

Health Issues of Nigerian Muslim Pilgrims in The Immediate Post Covid-19 Era Hajj Year 2022 in the Kingdom of Saudi Arabia

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ABSTRACT

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Introduction

Hajj and Umrah are the main pilgrimages recommended in the Islamic faith to be performed at least once in a lifetime by those who have the wherewithal. It is one of the largest mass gatherings worldwide.¹ Muslims all over the world (over 180 countries) visit the Great Holy Mosque in the city of Mecca to perform the prescribed religious rites of the main pilgrimage (Hajj) which spans the second week of the twelfth month (Zul-hijja) of the Islamic lunar Calendar. The lesser/minor pilgrimage (Umrah) can be performed at any time of the year. Most hujajs (pilgrims) from outside Saudi Arabia perform Umrah and Hajj in a single journey (tamatu). Some faithfuls also perform the lesser pilgrimage (Umra

in the last ten days of the month of Ramadan (9th month of the Islamic lunar calendar) due to the additional merits and blessings of this last third of the fasting month and additional opportunity of performing other meritorious and rewarding acts of worship such as i'tikaf (seclusion) in the Great Holy Mosque.

Ziyarahs (visitations) are also made to sacred mosques such as the mosque of the noble prophet Mohammad PBUH (peace and blessings of Allah be Upon him) in the city of Medina, Quba Mosque (the first mosque built in Medina), Baqeeah graveyard of the martyrs of the battle of Uhud as recommended in the scriptures of hadeeth. Masjid Qiblatayn (the mosque with two prayer directions), the seven mosques (sab'a masaajid), Ajwa date farm plantation of the noble prophet PBUH, and other notable places of interest in Islamic history in the city of Medina which are not necessarily recommended are also visited despite the non-attachment of any spiritual benefits. Due to COVID-19 pandemic, only 1000 Saudi-based citizens and residents (as opposed to the usual 2.5 million international pilgrims)² within the age ranges of 20-50 years were allowed to perform the 2020 hajj to enable appropriate crowd control and physical distancing which was considered as one of the key ways of preventing the scourge of the pandemic.³ In the year 2021, fewer than 60,000 citizens and residents of Saudi Arabia were allowed to perform the hajj for the same reason. Post-COVID-19 era refers to the period after the relaxation of the lockdown imposed on the people, businesses, and other activities by the government as a temporary measure for curtailing the then scourge of the COVID-19 pandemic.⁴ It relaxation was a gradual process worldwide in all sectors as well as for hajj and other mass gatherings. The two-meter physical distancing initially proposed was noted to be infeasible in most countries that are already densely populated.^{3,5} The same gradual easing of the strict



measures apply to hajj as seen from the initial reduction in the number of annual pilgrims to 1000 then the gradual increase in subsequent years. The hajj hiatus was opened to foreigners in the year 2022, with a restriction of the number of pilgrims to less than one million. 85% of the one million hajj quota was allotted to international pilgrims, with Indonesia (100,051), Pakistan (81,132), India (79,237), and Bangladesh (57,585) while 43,008 hajj pilgrims quota (fifth worldwide, highest slot in Africa) was allotted to Nigeria as opposed to over 90,000 slots allotted in 2019 pilgrimage year.⁶ The same was done for other countries with significantly high Muslim and pilgrim populations like Indonesia, Pakistan, India, Bangladesh, Malaysia, and Gulf Cooperation Council (GCC) countries, all got less than 50% of the slots allotted in the preceding international hajj year 2019.⁶ Several other measures needed to be modified, altered, or improved upon, apart from the reduction of the pilgrims' population. All these were put in place to avert the worsening of the health crises that may ensue from the mass gathering. Regarding Nigeria, other low and middle-income countries (LAMICs) as well as high income countries, pilgrims have so many prevailing health issues even in the pre-COVID-19 era. Most common health issues include increased risk of stampedes and injuries, fire outbreak, disease transmission, worsening of non-communicable diseases, complications of exposure to unaccustomed climate such as heat stroke, sunburns, harmattan, dehydration, psychological illness, health hazards from food and environmental hygiene. Challenges of crowd management, safety, security, and emergency preparedness are also posed. Provisions need to be made for these health factors and it will involve non-health specialists including venue engineers, event planners, security personnel etcetera to enable the successful performance of hajj rites as well as ensure optimal health of every member of the global community within and beyond the geographical area of the pilgrimage rites. Health infrastructure and service delivery still need to be maintained or improved upon after completion of hajj rites and remain in the cyclical path till the onset of the next hajj season which is usually about 11 days less than the same date of the preceding year in the Gregorian calendar. Non-Muslim imperial European powers were actively involved in hajj management before the emergence of the Saudi petrodollar and modern hajj management which is now being done entirely by

