ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

AWARENESS AND PRACTICE OF PRE-TRAVEL HEALTH CONSULTATION AND VACCINATION AMONG INTERNATIONAL TRAVELERS DEPARTING FROM ADDIS ABABA BOLE INTERNATIONAL AIRPORT

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LIST OF ACRONYMS

AFRO	African Regional Office
AMRO	American Regional Office
AOR	Adjusted Odds Ratio
CDC	Centres for Disease Control and Prevention
C.I	Confidence Interval
COR	Crude Odds Ratio
DAC	Development Assistance Committee
DPT	Diphtheria, Pertussis, Tetanus
EFMHACA	Ethiopian Food, Medicine and Health Care Administration and Control Authority
EMRO	Eastern Mediterranean Regional Office
EURO	European Regional Office
IHR	International Health Regulations
IQR	Interquartile range
MMR	Measles, Mumps and Rubella
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OR	Odds Ratio
PAMAPS	Postgraduate Academic Mobility for African Physician-Scientists
PhD	Doctor of Philosophy
SEARO	South East Asia Regional Office
SPSS	Statistical Package for the Social Sciences
WESP	World Economic Situations and Prospects
WHO	World Health Organization
WPRO	Western Pacific Regional Office
YF	Yellow fever

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ABSTRACT

Background: International travellers are exposed to various risks before, during or after travel and many travellers, apart from being at risk of infection from their new destinations also tend to transmit infection from one country to another. Travellers intending to visit a destination are expected to consult a travel medicine clinic or medical practitioner at least 4–8 weeks before the journey for health risk assessment and to update pre-travel vaccinations. Studies have shown that travellers may not seek health advice before travelling and some of them have refused one or more recommended vaccinations for various reasons.

Objective: This study assessed the awareness and practice of pre-travel health consultation and vaccination and associated factors among international travellers departing from Ethiopia through the Addis Ababa Bole International Airport.

Methodology: A cross-sectional study design was used and the total sample size was 670. A stratified sampling technique was used to ensure representativeness of travellers and travel destinations. The study took four (4) weeks to complete. Pre-travel health consultation and vaccination practices were assessed using a self-administered questionnaire distributed at the departure lounges of the airport. Binary logistic regression test was used to identify significant factors (at p value <0.05) associated with pre-travel vaccination status and multivariable logistic regression was used in fitting the best model. The results were presented in tables (at 95% confidence interval level) and charts as appropriate.

Result: A total of 639 questionnaires were analysed giving a response rate of 95.4%. The median age of study participants was 34 years (IQR 28-41). Three hundred and sixty nine (57.7%) travellers were aware about pre-travel health consultation and among these travellers, 215 (33.6%) took pre-travel health consultation before coming to Ethiopia. Also of the total study participants, 580 (90.8%) were aware of pre-travel vaccination out of which 531 (83.1%) took pre-travel vaccinations. The vaccination rate of the three recommended vaccines for all travellers were yellow fever (72.5%), DPT (21.4%) and Influenza (10.8%). Age, marital status, religion, country of residence, awareness about and practice of pre-travel health consultation, and traveller having had their vaccination cards checked in previous trips amongst others were independently associated with vaccination status. After controlling for the effect of other variables; marital status, religion and having had vaccination cards checked in previous trips were associated with vaccination status with p-value of 0.035, <0.001 and 0.002.

Conclusion: This study revealed that the level of uptake of recommended vaccinations for all travellers especially DPT and Influenza is low. As less than one-third of travellers had their vaccination cards checked at arrival in Ethiopia, it is pertinent for border health staff to gear up vaccination card inspection at the Addis Ababa Bole International Airport.

Keywords: Pre-travel health consultation, vaccination status, travellers.

INTRODUCTION

1.1 Background

International travel is undertaken by large, and ever increasing, numbers of people for professional, social, recreational and humanitarian purposes. More people travel greater distances and at greater speed than ever before, and this upward trend looks set to continue.(1) According to statistics from the World Tourism Organization, international tourist arrivals worldwide increased from 25 million in 1950 to 1326 million in 2017.(2) International arrivals are forecasted to reach 1.8 billion by 2030.(3)

Air transportation continues to increase over time. In 2015, slightly over half of all overnight visitors travelled to their destinations by air (54%), while the remainder (46%) travelled by surface transport.(3) Despite the fact that arrivals to African destinations reduced by 3% in 2015 due to instability in North Africa and disease outbreaks in Sub-Saharan Africa, tourism still rank as the first export sector in many developing countries.(3) Compared to 2016 report, international tourists arrivals at Africa and Europe grew above average in 2017; with Africa having a 9% increment compared to 2016.(2) This is linked to the recovery from instabilities and unrest in North Africa and an increasing air connectivity in the Sub-Sahara African sub region.(2)

International travels expose individuals to new cultural, psychological, physiological and microbiological experiences.(4) Travellers are thus exposed to a variety of health risks in unfamiliar environments.(1) Key factors in determining the risks to which a traveller may be exposed to are: mode of transport, destination(s), duration and season of travel, purpose of travel, standards of accommodation, food hygiene and sanitation, behaviour of the traveller, and underlying health of the traveller.(1) The epidemiology of infectious diseases in the destination country is of importance to travellers. Travellers and travel medicine practitioners should be aware of the occurrence of these diseases in the destination countries. Although the medical profession and the travel industry can provide extensive help and sound advice, it continues to be the traveller's responsibility to seek information, to understand the risks involved and to take the necessary precautions to protect their health while travelling.(1)

Travellers intending to visit a destination in a developing country should consult a travel medicine clinic or medical practitioner before the journey. This consultation should take place at least four (4) to eight (8) weeks before the journey and preferably earlier if long-term travel or overseas work is envisaged.(1) However, last-minute travellers can also benefit from a medical consultation, even as late as the day of travel.(1) The consultation will include information about the most important health risks (including traffic accidents), determine the

need for any vaccinations and identify any other medical items that the traveller may require.(1) The traveller should be provided with a personal record of the vaccinations given using the international certificate for vaccination or prophylaxis.(1)

Pre-travel health assessments aim to promote risk reduction through preventive measures and safe behaviour, including ensuring travellers are up-to-date with their immunizations.(5)

1.2 Statement of Problem

Forty seven countries in Africa (34) and Central and South America (13) are either endemic or have regions that are endemic for yellow fever. A modelling study based on African data sources estimated the burden of yellow fever during 2013 was 84,000–170,000 severe cases and 29,000–60,000 deaths.(6) Likewise, between 2015 and 2016, there have been reports of yellow fever outbreaks in Angola and Democratic Republic of Congo (DRC).(7) Worthy of note, however, is that no case of yellow fever has been reported in Kenya in the last 50 years,(8) this could be due to compulsory yellow fever vaccination among travelers and surveillance at the airport.

In 2017, the Chinese Centers for Disease Control and Prevention (CDC) tallied a total of 11 imported yellow fever (YF) cases among male Chinese workers who returned to Beijing from Luanda, Angola.(9) The careful whole genome sequencing and analyses show that all YF infections were acquired in Angola and that none of these workers received yellow fever vaccination prior to travel to Angola.(9)

Many residents of the above countries and regions have been in and out of Ethiopia with the potential of spread of yellow fever and other communicable diseases. Ethiopia is one of the African countries with risk of yellow fever transmission.(10) It also requires yellow fever vaccination for travellers arriving from countries with risk of yellow fever.(10) On 7th of May 2013, there were 6 reported cases of yellow fever in Ethiopia.(11)

Travelers to countries where cholera is a risk very rarely get infected with cholera but the risk increases during outbreaks.(12) Travel-related cholera infections has however been documented in different countries for example on November 4, 2015, a 56-year-old German businessman was admitted with acute renal failure following cholera infection after a three-day business trip to Manilla, Philippines.(13)

The United States Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO) recommend the following vaccinations for travellers to Ethiopia: hepatitis A, hepatitis B, typhoid, cholera, yellow fever, rabies, meningitis, polio, measles,

mumps and rubella (MMR), Tdap (tetanus, diphtheria and pertussis), chickenpox, pneumonia and influenza.(14)

