battle that can only be fought with God's help; God is frequently invoked for assistance; and a strong belief in God, as well as prayer and meditation, as well as support from faith communities, provided comfort.

Studies have shown that people turn to religious practices and beliefs when they are going through a difficult time or are ill<sup>[92,93]</sup>. By encouraging positive mental treatments, religious practices aid in the management of patients' health<sup>[93]</sup>. Diabetes acceptance and self-care behavior have been improved by religious activity-based support and a holistic approach to coping with diabetes can be achieved by integrating religious coping strategies with other psychosocial support strategies<sup>[92]</sup>. In a group of 51 diabetic patients, researchers in India studied how spirituality and religious activities were used as coping mechanisms<sup>[94]</sup>. It showed that dietary support from spouses is important for both sexes, with women believing religion and spirituality can help them control their blood sugar levels<sup>[94]</sup>. Conversely, Quinn *et al*<sup>[95]</sup> believe that religious beliefs can hinder successful coping, even though religious activities have been shown in several studies to be effective in the management of chronic health conditions. Only a few studies have examined the role of religious practices on diabetic self-management<sup>[22]</sup>, despite evidence that they are linked<sup>[96]</sup>. Table 1 shows some studies related to the role of religious factors in diabetes management. As can be seen from Table 1, there were a number of studies that found that religious factors performed well in the management of diabetes.

#### ***Role of faith communities in the management of diabetes during COVID-19 period***

Faith-based organizations, through adjustment of their doctrinal positions, can encourage people who have chronic health conditions in their organization, to adopt and maintain certain healthy and safe behaviours during pandemic so as to cope with the challenges that it brings<sup>[101]</sup>. Churches, synagogues, mosques, assembly halls, and other places of worship are examples of faith-based institutions. They can take the form of congregations, regional networks, or stand-alone organizations. Faith communities can make a significant contribution to the lives of those who belong to them<sup>[102]</sup>. The shared trust in information offered by faith-based groups has the potential to be quite effective. Faith and spirituality play a crucial impact in people's conceptions of health, disease, and healing, according to healthcare professionals<sup>[20]</sup>. Faith-based groups can help members

learn about diabetes, promote healthy surroundings, and participate in diabetes prevention and control activities.

Recent study has highlighted the critical importance of religious faith communities in promoting members' health and well-being<sup>[103]</sup>, since they can significantly determine health promotion behaviors and the conception of health education and promotion<sup>[87]</sup>. The religious leaders of faith communities encourage their congregations to adopt healthy habits and take care of their health through advice and guidance, by focusing on health as a whole and-by integrating health and wellbeing<sup>[87,104]</sup>. Research by Newlin *et al*<sup>[59]</sup> discovered that faith communities can be a tremendous source of support for diabetic patients, especially when it comes to glycemic management. According to Darvyri *et al*<sup>[57]</sup>, patients type 2 diabetes mellitus who have an extensive and dynamic faith in God are more likely to be well-managed. Similarly, the Jafari *et al*<sup>[90]</sup> found that inner serenity and vigor protect diabetics from unpleasant emotions, resulting in improved management and glucose control. When additional religious disciplines were investigated, it was discovered that participating in religious activities in faith groups reduced stress levels<sup>[105]</sup>, which influenced glycemic control directly<sup>[105]</sup>. The complications of diabetes may lead to amputation of the patients' body parts, this makes patients physically and mentally disabled<sup>[54]</sup>. It predisposes them to severe stress, depression and they explore different ways to cope and adapt to life<sup>[106]</sup>. Koenig *et al*<sup>[106]</sup> believes that religious teachings among the community members creates a positive attitude towards the world and makes the patients to surmount the challenges associated with such chronic diseases. This increases their ability to tolerate and accept the fact that some medical conditions cannot be changed. Table 2 summarizes some of the studies related to the role of faith communities in the management of diabetes. According to Table 2, faith communities contribute significantly to the management of diabetes through programmes within religious groups.