the Muslims. Saudi Arabia's safety, security, environmental and health policies have evolved after several decades of conducting hajj rites for the Muslim populace as a useful mode of risk management and international collaboration.² This write-up is based on relevant published works of literature, inferences derived by authors based on their participation in pre-hajj medical screening at Sarkin Maska Shehu Hospital (SMASH) Funtua, Katsina State, and what was experienced by some of the authors as Nigerian pilgrims in the 2022 hajj and other previous hajj rites.

General Health Screening

Screening for non-communicable diseases such as hypertension, diabetes, obesity, hyperlipidaemia, bronchial asthma, neoplasm, osteoarthritis, mental health, neurological as well as other systemic illnesses must be done through detailed but focused history taking, purposeful methodical physical examinations, and relevant cost-effective simple laboratory investigations. Pilgrims should be encouraged to disclose their health status by revealing any chronic medical or surgical conditions they had in the past or which they are currently on treatment for. This will enable appropriate health education and care for the respective pilgrims. Long-term medications are usually required for most chronic illnesses, such pilgrims should be advised to visit their specialist at least a month before departure date, to allow ample time for pre-travel medical fitness evaluation, medication review, and refill stock of medications that can last up to two months. Copies of appropriate prescription forms should be available and presented when necessary to avert altercation with drug law enforcement agencies during departure as well as at the entry port. Screening is done for most emerging and re-emerging contagious diseases such as monkeypox, Ebola virus disease, Lassa fever etcetera during the pre-Hajj medical evaluation of intending pilgrims. Screening for tuberculosis is also done to identify those who may require diagnostic testing and to commence treatment for infected pilgrims who may otherwise transmit the disease to others. For the year 2022 Hajj, evidence of COVID-19 testing was mandatory as well as other age and situation-appropriate routine laboratory investigations. In fact, the National Medical Team (NMT) of the National Hajj Commission, Nigeria (NAHCON)



reported three confirmed cases of COVID-19 among Nigerian pilgrims in that the year which were all isolated and treated by Saudi authorities.⁷

Nail clipping and hair shaving are parts of the pilgrimage rites that can expose pilgrims to blood-borne infections (BBI) such as hepatitis B, hepatitis C, HIV, and syphilis, hence the need to screen pilgrims for these contagious diseases. Pilgrims are therefore enjoined not to share razors, scissors, shaving sticks, clippers, and other sharp objects. Unlicensed /roadside barbers should not be patronized. HIV infected pilgrims should take along their recent prescriptions and stock of highly active antiretroviral therapy (HAART). A comparative study of Kano State (Nigerian) Hajj Pilgrims and non-pilgrims revealed that treatment adherence is worse in pilgrims. This was attributed to the possibility of the belief in supernatural healing during the spiritual journey and tasks, stigma, disinclination, inability to cross the airport with the medication, forgetfulness and exhaustion of stock.⁸

Immunization

Evidence of vaccination against internationally notifiable diseases must be presented with appropriate timing. This is mandatory for the COVID-19 vaccine which includes complete doses plus a booster dose of any of the vaccines approved by the World Health Organisation (WHO). Quadrivalent (ACYW135) vaccine against cerebrospinal meningitis (CSM) is also mandatory for all pilgrims from all countries of the world. Pilgrims from Nigeria and other countries endemic or at risk of some ailments like yellow fever and poliomyelitis must also present valid evidence of vaccination against such diseases.⁹ Influenza vaccine is recommended for people of extreme ages and those with chronic illnesses such as HIV/AIDS, asthma, Chronic Obstructive Pulmonary Diseases (COPD), heart diseases, internal pilgrims, and health workers.⁹