A study has shown that less than one third of adolescents travelling from Greece to Africa and Asia seek pre-travel counselling.(15) Another survey carried out among travellers at the departure lounges of five airports in Australasia (Singapore, Kuala Lumpur, Taipeh, Melbourne, Seoul) whose travel destinations were Asia, Africa or South America showed low (31%) pre-travel health advice seeking behaviour and fewer than 5% of travellers had been vaccinated in preparation for their trip.(16)

Among U.S travellers, a study found that out of 23,768 eligible travellers, 6573 (25%) refused one or more recommended vaccine(s).(17) Out of those eligible, more than one-third refused the following vaccines: meningococcal: 2232 (44%) of 5029; rabies: 1155 (44%) of 2650; Japanese encephalitis: 761 (41%) of 1846; and influenza: 3527 (33%) of 10539. The most common reason for declining vaccines was that the traveller was not concerned about the illness.(17) Vaccination against rabies, typhoid fever, Japanese encephalitis and meningococcus was highly inadequate for adolescents travelling from Greece to endemic areas.(15)

A survey performed among 421 travellers to Tanzania with a pre-travel consultation at the Travel Clinic of the University of Zurich about their experiences with YF certificate inspections upon arrival in Tanzania between January and November 2015 showed that most vaccine card checks were done while crossing the land border of Tanzania. They were also performed in travellers who did not enter Tanzania from a YF-endemic country. In the case of travel without valid YF certificate, an exemption certificate was always accepted. In travellers with neither a valid YF nor an exemption certificate, travellers reported forced YF vaccination and fines before entry was granted.(18)

The Ethiopian Food, Medicine and Health Care Administration and Control Authority (EFMHACA) among other activities has the mandate to regulate ports of entry and exist (export and import) permits for food and drug.(19) They work in collaboration with the Directorate of Border Health of the Federal Ministry of Health to check vaccination cards at the point of entry and to quarantine infectious disease cases. However, records of such activities as related to border health and vaccination card checks are not available. Consequently, this study aimed at generating such evidence by assessing how well international travellers are completing their vaccinations before arrival into Ethiopia.

1.3 Rationale/Justification

The rapid way diseases are spreading calls for measures to be taken by unaffected countries in readiness for any outbreak.(20) Travellers, who are not aware about travel health services, carry the risk of contracting or spreading infectious diseases.

There have been studies about pre-travel health care seeking practices and pre-travel vaccinations in many developed countries(21–23) and a few developing countries(18) however, such studies in Ethiopia are generally lacking. Likewise, previous studies[18,25-28] were interested in and conducted on pre-travel health advice but this study focussed on and assessed pre-travel health consultation.

Some other studies have focussed on protecting travellers from developed countries from contracting infectious diseases from developing countries (especially African countries) by assessing the preventive measures taken by travellers against infectious disease(s) of the researchers' interest.[18,25-28] This study however, aimed at assessing travellers' awareness about pre-travel vaccination and the vaccination rate of travellers against infectious diseases endemic in a specified country (Ethiopia). Also, there is paucity of recent studies globally that compared the pre-travel vaccinations among travellers from developed and developing countries who have stayed temporarily in a particular country; leaving a gap that informed the internal comparison engaged in this study.

This study went a step further by checking travellers' international card of vaccination and prophylaxis to ascertain participants' vaccination status as against the self-reporting of vaccinations employed in previous studies.(27) The data for this study was also primarily gathered in contrast to secondary data from travel clinics used by various similar studies.(21–23)

1.4 Significance of Study

This study contributed to what is known about pre-travel health care seeking/consultation practices and vaccinations among travellers globally and in particular, serves as baseline information for Ethiopia. The findings were also useful in identifying the World Health Organization's (WHO) region where the majority of international travellers in Ethiopia came from and their awareness and practice of health consultation and vaccination status.
The result of this study will assist the Ministry of Health through the Border Health Directorate and Ethiopian Food, Medicine and Health Care Administration and Control Authority (EFMHACA) to make evidence-based legislations concerning cross-border disease control at the airport and at the various Ethiopian embassies across the globe with focus on travellers' vaccinations before coming into Ethiopia.

2. LITERATURE REVIEW

Due to increasing mobility of people such as travelling for pleasure, business and migration worldwide, the role of travel related health has become a more important public health concern and there has been ever increasing acceleration of interest in this area.(1),(28)

2.1. Historical Background

Medical advice on health during travel, is not a new area of interest, in fact, according to a published book '*Travel Medicine Tales behind the Science'* its roots can be traced as far back as the 1st century.

The reasons for traveling in the medieval ages till the industrial revolution years include: for discoveries, colonisation, pleasure, and leisure trip.(29) The modern reasons for traveling include: mass tourism, tourist industry, Business tourism, Expatriates, guest work(ers), Refugees, migrants, Visiting friend and relatives (VFR), Humanitarian aid and missions, adventure travel, recreational sports(29) while recent forms of travelling could be as a result of trafficking, or international prostitution.(29) amongst others. Because of multiplying number of travel, and the cheaper forms of travel, three new and high risk groups have appeared:(29)

1) family travellers
2) young travellers (backpackers)
3) old age travellers

A particular source of disease spread was through sea voyages and in order to protect themselves against disease, official quarantines began in ports in the 14th century.(30) The plague, which decimated the populations in Europe was brought in through ships in the Middle ages.(30) The great plaque pandemic killed the one-third of inhabitants of Europe.(29)

From the 20th century and particularly in the last few years, there has been an intensity of interest in the risk factors in travelling, and since the 1970's travel health epidemiology, microbiology and prevention have developed at a much faster rate.

In Europe and North America of today, there have been several areas of focus such as analysis of travel clinic records, and airport survey(22,23,31),(32) amongst others.

2.1.1 Travel Related Health Risks

According to WHO the key factors to which travellers may be exposed to travel-related risks can be determined as follows: mode of transport, destination, duration and season, purpose, standards of accommodation and food hygiene, behaviour of the traveller and underlying health of the traveller.(1) Destinations where accommodation is of poor quality, hygiene and

sanitation are inadequate, medical services do not exist and clean water is unavailable may pose serious risks for the health of travellers.(1)

The actual likelihood of an adverse health event is also dependent on the period of the year, the exact place of exposure, the precise accommodation, and the activities and likely exposures of the individual, so will vary within and between trips. Furthermore, personal factors, including basic demographics (age and gender), co-morbidities, education level, and financial status influence risk. Individual factors such as risk behaviour and compliance with prophylactic measures also modify personal risks.(33)

2.1.2 Travel Related Health Risk Profile

The pre-travel consultation is structured into three key elements:

1. Risk assessment
2. Risk communication
3. Risk management

Risk assessment for impending travellers is generally considered in the following sequential manner: (33)

1. Estimate baseline risk for the average traveller (requires absolute risk data).
2. Consider specific risk factors relevant for the individual traveller that may modify the "average" risk [requires exposure, itinerary, demographic data, and comorbidity, often reflected as relative risk (RR) and odds ratio (OR) data].
3. Consider the role of interventions such as vaccines and prophylaxis: compare travel risks with and without the intervention and balance this against potential side effects (requires data on baseline risk as well as on effectiveness and harms of interventions).
4. Account for individual risk perception and risk tolerance issues, which influence the travellers' interpretation of risk measures and the likelihood they will accept or decline interventions offered.

A way to obtain data on travel-associated health risks is to use notification data. The number of notified cases can be used as case numbers (numerator data), and sources such as national registries or World Tourism Organization can be used to infer the total numbers of travellers (denominator data). These data can be stratified into regions of exposure and acquisition. However, this approach is generally possible only for infections that are reportable.(33) However, as obtained in a previous study,(34) the population of travellers to areas with yellow fever transmission will be termed as at risk of the infection.