#### ***Implications and suggestions for further studies***

People with chronic illnesses can cope better when religious factors and faith communities are present as they can provide them with hope, confidence, and support<sup>[53,111]</sup>. Religious factors and faith communities can promote a positive outlook on diabetes complications<sup>[112]</sup>. Often, patients and physicians turn to prayer and faith-based approaches to alleviate chronic illness (as is common with diabetes) when conventional medicine fails to provide relief<sup>[44,113]</sup>. This study has provided insight into how religious factors and faith communities can be beneficial to people with diabetes. It is recommended that further study be conducted into the positive influences of religious factors and faith communities on diabetes management. There may be a need for further research in order to develop and validate an effective faith-based and spiritual intervention model that is applicable to a wide range of religious groups. It is imperative that researchers employ a faith-based paradigm in order to expand diabetes management access across religious denominations and communities. Diabetic patients have religious beliefs, which are crucial to reducing the level of stress and emotional distress related to diabetes treatment in the COVID-19 era. It is important to examine the relationship between religious variables and health-related issues in order to understand the impact of religious factors and faith communities in diabetes management<sup>[57]</sup>. We need more research to understand how beliefs, religious considerations, and faith-based therapies interact with diabetes management. Since religious factors such as prayer, meditation, and scripture reading are linked to diabetes management, and the present study only analyzed existing studies regardless of flaws in methodology, correlational studies are recommended to investigate the impact of religious beliefs and doctrinal teachings on diabetes management. Studies need to be conducted to determine a more dynamic and pragmatic approach to diabetes care, by utilizing experimental methodologies. It is hoped that this will help identify what religious elements contribute to better diabetes management in faith communities. Diabetes management can be highly optimized by synergizing the beneficial effects of religious factors and the supports of faith communities during an epidemic like the COVID-19. There is a need for further studies to also examine these issues through systematic review approach in order to provide

more insights on how religious factors and faith communities impact the extent to which diabetic patients manage their condition during a pandemic.

If clinicians hope to achieve effective outcomes in the management of diabetes, they must consider factors such as patients' comorbidities, gender, age, and educational level that may affect perceptions of diabetes management on the part of patients and their relatives. As reported by Ciarambino *et al*<sup>[114]</sup> in a retrospective study, there were differences between male and female patients with hypertension and diabetes who contracted SARS-CoV-2. There was a longer hospital stay, an increased number of admissions to the intensive care unit, and an increased death rate for male patients compared to female patients, according to their findings. In a prospective observational study of 148 family members of 151 patients with suspected COVID-19 cases, Ciarambino *et al*<sup>[115]</sup> found that older women and low educational levels influence perceived satisfaction with COVID-19 management. Their research indicates that age, gender, and education level matter in the satisfaction of family members of patients with suspected COVID-19 cases. On the other hand, it has been found in another study that men and younger COVID-19 patients felt more apprehensive of probable clinical errors, but that the level of satisfaction with the care they received improved with their educational level as well<sup>[116]</sup>. Research also indicates that the immune response to COVID-19 differs with gender and age; testosterone, for example, decreases the vaccination response and delays the cytokine response in a male individual<sup>[117]</sup>. Also, evidence indicates that the immune system's function declines with age, especially in female older patients<sup>[117]</sup>. Therefore, in order to properly assist diabetic patient with COVID-19 cases, it is necessary to take into account the gender and the age of the patient.

## **CONCLUSION**

**1** One of the most serious threats to global health in human history is the COVID-19 pandemic. While adapting to this new normal, it is imperative that individuals remain aware of the ways in which certain behaviors may increase their risk of infection or exacerbate COVID-19 issues. Chronic disease patients, such as those with diabetes, were

severely affected by this epidemic. The identification of appropriate treatment and coping options is crucial, particularly for <sup>1</sup> individuals suffering from chronic conditions such as diabetes. Infections with COVID-19 may impair the efficacy of diabetic medications, thus putting diabetics at risk. In this study, the researchers examined the role of religious factors and faith communities in the management of diabetic conditions. The literature suggests that religious factors and faith communities play a crucial role in managing diabetes.

## ORIGINALITY REPORT

# 3%

SIMILARITY INDEX

## PRIMARY SOURCES

1	<a href="https://new.espn.com">new.espn.com</a> Internet	56 words — 1%
2	<a href="https://www.medicalnewstoday.com">www.medicalnewstoday.com</a> Internet	16 words — < 1%
3	Stefan R Bornstein, Francesco Rubino, Kamlesh Khunti, Geltrude Mingrone et al. "Practical recommendations for the management of diabetes in patients with COVID-19", The Lancet Diabetes & Endocrinology, 2020 Crossref	14 words — < 1%
4	<a href="https://scroll.in">scroll.in</a> Internet	14 words — < 1%
5	<a href="https://pubmed.ncbi.nlm.nih.gov">pubmed.ncbi.nlm.nih.gov</a> Internet	11 words — < 1%
6	<a href="https://ses.library.usyd.edu.au">ses.library.usyd.edu.au</a> Internet	10 words — < 1%
7	<a href="https://www.science.gov">www.science.gov</a> Internet	10 words — < 1%

EXCLUDE QUOTES ON

EXCLUDE BIBLIOGRAPHY ON

EXCLUDE SOURCES

EXCLUDE MATCHES

< 10 WORDS

< 10 WORDS