A 500mg single dose of ciprofloxacin tablet is given as chemoprophylaxis to all pilgrims from Nigeria and other countries in the meningitis belt of Africa at their port of entry (usually Jeddah airport) to lower their rate of carriage.⁹

Communicable (Infectious) Diseases

Infections (especially respiratory tract infections) are the leading cause of morbidity^{10,11} and account for over 50% of all symptoms recorded during hajj. Increased density of contacts in mass gatherings can cause up to 78-fold¹² increase in rates of disease

transmission as pilgrims come from places with varying health systems and they have different susceptibility and immunity to pathogens. The Kingdom of Saudi Arabia (KSA) specified some standard health requirements that must be met by pilgrims and ascertained by the home /native country health system before certifying the person as fit to partake in the hajj pilgrimage.⁹ This will ensure the optimal health of other pilgrims from other parts of the globe, the native Saudi population as well as mitigate the risks of spreading the ailments by pilgrims upon returning to their home countries.

The malaria parasite is harboured by a significant number of pilgrims from Nigeria and other endemic countries, KSA is currently at the pre-elimination phase of malaria. The risk of transmission among pilgrims is very low due to an efficient vector control system and regional collaboration.^{13,14}

Several other disease preventing efforts of KSA includes the provision of free face masks and sanitizers for pilgrims in the precincts of the holy mosques, continuous scrubbing and disinfection of floor, rails, and various surfaces, in addition to continuous waste disposal, and safe water supply.

Respiratory System

A 2007 study of morbidity data among French pilgrims in the city of Marseille showed that symptoms of respiratory illness is the leading (51%) cause of hospital presentation.¹⁵ This is similar to the report by the Medical Director of the National Hajj Commission of Nigeria (NAHCON), respiratory tract infections is the leading cause of morbidity among Nigeria pilgrims in the hajj year 2022.⁷

Middle east respiratory syndrome (MERS, camel flu) is a viral respiratory illness caused by middle east respiratory syndrome coronavirus (MERS-CoV) that was first identified a decade ago (2012) in KSA.¹³ Animal-to-human (zoonotic) transmission of MERS-CoV is established, and the causative virus has been isolated, identified, and linked to human infection in dromedary camel, common livestock, whose milk and meat are parts of delicacies in Arab communities. Human-to-human transmission is commoner in healthcare settings and among close contacts. Infection may be asymptomatic or present with fever, cough, dyspnea, or gastrointestinal symptoms like diarrhea.¹⁶ Camel meat and milk are nutritious animal products that are safe for consumption after proper cooking and pasteurization.¹⁶ The sacrifice of a quadruped is part of hajj rites, especially for most Nigerian pilgrims

who will be separating their hajj and umrah in a single journey (tamatu'). Most pilgrims however will not go to the abattoir/slaughter slabs on their own. They will rather contract this activity to recognised agencies including Jaiz and Al-Rajhi Bank (which are foremost Islamic Banks in Nigeria and Saudi Arabia respectively) that are licensed for the collection, processing, and distribution of meat to the needy. Few pilgrims get the animals and arrange with some residents to slaughter and process the meat with the hope of reducing cost and getting a part of the animal for their consumption as encouraged in the Islamic doctrine.

Individuals diagnosed with tuberculosis during the pre-hajj medical examinations should be advised to postpone their Hajj till subsequent years when they are expected to have completed their treatments. Those who have completed the first two months (intensive phase) of the directly observed therapy short-course (DOTS), with a negative sputum test (which excludes the possibility of infection transmissibility), are symptoms free and treatment adherent may be certified fit to partake in hajj by the medical authorities if established that they are not carrying a drug-resistant strains of the mycobacteria. Preventive hygiene of face mask use, cough etiquette, physical distancing, contact avoidance, and hand hygiene must be taught by the national medical team as part of pre-hajj medical advice/health education sessions.

Closing gaps in the rows of worshippers is highly recommended during Islamic prayer sessions (solat). Worshippers are supposed to line up toe-to-toe and shoulder-to-shoulder during solat. Some worshippers are noted to be abiding less by this recommendation, due to the observance of physical distancing as a preventive measure against COVID-19 and other contagious illnesses. The two-meter distancing earlier proposed has been realized to be infeasible for physical distancing in congested settings,^{3,5} rather more emphasis needs to be laid upon face mask use, hand hygiene, and cough/sneezing/ yawning etiquette.