2.2 International Health Regulations

The International Health Regulations (IHR) 2005 are the international legal instrument designed to help protect all States from the international spread of disease, including public health risks and public health emergencies.(35)

The initial WHO International Sanitary Regulations of 1951 were revised and renamed the International Health Regulations in 1969.(36) In response to the increased and changing risks of international transmission of disease, the Regulations were substantially revised over a 10-year process ending in the IHR 2005.(37) The revised Regulations were adopted by the WHO Member States at the 58th World Health Assembly on 23 May 2005. In accordance with the Constitution of WHO, the Regulations entered into force on 15 June 2007and are currently legally binding upon 196 States Parties around the world (including all WHO Member States).(38)

The purpose and scope of the IHR (2005) are very broad, focusing upon almost all serious public health risks that might spread across international borders.(37) According to Article 2, the purpose and scope of the Regulations are: "to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade."(35)

2.3 Diseases Subject to International Health Regulations

Three diseases are currently subject to the International Health Regulations: yellow fever, plague, and cholera. The regulations, which were first adopted by the World Health Assembly in 1951 and then revised slightly in 1969, are a mechanism to provide security against the international spread of epidemic diseases with a minimum interference with world traffic. These are the only binding international legislation for public health and they require that: Each national health administration should inform WHO within the first 24 hours of being informed of the first suspected case on its territory of a disease subject to the Regulations. This includes both indigenous and imported cases. All subsequent cases and deaths should be reported to WHO.(39)

The following 4 diseases are always internationally notifiable diseases:(40)

1) Poliomyelitis due to wild-type poliovirus
2) Human influenza caused by a new subtype
3) Severe acute respiratory syndrome (SARS)
4) Small pox

2.4 Travel Related Health Consultation

Travellers intending to visit a destination in a developing country should consult a travel medicine clinic or medical practitioner before the journey.(1) This consultation should take place at least 4–8 weeks before the journey and preferably earlier if long-term travel or overseas work is envisaged.(1),(41) However, last-minute travellers can also benefit from a medical consultation, even as late as the day of travel.(1) The consultation will include information about the most important health risks (including traffic accidents), determine the need for any vaccinations and/ or antimalarial medication and identify any other medical items that the traveller may require.(1),(41)

Preparedness for everybody travelling regardless of the purpose of travel, needs to be at the highest achievable level and to be as individual as possible for health protection. Furthermore, since risk reduction might not be possible in every case, more weight has to be put on risk management. A brief consultation makes it difficult to map out the complete risk profile. Practitioners must allocate appropriate time; the longer and more complex the itinerary, the more time will be required. It should be made as a specific consultation, not an add-on to something else.(41)

In Europe, a multicentre study conducted at international airports of nine (9) different countries revealed that even though the majority of travellers (73.3%) had sought general information about their destination prior to departure, only just over half of the responders (52.1%) sought travel health advice. When travel health advice was sought, 43.8% did so more than 4 weeks before leaving, 21.4% between 2 and 4 weeks before leaving, 18.6% between 1 and 2 weeks before leaving, and 16.1% during the last week prior to visiting a destination in the tropics. Tourists and people traveling for religious reasons had sought travel health advice more often, whereas travellers visiting friends and relatives were less likely to do so.(34)

2.5 Travellers Pre-travel Vaccination and Prophylaxis Practices

Pre-travel vaccination and prophylaxis practices vary widely from one country to another, among different study groups, and by vaccine types. For instance Helena C. Maltezou et al., in a study regarding preparedness of adolescents departing from Athens International Airport, showed that only 15/68 (22%) adolescents received pre-travel vaccinations.(15)

Data from the Global TravEpiNet in the United States of America showed that more than 90% of missionaries, non-medical workers, and medical service workers were vaccinated for or considered immune to Measles Mumps Rubella (MMR), Tetanus-diphtheria Td/Tdap, hepatitis A, typhoid, and yellow fever; 292 (29%) of 990 missionaries, 228 (18%) of 1,298 non-medical

service workers, and 76 (6%) of 1,269 medical workers were not vaccinated or considered non-immune for hepatitis B at pre-travel consultation.(22)

Among international travellers in Oman, the practice concerning preventive travel health measures, such as the use of specific immunizations and antimalarial prophylaxis, was very limited, and influenced by some personal and travel-related factors.(42) Regarding food items that can commonly cause infections while traveling, food from street vendors was the most frequently identified as a harmful item (64.6%), while milk and milk products (21.6%) and ice cubes (25.5%) were the least likely to be identified correctly as potentially harmful.(42)

Also Koen Van Herck et al., in a study done among international travellers regarding preventive practices found that with regard to behaviour outdoors, in the evening, 78.2% of travellers intended to apply mosquito repellent and 71.6% to cover their arms and legs, while use of deodorant (26.4%) or perfume or aftershave (18.6%) was restricted.(34) Half of the responders intended to use the air-conditioner at night, one in two to sleep under a mosquito net, 58.2% to use an insecticide every night, and 67.2% to keep their windows, doors and tents closed.(34)

2.6 Factors Associated with Travellers' Pre-travel Consultation and Vaccination Practice

Age and being a tourist have been found to be associated with pre-travel consultation. According to a study conducted in Oman, those aged between 18 years and 35 years were the most likely to seek travel health advice prior to the trip.(42) A subgroup analysis comparing travellers visiting friends and relatives (VFR) with tourists and business travellers in a study done in Europe showed that tourists had more often sought travel health advice, and were more often carrying prophylaxis drugs.(34)

Several factors have been found to be associated with non-vaccination among travellers. A three (3) year review done by Rhett J. Stoney et al.,(22) at the Global TravEpiNet among US travellers going abroad to provide humanitarian service, showed that 596 Humanitarian Service Workers (HSWs) [which included missionaries, non-medical service workers, and medical workers] did not receive vaccination because the clinician reported the vaccine not indicated for the travellers' itineraries.(22) Other reasons for non-vaccination of hepatitis B among these 596 HSWs included HSWs who declined, referral to another healthcare provider, and who reported insufficient time to complete the vaccination series.(22) In another study conducted in seven (7) countries, Anita E. Heywood et al., found that lack of information about vaccination schedules, previous visits to the country, cost, lack of time and safety concerns were the main reasons for not getting vaccinated.(27)

2.7 Conceptual Framework

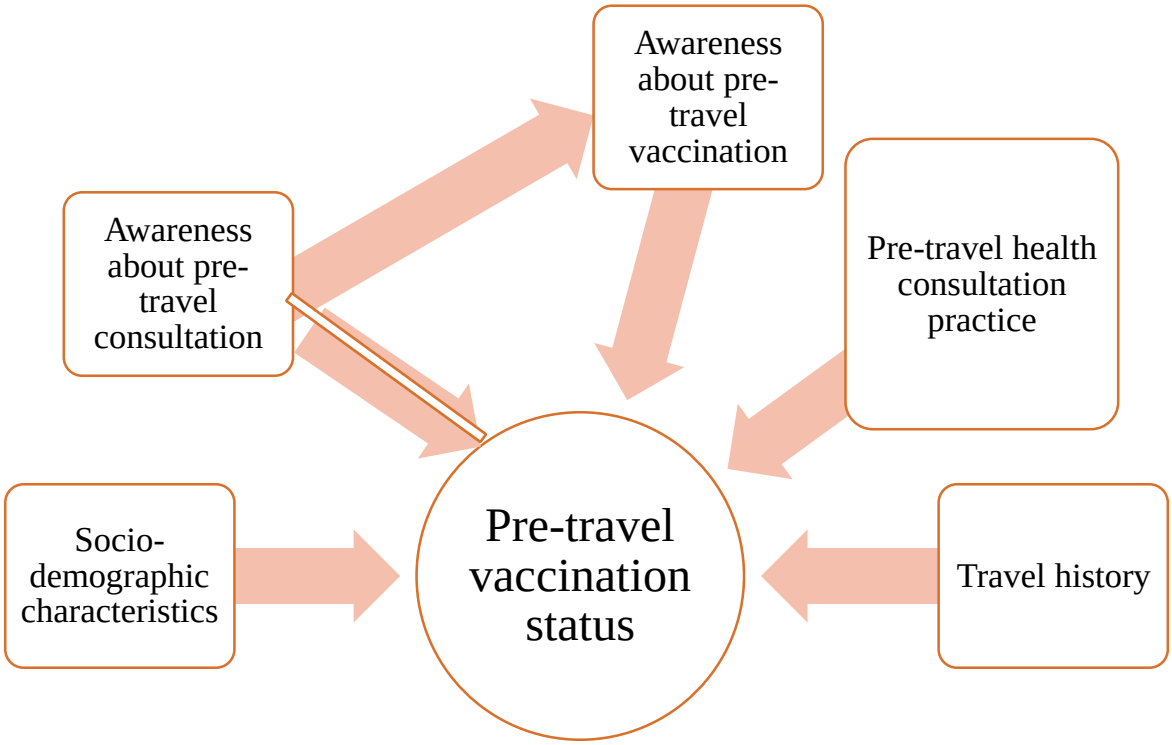

Figure 1: A conceptual framework showing the relationship between pre-travel vaccination status and its associated factors (Source: Previous Studies).