Individuals with pre-existing illnesses of the respiratory system like bronchial asthma and chronic obstructive airway diseases (COPD) should take necessary precautions to avert symptom recurrence. Stress from intense activities, respiratory infection, cold air from air conditioners can lead to symptoms exacerbation.^{17,18} Air-conditioners are not available for domestic use in most Nigerian homes as it is not

affordable to purchase and maintain by average Nigerian families. However, the affluent Saudi community employs the use of air-conditioners in hotel rooms and Masjids. Cold air in winter/harmattan season is known to be associated with airway hyper-responsiveness, air pollution, bio-contaminants proliferation, and other negative effects, especially on the lungs. Cold water/beverages consumptions can also be irritating to upper airway in some individuals. There is risk of exacerbation of asthma and COPD when the air temperature drops too quickly by 2 to 5 degrees Celsius without gradual adaptation in individuals that are not accustomed to such.¹⁸

Inhalers and other necessary medications should be carried along with their recent prescriptions during the journey to enable early intervention during symptom exacerbation before hospital presentation. Lukewarm water or warm beverages are preferred to cold water as a thirst quencher in people at risk of airway disease.¹⁹

Cardiometabolic system

Evaluation of cardiovascular risk factors is essential component of pre-hajj medical screening. People with a history of stroke, systemic hypertension, diabetes mellitus, and hyperlipidaemia are placed on appropriate treatment and given health education to keep their illness in a stable and controlled state. The incidence of cerebrovascular accidents has been reported to be lower in Iranian pilgrims during hajj compared to the natives in home country. This was attributed to the proper screening for cardiovascular risk factors and intervention efforts that mitigate illness progression and complications.²⁰

Authorities of the KSA Ministry of Health (MOH) should be commended for placing Automatic External Defibrillators (AED) at strategic places in the premises of the sacred mosques for use in resuscitation during emergencies like cardiac arrest. The security personnel in the premises of the Grand Holy Mosque (as well as other mosques) should be trained on the basic life support skills and the use of AED in such emergencies before the arrival of an ambulance for conveyance to the hospital.

As part of hajj preparations, intending pilgrims should engage in regular exercise²¹ to enable them to be fit to perform the rigorous and physically demanding tasks of hajj without getting exhausted easily.

Junk food is considered as high in fat, salt and sugar (HFSS)²² with little dietary fiber, protein, vitamins,



minerals, or other important nutrients. They are considered unhealthy for people with cardiovascular risk factors such as hypertension, diabetes, hyperlipidaemia, and obese individuals. These HFSS foods are usually distributed as free packaged meals for pilgrims by some Saudi Philanthropic agencies. Pilgrims from Nigeria and other LAMICs benefit from these meal packs to supplement their dietary needs without any regard or consideration for the effect on their cardiovascular health. Pilgrims with cardiovascular risk factors should be educated to avoid getting these meals but can get the fresh fruit and vegetable packs that are also distributed by the philanthropists for their nutritional supplementation.

Pilgrims need to take into cognizance the necessary dietary modifications occasioned by their health. Hypertensive individuals are to abide by the necessary salt restriction in their diet, refined sugars should be avoided by diabetic individuals as much as possible. Catering institutions that got contracts for mass meal supply to pilgrims should be notified and instructed by the company for the Mutawwifs of Non-Arab African countries (MU'ASSASA) of the need to prepare special dietary needs/dishes for these categories of people.

Gastro-intestinal System

Despite the heavy congestion, infectious diseases of the gastrointestinal system are less common among hajj pilgrims.¹⁵ Diarrheal disease mean prevalence of 2% was recorded in a multinational study of pilgrims (from 26 countries) in 2013, with the highest prevalence of 23% among French pilgrims.²³ The cholera outbreak in Hajj which used to be a frequent occurrence seems to have ceased.² This may be due to remarkable improvement in food, water, and general hygiene in religious sites and the adoption of food and water hygiene principles by the pilgrims as made available by Saudi authorities.²⁴ Pilgrims should avoid unnecessary/ prolonged storage of cooked food, ensure proper washing of fruits and vegetables before consumption. Roadside food vendors are sometimes patronized by Nigerian pilgrims who crave African/Nigerian dishes. Such pilgrims need to be informed of the availability of licensed hygienic African food outlets in the city of Mecca and Medina at a reasonable cost.