3. RESEARCH QUESTION AND OBJECTIVES

3.1 Research Question

How well are international travellers departing from Addis Ababa Bole International Airport aware about and practice pre-travel health consultation and vaccination and what factors are associated with travellers' vaccination status?

3.2 Objectives of the Study

3.2.1 General Objective

The general objective of this study was to assess the pre-travel health consultation practice and vaccination status and its associated factors among international travellers departing from Ethiopia.

3.2.2 Specific Objectives

The specific objectives are to:

1) Assess the awareness and practice of pre-travel health consultation among international travellers departing from Ethiopia.
2) Assess the pre-travel vaccination status of international travellers departing from Ethiopia.
3) Identify the factors associated with pre-travel vaccination among international travellers departing from Ethiopia.

4. MATERIALS AND METHODS

4.1 Description of Study Area

Addis Ababa Bole International Airport is located in the Bole area, 6 km (3.7 mi) southeast of the Addis Ababa city centre and 65 km (40 mi) north of Debre Zeyit.(43) The Airport was formerly known as *Haile Selassie I International Airport*.(44) It is the main hub of the Ethiopian Airlines, the national airline that serves destinations in Ethiopia and throughout the African continent, as well as nonstop service to Asia, Europe, North America and South America.(43) The Airport is also the base of the Ethiopian Aviation Academy.(45)

The airport has undergone expansion in recent time and the newly expanded airport which started operation in January 2003 and is adjudged, one of the most convenient and welcoming airports in the continent.(45) The terminal II of the new Addis Ababa Bole International Airport is dedicated to render services for international flights while Terminal I is for all domestic flights.(45) Addis Ababa Airport hosts over 150 flights per day and registered a total passenger flow of 8,900,000 passengers in 2016.(44)

4.2 Study Design

A cross-sectional analytical design was used for this study.

4.3 Study Population

The study population were international travelers departing from Ethiopia through the Addis Ababa Bole International Airport to another country after their stay in Ethiopia.

4.3.1 Inclusion Criteria: International travellers 18 years and above were included in this study. The age limit was chosen to avoid the ethical need of getting assent from the parents/guardians of minors.

4.3.2 Exclusion Criteria:

a) All passengers on transfer.
b) All Ethiopian nationals departing through the Addis Ababa Bole Airport. The Ethiopian nationals were excluded because the study aimed to assess pre-travel vaccination among foreigners who were departing from Ethiopia after their stay in the country as the recommended vaccines(14),(56) were meant for foreigners visiting Ethiopia.
c) Also excluded were international travellers above 18 years who were not willing to participate in the study and those who could not read nor write in either English or French.

4.4 Sample Size Determination

The minimum sample size was determined using the Leslie Fischer's formula for calculating sample size for prevalence studies.

$$n = \frac{z^2pq}{d^2}$$

Where:

n = sample size

z = normal deviate at 95% confidence interval

p = prevalence of disease

q (complementary probability) =1 – p

d = level of precision/acceptable margin of error.

The sample size was calculated using the following assumptions: 95% confidence interval, and 4% acceptable margin of error. The assumed proportion of awareness about pre-travel vaccination **p** was taken as 46% from a previous study.(46) The sample size was calculated to be 596 travellers.

To compensate for non-responses, misplaced or improperly completed questionnaires, the calculated sample size will be increased by 10% (0.10).

$$N\ (actual) = \frac{n}{1 - X}$$

$$N\ (actual) = \frac{596}{1 - 0.1}$$

This gave a total of 662 travellers which was rounded up to **670 international travellers.**

4.5 Sampling Technique

Stratified sampling technique was used for this study.

The lists of the international flights and their daily schedule for January, 2019, the month preceding the study period, were obtained from the commercial travel section of the Operation unit of Addis Ababa Bole International Airport (***Annex 3).*** The schedule attached as annex however, was for the first day of the month as the list for one month (a total of 176 pages) was too long to be attached to this thesis ***(annex 3.2)***. The total travellers per WHO region for the month of January was computed by the researcher, based on the flight schedule obtained from the airport, and used to project the expected travellers' volume for the month of February, 2019. This is because the flight schedule and average passenger per flight remains valid from October 28, 2018 till March 30, 2019 ***(Annex 3.1)***. The departure flights were then grouped into six, based on their destinations and according to the regions of the World Health Organization

(WHO)(47) (Africa, Americas, South-East Asia, Europe, Eastern Mediterranean, Western Pacific) as shown in table 11 ***(annex 5)***.

A stratified random sampling and proportion to population size approach was used to allocate the total sample size per region to ensure representativeness of travellers and travel destinations as shown in the figure 2 below. The African region was further stratified into the West African, East African, Central African, and Southern African regions (to ensure representativeness of travellers and travel destinations within Africa) as shown in figure 3 below. Following stratification, a systematic random sampling method was used to recruit subjects for the study (Figure 2 and 3). The first subject was selected using simple random sampling between 1 and 633 while others were selected using systematic random sampling based the calculated interval of 633. The first subject number 254 and the next was 887, 1141 until the total sample size for each WHO region was reached. The total sample size for the American and Eastern Mediterranean regions were reached earlier than others, so the data collectors for these two regions assisted in collecting data for the African region.

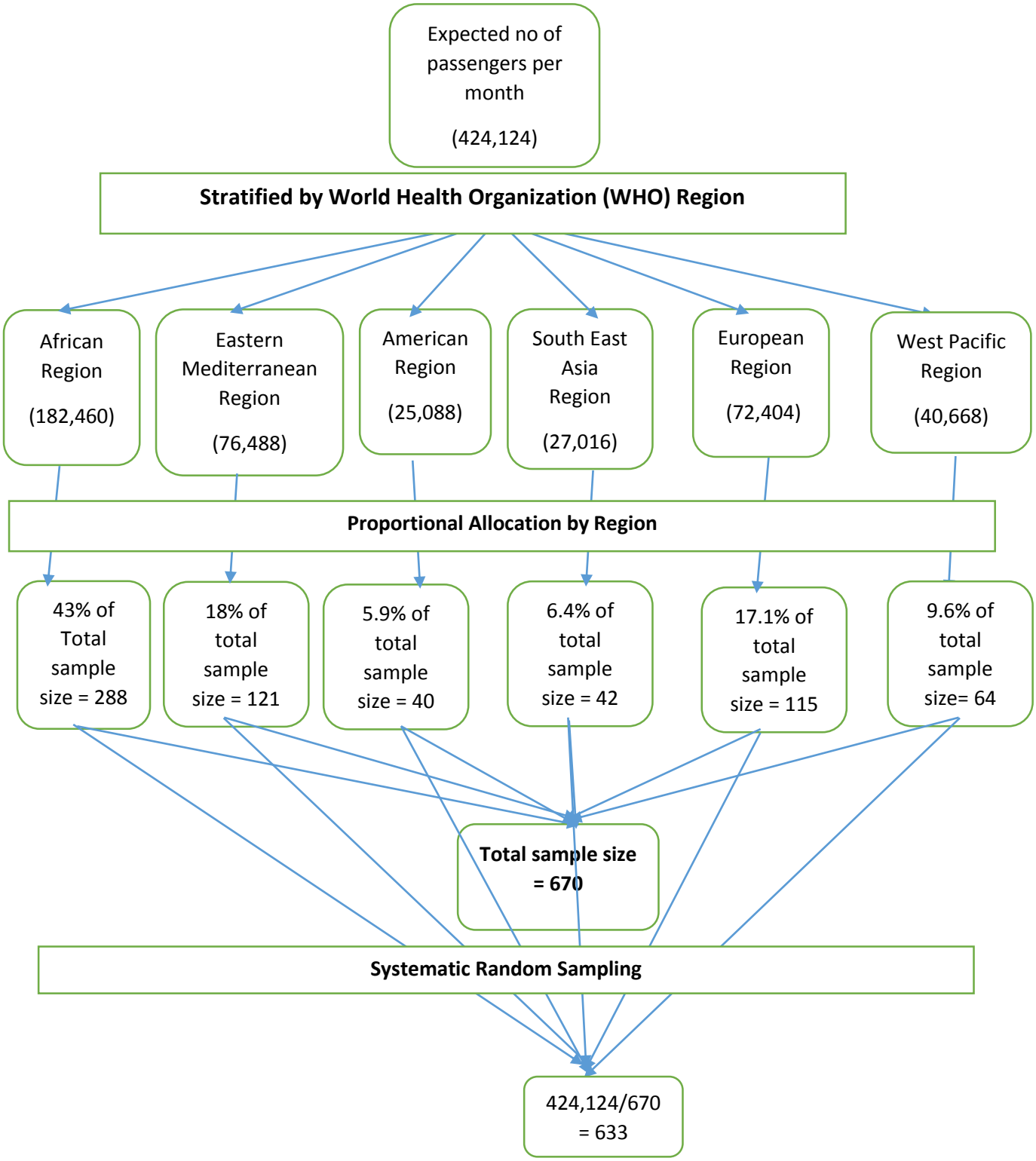

Figure 2: Stratified Sampling by the WHO Regions of the Monthly Expected International Passengers at Addis Ababa Bole International Airport for February, 2019.

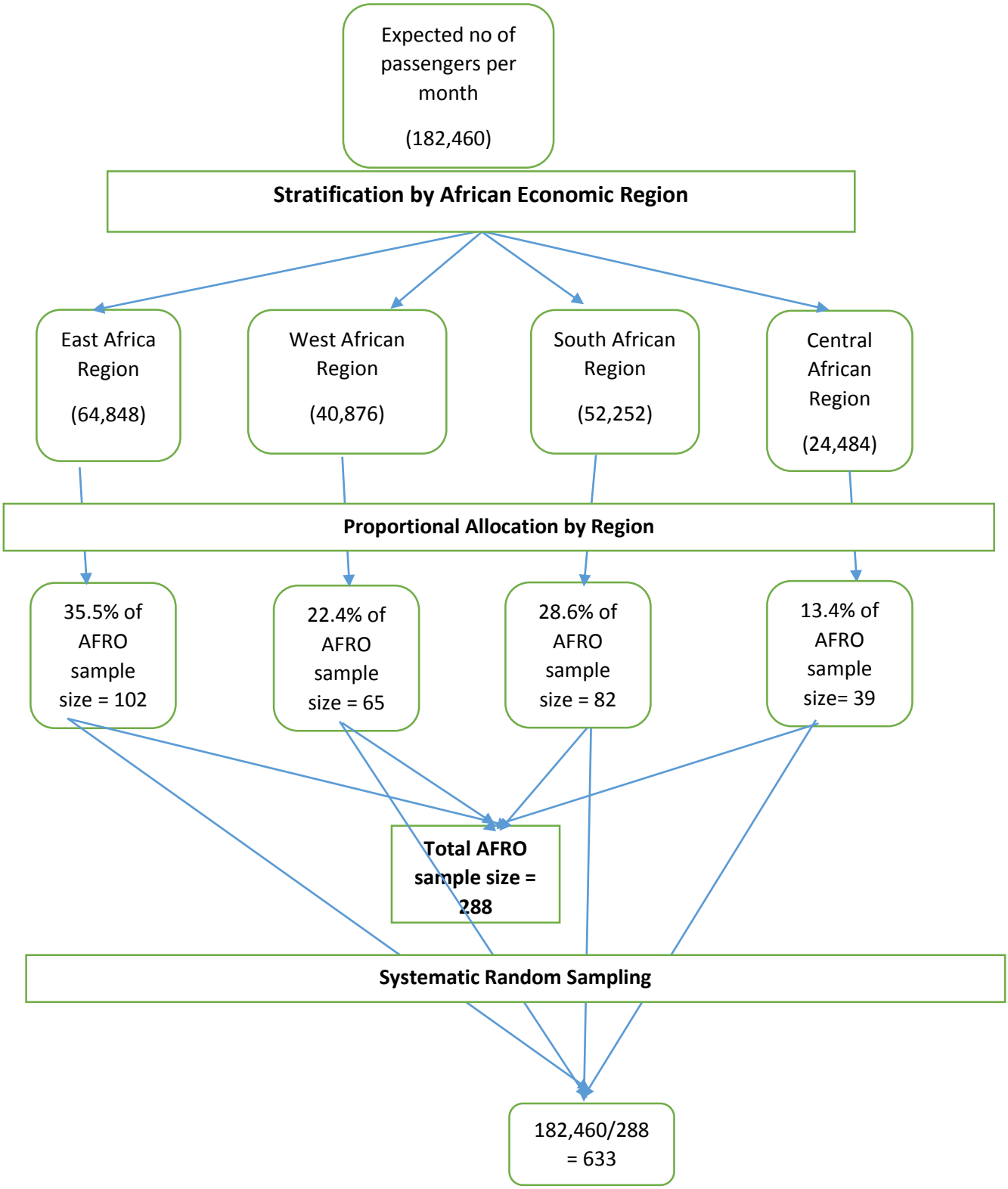

Figure 3: Stratified Sampling by the African Sub-regions of the Monthly Expected International Passengers at Addis Ababa Bole International Airport for February, 2019.

4.6 Instrument for Data Collection and Data Collection Procedure

A questionnaire adapted (to reflect national and sub-national context) from the International Health Travel Questionnaires (IHTQ) and from related previous studies (21),[23,28,43,45–49] was used to collect relevant information. The questionnaire was prepared in English language, translated to French and then back-translated to English to ensure consistency.

Six staff (1 per WHO region) of the airport were recruited for data collection and trained for three days on the sensitivity of the study, how to maintain confidentiality, methods in administering the questionnaires, how to assist the respondents in ensuring that questionnaires are properly completed, how to apply courtesy especially when checking their vaccination cards and what to look out for on the vaccination cards.

Questionnaires were distributed at the departure lounges (after check in and before passengers proceed to departure gates for boarding). Each data collector distributed questionnaires based on the flight schedule obtained from the airport (annex 3.2). Data were collected simultaneously for the six (6) WHO regions. The first subject was selected using simple random sampling between 1 and 633 while others were selected using systematic random sampling based on the calculated interval of 633. The first subject was number 254 and the next were 887, 1550 until the total sample size for each WHO region was reached. The total sample size for the American and Eastern Mediterranean regions were reached earlier than others, so the data collectors for these two regions assisted in collecting data for the African region. Travellers' vaccination cards were checked to confirm vaccination status whenever respondents (passengers) give consent. The data collection took a total of four weeks (4) to complete.