Peptic ulcer disease (PUD) is reported as one of the commonest illnesses among Nigerian pilgrims.⁷ Eating habits may be a focus of concern here as some food items may precipitate symptoms recurrence

(e.g. caffeinated beverages) and should be taken with caution. The stress of the journey may also induce or precipitate PUD in the predisposed.

Zamzam is a readily available water source in the precinct of the Holy Mosque, prescribed in the religion to be consumed immediately after completion of sa'ay. It is also used for nutritional and medicinal value based on prophetic recommendations for quenching thirst, hunger and as a healing for several ailments. Modern plumbing and the hydrological system have made the claims of possible contamination or pollution of Holy Zamzam water from Hagar's well a thing of the past (2). A recent subject of controversy is the claim of unsafe high concentrations of arsenic and nitrates in Zamzam water. The possible carcinogenicity of arsenic as a heavy metal calls for caution as raised by British Broadcasting Corporation (BBC) in hot health and sociopolitical debate in May 2011.²⁵

Arsenic is a heavy metal, though beneficial to a large extent it has also been described to be carcinogenic.²⁶ Organ toxicity (e.g. nephrotoxicity, hepatotoxicity) which are a typical occurrence in acute and chronic heavy metal poisoning like lead, and mercury was not demonstrated during five-week comparative study on experimental animals that were fed with Zamzam water.²⁷ Arsenic has also been used in some cancer chemotherapy, as it is not unusual for a chemotherapeutic agent to be found to be carcinogenic as well.²⁸ Such paradoxical and bidirectional effects have been described in several classes of drugs.²⁹ A study of 30 samples of Zamzam water obtained from the precincts of the Holy Mosque in Makkah as well as from pilgrims from several countries were analysed for different micronutrients, minerals, heavy metals, and other constituents. There was no significant difference between the constituents of all the samples even after storage for two years. The concentration of Arsenic and Lithium were demonstrably higher than WHO allowable limits in all the samples. The higher lithium concentration may be beneficial for mood stabilization and suicide prevention.³⁰ A possible rejoinder for higher concentration of arsenic and the scriptural recommendation of healing properties of Zamzam water is the demonstration of the presence of antioxidant minerals like selenium, magnesium, manganese, and strontium concentrations of which probably counteract the oxidative effect of high arsenic concentration.³¹

Ingestion of Zamzam water for the few days or weeks of the annual Hajj and Umrah pilgrimage by pilgrims is unlikely to precipitate carcinogenesis or organ toxicity as demonstrated in experimental animals (27). Consistent use is probably more for the Meccan dwellers who are more likely to make use of the water on several occasions due to proximity, availability, and the belief in its healing properties. Retrospective epidemiological data may need to be garnered to know if any form of cancer (or other features of heavy metal poisoning) is more prevalent in Meccans than dwellers who drink Zamzam water.

Central Nervous System

The meningitis outbreak of the 2000-2001 led to the revolutionary mandatory vaccination with the quadrivalent meningococcal vaccine against serotypes A, C, W, and Y.¹² *Neisseria meningitidis* infection of the central nervous system can be deadly and may cause long-lasting debilitating complications.

Incidence of cerebrovascular accidents was found to be about 8.9/per 100,000 pilgrims during the 2015 hajj, with peak occurrence on the day of Eid-ul-Adha and an 11.6% case fatality rate.³² Azarpazhooh *et al.* estimated the adjusted incidence of first-ever stroke (FES) amidst Iranian pilgrims and compared it with the non-pilgrim Iranian population in Mashhad city of Iran. The incidence of FES was generally lower than that of the non-pilgrim populations.²⁰ Hypertension, diabetes mellitus, hyperlipidaemia, and other risk factors for CVA should be assessed and controlled before allowing pilgrims to proceed on hajj. Epilepsy is a common neurological illness, pilgrims are better stabilized on antiepileptic drugs (AEDs) before being certified fit to proceed with Hajj by the medical team.³³