4.7 Pre-testing of Research Questionnaire

Face validation of questionnaire was first done by the two advisors before pre-testing of questionnaire. The questionnaire was pre-tested a week prior to the commencement of the actual study among international travellers departing the Addis Ababa Bole International Airport, Ethiopia. Modifications were made to questionnaire numbers 106 (re-categorization of monthly income), 209 (by adding hours of stay), 403 (question was changed from "did you take vaccinations before arriving in Ethiopia" to "have you ever taken any pre-travel vaccinations," and 408 (options C and D were added) after the pre-test. The modified versions of the questionnaire are attached as annex 2. A total of 34 questionnaires (5% of total sample size) were used for the pre-testing.

4.8 Data Quality and Management

4.8.1 Data Handling

Data collection was done every day of the week and according to the pre-planned schedule (displayed in table 3 and 4) in order to ensure representatives of the flight destinations selected during sampling.

The supervisor ensure that all administered questionnaires were checked for errors and completeness such that necessary corrections were made on the field. All questionnaires with errors or missing variables noticed during data entry were rejected. The data obtained were entered into computer using Epi data version 3.1 and then exported to Statistical Package for the Social Sciences (SPSS) version 25 for statistical analysis.

4.8.2 Study Variables

The variables of interest were: i) awareness about pre-travel health consultation ii) practice of pre-travel health consultation iii) awareness about pre-travel vaccination and iv) vaccination status. The vaccination status was the dependent variable while i) awareness about pre-travel health consultation ii) practice of pre-travel health consultation iii) awareness about pre-travel vaccination were the independent variables.

4.8.3 Data Analysis

Univariate analysis was done for descriptive data to check the frequencies and percentages of each variable. The results were then presented in frequency distribution tables. The proportion of pre-travel vaccinations status was presented using pie charts. The self-reported vaccination status was used in this analysis because the questionnaire was self-administered with no space for data collectors to record the specific vaccinations seen in the travellers' vaccination cards.

Bivariate analysis was done (using binary logistic regression) to assess the relationship between pre-travel vaccination status (dependent factor) and independents variables. The independent variables of interest were socio-demographic characteristics, travel history of participants, awareness about pre-travel health consultations, the practice of pre-travel health consultations, and awareness about pre-travel vaccinations. Before this step, variables too few to model were re-categorized to have adequate sample size in each cells. Examples of such re-categorization were marital status where the married were merged with divorced/separated/widow; also occupation status where casual workers were merged with fixed/full time employees as part-time/full time employment. The region of Ethiopia stayed was re-categorized as follow: Agrarian (Amhara, Tigray, and Oromia); Pastoralist (Somali, Afar, and Southern nations); Emerging (Gambela and Beninshangui-Gumuz); Cities (Addis, Harari and Dire Diwa). The

source of information for pre-travel health consultation was re-categorized as Health care professional (health professional/ travel medicine specialist) and non-health care professional (friends/relatives, social media/internet, print media/mass media, embassy, employer, travel agents and others). Reason for taking pre-travel health consultation was re-categorized as "for pre-travel vaccination" (for pre-travel vaccinations), "for other reasons" (it is the right thing to do, my employer recommended it, because of my known helath condition, the embassy recommended it and others).

Variables that were statistically significant ($p<0.05$) during bivariate analysis were entered into multivariable analysis to control for the effects of other variables. The results showing crude and adjusted ratios were presented in tables. A p-value of less than 0.05 was used as the level of statistical significance and odds ratio (crude and adjusted) were presented with 95% confidence interval.

4.9 Operational Definitions

1) Country of residence was classified according to the grouping on the Development Assistance Committee (DAC) list of Official Development Assistance (ODA) recipients of the Organization for Economic Cooperation and Development (OECD) and the country classification system of the 2014 World Economic Situations and Prospects (WESP).(54),(55) With reference to grouping on the Development Assistance Committee (DAC) list of Official Development Assistance (ODA) recipients of the Organization for Economic Cooperation and Development (OECD), the least developed, other low income countries, lower middle and upper middle income countries and territories were classified as developing countries while high income countries were classified as developed countries.(54) Likewise, based on the 2014 World Economic Situations and Prospects (WESP), the developing countries and countries in transition were classified as developing while the developed countries were regarded to as developed.(55)
2) Residents, for the purpose of this study, were defined as those who are permanently resident in Ethiopia, including Ethiopian nationals and foreigners who have lived more than 6 months in Ethiopia since their first day of arrival. The incubation period of rabies is an average of 6 months and travellers who probably had contacted rabies before arrival in Ethiopia are expected to manifest symptoms within this period, hence the 6 months benchmark.
3) Pre- travel health seeking practices refer to both the seeking of health advice from a health professional as well as health information from other sources.(5)

4) Pre-travel health consultation refers only to information obtained from a health professional.(5)
5) Specific vaccination requirements vary from one Ethiopian region to another; the researcher therefore used the three (3) vaccinations (Yellow fever, DPT, and influenza) that are recommended for all travellers going to Ethiopia(14),(56) to classify travellers into two broad groups. Travellers who did not receive any of the three vaccines were classified as not vaccinated.
6) Vaccinated were those who took at least one of the three recommended vaccinations.(14),[56] The vaccinated group was further classified into fully vaccinated or partially vaccinated depending on whether travellers took all the three vaccinations or not.
7) Transfer passengers are those who change from one flight to another and who did not leave the airport during the process.
8) Transit passengers are those who change from one flight to another or from one airline to another after having an overnight stay in the country.

4.10 Ethical Consideration

Ethical clearance for this study was obtained from the Ethical Review Committee of the Addis Ababa University, Ethiopia *(Annex 4)*. The permission to carry out the study was obtained from the Airport Security Department through the Operation Manager of Addis Ababa Bole International Airport and also from the Head of the Ethiopian Food, Medicine and Health Care Administration and Control Authority (EFMHACA).

This study did not involve any physical/clinical examinations or investigations and thus the study did not pose any risk whatsoever to the participants (respondents). The respondents were told that participation is voluntary and they will not suffer any consequences if they chose not to participate in the study. Written consents were obtained from study participants before collecting information from them and the respondents had the right to decline or withdraw from the study at any time. The participants were then identified using serial numbers only, to ensure confidentiality.

4.11 Dissemination Plan

The result of this study will be submitted to the School of Public Health of Addis Ababa University as a thesis and recommendations will be communicated, in writing, to the Federal Ministry of Health of Ethiopia as a possible justification for border health policy making. The findings are planned to be presented during the 2019 Annual Conference of the Ethiopian Public Health Association and also planned to be published in peer-reviewed journals.

5. RESULTS

5.1: Socio-demographic Characteristics of Travellers

A total of 639 valid questionnaires, out of the 670 total sample were analysed; giving a response rate of 95.4%. Seventy six (11.9%) questionnaires were completed in French Language while the remaining 563 (88.1%) accounted for the questionnaires completed in English Language.

The median age for all participants was 34 years with interquartile range (IQR) of 28 to 41. As shown in table 1 below, 188 (29.4%) travellers were between the age of 18 and 29 years; 255 (39.9%) were between 30 and 39 years of age. The age between 40 and 49 years were accounted for by 138 (21.6%) travellers. Fifty eight (9.1%) travellers were 50 years old and above.

In terms of gender, 427 (31.5%) were males. Regarding marital status, 201 (31.5%) were single, 404 (63.2%) were married, and 34 were divorced, separated, or widowed. One hundred and seventy one (26.8%), 241 (37.7%), and 221 (34.6%) travellers had secondary/high school/grade 12, undergraduate/college, and postgraduate (masters, PhD or fellowship) levels of education respectively. Seventy eight (12.2%) of the travellers were unemployed/student/trainee or retired; 188 (29.4%) were self-employed/private business, 99 (15.5%) were casual workers, and 274 (42.9%) had fixed term/full time employment. As regards monthly income, 440 (68.9%) earn less than or equal to 2000 US dollars monthly, while others 199 (31.1%) earn above 2000 US dollars monthly. Christianity accounted for 331 (51.8%) of the travellers religion while Islam and others (Jewish, Buddhism, Hinduism and none) accounted for 201 (31.5%) and 107 (16.7%) respectively.