The prevalence of mental illnesses among Hajj pilgrims ranges between less than 1% and 7.2%.^{34,35} Patients with major mental illnesses (like Schizophrenia and related disorders, bipolar, depressive, and anxiety disorders) should be encouraged to disclose their illnesses to the medical team who should advise or refer such pilgrims to a psychiatrist for assessment of their fitness to proceed on Hajj. An illness remission state must be attained before proceeding on hajj. The stock of medication and prescription notes should be carried along as done for other chronic ailments during the hajj journey for ease of refill and sustaining the maintenance dose to avert recurrence. It is not uncommon for mental illness to recur due to the

strenuous nature of hajj rites. Early warning signs and relapse signature characteristics of the illness should be identified and the patient educated on the need for early presentation and early intervention to avert full relapse.

Hajj season is an opportunity for people who abuse psychoactive substances to abstain from their addictive behaviour as much of their time and attention should be dedicated to worship and not recreational drug use/activities. Consumption of alcoholic beverages is a punishable offense in Islam, the same applies to buying, selling or using it in the Kingdom of Saudi Arabia as well as most other Islamic countries of the world. Smoking is prohibited in most holy sites to avert the exposure of other pilgrims to passive smoking and prevent fire accidents in congested settings/mass gatherings. Most other psychoactive substances are considered khamr (intoxicants) whose consumptions are also sinful in Islam and should be avoided to enable the attainment of the desired spiritual benefit of the hajj. There are anecdotal reports that consumption of Zamzam water reduces addictive behaviour possibly because of its sub-therapeutic lithium content.³⁶ Lithium concentration of Zamzam water may be of therapeutic value in people with suicidality, mood, other behavioural disorders, and lead neurotoxicity.³⁷

Some intending pilgrims could not perform the 2022 Hajj due to the stringent measures dictated by the COVID19 pandemic, and the limited period given to prepare for the operation by the Hajj Ministry of Saudi Arabia, which made NAHCON title it as an "emergency hajj."⁷ Such people were emotionally distraught as that translated to missing the hajj chance for three consecutive years. NAHCON put measures in place that ensured such individuals were given topmost consideration during the 2023 hajj year.

Musculoskeletal System

Prevalence of musculoskeletal pain was reported to be as high as 80.46% among pilgrims of different nationalities who were interviewed at various sites of hajj rites.³⁸ The painful conditions (especially lower limb pain) are more prevalent in females, older age groups, and the obese.³⁸ Disorders of the musculoskeletal system are next to respiratory tract infection in order of hospital presentation amongst Nigerian pilgrims,⁷ same was reported in a study of Pakistani pilgrims presenting in Pakistani Hajj Medical Mission` Hospital and Dispensary in



Mecca.³⁴ This is due to the need to walk in performing most tasks by pilgrims. Some pilgrims also miss their ways and end up walking long distances in search of their destinations. The language barrier also makes it difficult for most pilgrims to get appropriate guidance from Saudi security personnel. Making use of a wrist straps which can be read by the Saudi personnel, and the use of maps (including google maps) can ameliorate this. Pilgrims should also try to make use of the free transport systems (e.g. train services) provided by Saudi authorities.

Footwear should not be tight fitting (note that shoes and socks are not allowed for men). It is advisable to use old footwear than new ones to avoid sores and blisters during rigorous tasks like tawaf and sa'ay. Voluntary health workers (VHW e.g. Red Crescent Society of Saudi Arabia) are readily available and accessible on most walkways to the sites of performance of rigorous rites to assist people that have muscle cramps, osteoarthritis, sprains etcetera. People with disabling illnesses and the aged should be informed about the permissibility of delegating a healthier younger person to perform the Hajj on their behalf. This will reduce the burden of illness, cost, and associated discomfort. Stampedes, accidents, injuries, and exhaustion are a common occurrence during the hajj.³⁹ This can be minimized by following Islamic guidelines on performance of rites, adoptions of permissible options, devices, and technologies.

Most activities can be done at convenient periods of different parts of the day. Pilgrims can be grouped into batches of genders, regions, or nationalities in performing tasks like the stoning of Satan effigy to avert congestion, falls, and stampede that may occur during the task.

People with physical disabilities are permitted to do the stoning at an earlier part of the day or delegate a healthy person to perform it on their behalf while able-bodied pilgrims are encouraged to do their stoning by mid-day.