Table 1: Socio-demographic Characteristics of International Travellers included in the Study

Variable	Frequency (n=639)	Percentage (%)
Age Groups		
18-29	188	29.4
30-39	255	39.9
40-49	138	21.6
50 and above	58	9.1
Gender		
Male	427	66.8
Female	212	33.2
Marital Status		
Single	201	31.5
Married	404	63.2
Divorced/Separated/Widowed/Others	34	5.3
Educational Status		
No formal	6	0.9
Up to High school/Grade 1 to 12	171	26.8
Undergraduate/College	241	37.7
Postgraduate (Masters/PhD/Fellowship)	221	34.6
Occupation		
Unemployed/student/trainee/Retiree	78	12.2
Self-employed/private business	188	29.4
Casual worker	99	15.5
Fixed term/full time employment	274	42.9
Monthly income in USD		
Less than or equal to 2000	440	68.9
Greater than 2000	199	31.1
Religion		
Christianity (Orthodox, Protestant, Catholic)	331	51.8
Islam	201	31.5
Others (Jewish, Buddhism, Hindu, None)	107	16.7

Using the World Health Organization (WHO) classification of regions, this study found out that a large number of travellers, 278 (43.5%), departing from Ethiopia were from the African Region (AFRO) especially residents of East African countries who were 105 (16.5%) in number. One hundred and nineteen (18.6%) of travellers were from the Eastern Mediterranean region, followed by 111 (17.4%) from the European region (EURO). In terms of area of residence, 560 (87.6%) were resident in urban areas. Of the total 639 travellers, 194 (30.4%) resided in developed countries, while 445 (69.6%) were from developing countries. In terms of where travellers were travelling to, the top three destinations were 310 (48.5%) to the African Region (AFRO), 111 (17.4%) to the Eastern Mediterranean Region (EMRO), and 85 (13.3%) to the European Union (EURO) (Table 2).

Table 2: WHO Regions and Area of Residence of the International Travellers included in the Study

Variable	Frequency (n=639)	Percentage (%)
Region of Residence		
AFRO	278	43.5
EMRO*	119	18.6
EURO**	111	17.4
AMRO	36	5.6
SEARO	37	5.8
WAPRO	58	9.1
Area of Residence		
Urban	560	87.6
Rural	79	12.4
Country of Residence		
Developed	194	30.4
Developing	445	69.6
Region respondents are traveling to		
AFRO	310	48.5
EMRO*	111	17.4
EURO**	85	13.3
AMRO	22	3.4
SEARO	55	8.6
WAPRO	56	8.8

Abbreviations:
AFRO: African Region
EMRO*: Eastern Mediterranean Region
EURO**: European Region
AMRO: American Region
SEARO: South East Asia Region
WAPRO: Western Pacific Region.

5.2 Travel History and Travel Pattern of International Travellers Departing from Ethiopia

As shown in table 7, 468 (73.2%) of the travellers stayed in Addis Ababa. The other most frequently stayed regions included Amhara (4.1%), Tigray (3.4%), Somali (3.8%) and Oromia (7.4%); others are as displayed in table 3 below. While in Ethiopia the length of stay of travellers varied from less than 24 hours 374 (58.5%) to more than 4 weeks 76 (11.9%). The purpose of travellers coming to Ethiopia included for work 100 (15.6%), tourism 67 (10.5%) and transit 338 (52.9%) amongst others. Of the total travellers, 114 (17.8%) have been to Ethiopia before; while 303 (47.4%) have had their vaccination cards checked at different airports in their previous travels. Out of the total 639 travellers, only 185 (29.0%) had their vaccination cards checked at arrival.

Table 3: Travel History within Ethiopia of the International Travellers included in the Study

Variable	Frequency (n=639)	Percentage (%)
Area of Ethiopia traveller lived in/stayed		
Amhara	26	4.1
Afar	15	2.3
Tigray	22	3.4
Somali	24	3.8
Oromia	47	7.4
Gambela	10	1.6
Benishangui-Gumuz	1	0.2
Southern Nations	21	3.3
Addis Ababa	468	73.2
Dire Dawa	5	0.8
Length of Stay		
< 24hours	374	58.5
1-7 days	96	15.0
1-4 weeks	93	14.6
1 to 6 months	76	11.9
Purpose of Coming to Ethiopia		
Study	20	3.1
Work/volunteer/humanitarian service	121	18.9
Visiting Friends and Relatives	46	7.2
Tourism	67	10.5
Conference/Meetings	47	7.4
Transit	338	52.9
Have you been to Ethiopia before?		
Yes	114	17.8
No	525	82.2
Has your vaccination card been checked in previous travel before?		
Yes	303	47.4

No	336	52.6
Was your vaccination card checked on arrival?		
Yes	185	29.0
No	454	71.0

5.3 Awareness and Practice of Pre-Travel Health Consultation

Table 4 displays the awareness and practice of pre-travel health consultation among the study participants. Of the total 639 travellers, 369 (57.7%) reported being aware of pre-travel health consultation and their source of information notably included friends/relatives 69 (18.7%), social media/internet 135 (36.6%), the embassy 29 (7.9%) and health professionals 83 (22.5%) amongst others. Out of the 369 travellers who were aware about pre-travel health consultation, 264 (71.5%) reported to have taken pre-travel health consultation before coming to Ethiopia. One hundred and twenty eight (71.5%) of the 264 passengers sought pre-travel health consultation because it is the right thing to do, 36 (13.6%) because their employer recommended it, and 65 (24.6%) in order to take pre-travel health vaccinations. Pre-travel health consultation was sought from travel clinic (travel medicine specialist) by 76 (28.8%) of the travellers, general health clinics (general practitioners) by 94 (35.6%), and specialist hospital (non-travel medicine specialist by 45 (17.0%) travellers. Among those who took, 76 (28.8%) travellers took pre-travel health consultation less than 1 week before travel, 65 (24.6%) between 1 and 2 weeks, 55 (20.8%) between 2 and 4 weeks, 37 (14.0%) between 4 and weeks, and 31 (11.7%) more than 8 weeks before travel. Of the 105 travellers who did not take pre-travel health consultation, 41 (39.0%) did not do so because they did not find it important and 30 (28.5%) travellers could not because they were too busy to do so before their trips.

Table 4: Awareness and Practice of Pre-travel Health Consultation among International Travellers included in the study.

Variable	Frequency	Percentage (%)
Aware about pre-travel health consultation? (n=639)		
Yes	369	57.7
No	270	42.3
Source of Information (n= 369)		
Friends/relatives	69	18.7
Social media/internet	135	36.6
Print Media/Mass media	15	4.1
Embassy	29	7.9
Employer	15	4.1
Health professional/travel medicine specialist	83	22.5
Travel agent/Others	23	6.2
Was pre travel consultation taken before coming to Ethiopia? (n=369)		
Yes	264	71.5
No	105	28.5

Reason for taking pre-travel health consultation (n=264)		
It is the right thing to do	128	48.5
My employer recommended it	36	13.6
For pre-travel vaccinations	65	24.6
Because of my known health condition	22	8.3
The embassy recommended it	9	3.4
Others	4	1.5
Where was pre-travel health consultation taken? (n=264)		
Travel clinic (Travel medicine specialist)	76	28.8
General health clinics (General Practitioner)	94	35.6
Specialist Hospital (Non-travel medicine specialist)	45	17.0
Others	49	18.6
Time to travel when pre-travel health consultation was taken (n=264)		
Less than 1 week	76	28.8
1 to 2 weeks	65	24.6
2 to 4 weeks	55	20.8
4 to 8 weeks	37	14.0
More than 8 weeks	31	11.7
Reason why pre-travel health consultation was not taken (n=105)		
Financial reason/cost	8	7.6
I did not find it important	41	39.0
Difficulty of geographical access	4	3.8
There was no time to do so/busy	30	28.5
Others	22	21.0
Have you previously sought pre-travel health consultation for other trips? (n=369)		
Yes	217	58.8
No	152	41.2

5.4 Awareness and Practice of Pre-Travel Vaccination

As shown in table 5 below, of the total 639 travellers, 580 (90.8%) were aware of pre-travel vaccination out of which 531 (83.1%) reported to have taken pre-travel vaccination at one point or other before coming to Ethiopia. Out of the 531 travellers who took pre-travel vaccinations, 262 (41.0%) took it because it is the right thing to do, 74 (11.6%) because their employer recommended it, 118 (18.5%) as part of requirements by the embassy to obtain visa, 56 (8.8%) to safeguard their own health and 21 (3.3%) for some other reasons. Some travellers did not take pre-travel vaccination because some did not find it important (5.2%) and some others were not aware about it (4.7%). The other reasons for not taking vaccinations were as displayed in the table below. Four hundred and twenty six (66.7%) of the total 639 study participants accepted to show interviewers their international card of vaccination however, only 413 (64.6%) eventually made their cards available for inspection. Sixty travellers (9.4%) admitted to not having vaccination cards while 12 (1.9%) reported that their vaccination cards were not with them.