The use of wheelchairs, electronic carts etcetera is permissible for the disabled. These are available for rent, even though it may not be affordable to some Nigerian pilgrims.

Adoption of apps and online portals (like tawakalna, absher, eatmarna, maqam, etc all available for free download on Play Store) enable pilgrims to book an appointment for timing specific period for one to do task like visitation of Holy Rawdah; the sacred place between the mimbar (pulpit) and the house of the

noble prophet PBUH. This has been tried as part of technological approaches for easing hajj tasks. Some recognized limitations therein include non-compatibility of some devices with the apps, the requirement of valid and specific types of credit cards, affordability, and availability of internet access.

Genitourinary system

Islam encourages accompaniment by one's legally married spouse(s) in the hajj ritual, sexual cohabitation is however a forbidden act during Hajj and can nullify the validity of Hajj. Separate accommodation facilities are provided for each gender during hajj. Pregnancy is not a contraindication for pilgrimage. The pregnancy test is part of a routine tests conducted for women during pre-hajj medical screening. Pregnant women are encouraged not to perform Hajj to avert possible complications that may arise due to the strenuous nature of the rites. At least, a case of miscarriage was reported among Nigerian pilgrims in the Hajj year 2022,⁴⁰ despite the inclusion of pregnancy tests and ultrasound scanning as parts of pre-hajj medical screening. There are possibilities that such women got impregnated after the conduct of the pregnancy test, or the pregnancy was missed. It may therefore be recommended that, married female pilgrims practice sexual abstinence or be on contraceptives after the conduct of medical screening, if there are no other gynaecological reasons against such.

Menstruating women have some limitations in performing most of their worship generally in *Islam* as seen in solat (prayer) and sawm (fasting). However, most of the Hajj and Umra activities are not limited by menstruation except Tawafs which is one of the obligatory aspects of the pilgrimage rites. It is however allowed for women to defer the period of performance of compulsory Tawafs (tawaful ifada) till the cessation of menstruation, while other forms of the (voluntary) tawaf (eg Tawaful wada: farewell tawaf) may be left undone. It is also allowed for a woman to take medications (eg norethisterone, combined oral contraceptive pills) that can suppress/ postpone her menstruation cycle during the Hajj period till a later time to enable prompt/timely performance of these rites. This should be done after discussing such with her gynaecologist to avert the possibility of any adverse effect that may arise upon the use of such medication.⁴¹

To avert dehydration from extremely hot arid weather, pilgrims are advised on the need for frequent drinking of water. Bottled Zamzam and non-Zamzam water are readily available, and freely distributed in the city of Mecca and the precinct of the Holy Mosques. Dysuria may be a feature of urine hyper-concentration in an individual that is not taking enough water. Heat stroke characterized by a sudden loss of consciousness can result from excessive heat. Pilgrims are therefore advised to make use of an umbrella to avert heat from intense sunshine.

Limitations

More qualitative and quantitative research are needed on the health issues of Nigerian pilgrims to enable the designation of appropriate preventive and interventional strategies. Studies that span over longer duration of time and which will of course require more resources are also desirable.

Conclusion and Recommendation

A holistic approach to healthcare is applicable in mass gatherings like hajj as it is for other aspects of the health sector. The tremendous and continuous developmental efforts by the Ministry of Hajj and Umrah and the Ministry of Health of the KSA is commendable. Continuous improvement in services, technological innovations, adaptations, collaborations, and training avenues like the Hajj University concept in KSA, Hajj Institute of Nigeria, (HIN), should not cease.

Health education of pilgrims during pre-hajj seminars and workshops need to be given priority among Nigerians and other LAMICs. Pilgrims should be encouraged to disclose their health status and assured that this may not necessarily prevent them from performing hajj but may serve to improve their health during hajj. Warm water/ beverages should be made available the same way as cold water is made to be readily available as a thirst quencher, prophylactic and therapeutic modality for people who are prone to respiratory illnesses.

Pilgrims should be advised (if not mandated) to undergo post-hajj health screening. Similar importance given to pre-hajj screening should be accorded to post-hajj screening to mitigate the risk of disease transmission in the native countries of all pilgrims.

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