Table 5: Awareness and Practice of Pre-travel Vaccination among International Travellers included in the Study.

Variable	Frequency	Percentage (%)
Aware about pre-travel vaccination? (n=639)		
Yes	580	90.8
No	59	9.2
Have you ever taken any pre-travel vaccination? (n=639)		
Yes	531	83.1
No	108	16.9
Reason for taking pre-travel health vaccination (n=531)		
It is the right thing to do	262	41.0
My employer recommended it	74	11.6
As part of requirements for visa	118	18.5
To safeguard my health	56	8.8
Others	21	3.3
Reason for not taking pre-travel vaccination (n=108)		
Financial reason/cost	7	1.1
I did not find it important	33	5.2
There was no time to do so/busy	7	1.1
I am not aware about it	30	4.7
To avoid side effects of vaccination	2	0.3
I refused it	1	0.2
Vaccines required were not available	2	0.3
Vaccines are contraindicated in pregnancy/in my health condition	6	0.9
Others	20	3.1
Can you show us your international card of vaccination? (n=639)		
Yes	426	66.7
No	141	22.1
I do not have	60	9.4
Vaccination card is not with me	12	1.9
Yellow card seen		
Shown	413	64.6
Not shown	226	35.4

5.5 Vaccination Rate and Vaccination Status of Study Participants

Displayed in table 6 are the pre-travel vaccines recommended for travellers visiting Ethiopia and the frequency of vaccinations among participants. Amongst the 14 recommended vaccines, the three most commonly taken were Hepatitis A by 219 (34.3%) travellers, Hepatitis B by 254 (39.7%), and Yellow fever by 463 (72.5%) travellers; while Chicken pox, Shingles and Influenza were the three least taken vaccinations as taken by 62 (9.7%), 40 (6.3%) and 69 (10.8%) travellers respectively.

Table 6: Pre-travel Vaccination Rate of International Travellers included in the Study.

Variable	Frequency (N=531)	
	Yes (%)	No (%)
Pre-travel vaccines		
Hepatitis A	219 (34.3)	312 (48.8)
Hepatitis B	254 (39.7)	277 (43.3)
Typhoid	162 (25.4)	369 (57.7)
Cholera	138 (21.6)	393 (61.5)
Yellow fever	463 (72.5)	68 (10.6)
Rabies	101 (15.8)	430 (67.3)
Meningitis	148 (23.2)	383 (59.9)
MMR	125 (19.6)	406 (63.5)
DPT	137 (21.4)	394 (61.7)
Chicken pox	62 (9.7)	469 (73.4)
Shingles	40 (6.3)	491 (76.8)
Pneumonia	71 (11.1)	460 (72.0)
Influenza	69 (10.8)	462 (72.3)
Polio	158 (24.7)	373 (58.4)

Based on the reported vaccination rate for the recommended vaccinations for all travellers coming into Ethiopia,(14)[56] 149 (23.3%) of the total respondents were not vaccinated, while 490 (76.7%) were vaccinated (Figure 4).

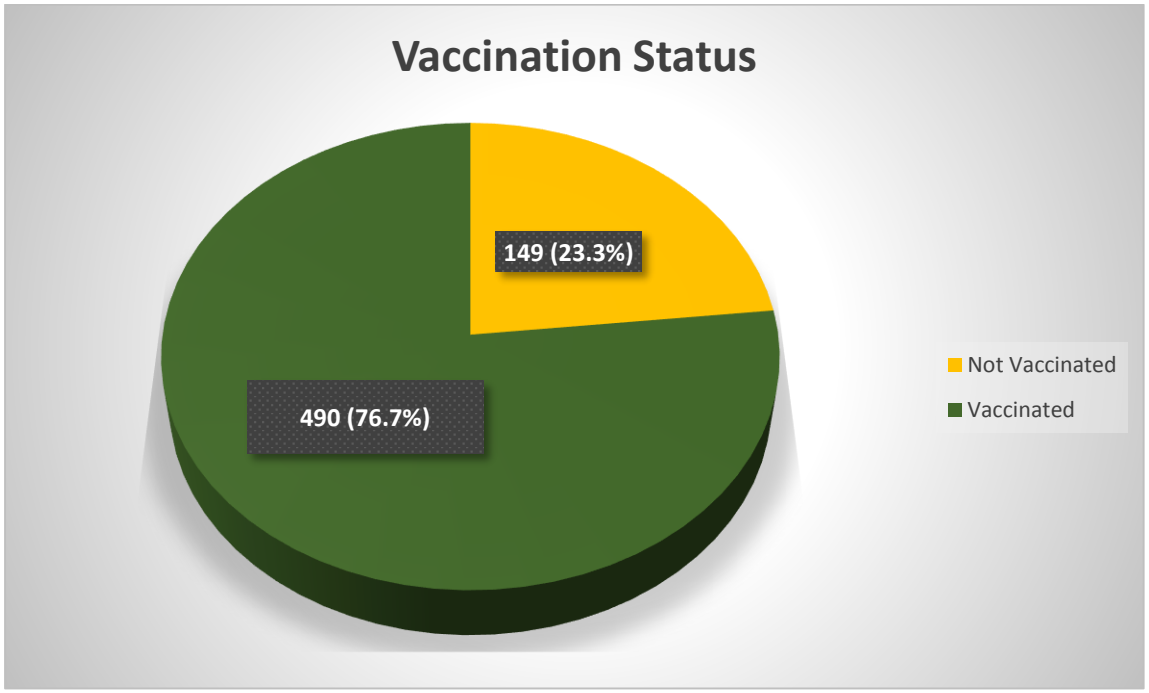

Figure 4: Vaccination Status of International Travellers included in the Study.

Figure 5 below gives an overview of the outcomes of the study based on the specific objectives. Out of the total 639 international travellers included in the analysis, 369 (57.7%) were aware about pre-travel health consultation and the remaining 270 (42.3%) were not aware. Among the 369 (57.7%) who were aware about pre-travel health consultation, 215(33.6%) reported to have taken pre-travel health consultation before coming to Ethiopia; 49 (7.7%) took pre-travel health advice and 105 (16.4%) did not take pre-travel health consultation nor pre-travel health advice. Among the 215(33.6%) who took pre-travel health consultation, 187 (29.2%) were vaccinated while 28 (4.4%) were not vaccinated. Among the 49 (13.3%) who took pre-travel health advice, 47 (7.4%) were vaccinated while 2 (0.3%) were not vaccinated. Among the 105 (16.4%) who did not take pre-travel health consultation nor pre-travel health advice, 83 (13.0%) were vaccinated while 22 (3.4%) were not vaccinated. Regarding vaccination status, among the 187(29.2%) vaccinated travellers who took pre-travel health consultation, 168 (26.2%) were partially vaccinated while 19 (3.0%) were fully vaccinated. Of the 47 (7.4%) vaccinated travellers who took pre-travel health advice, 43 (6.8%) were partially vaccinated while 4 (0.6%) were fully vaccinated. Among the 83 (13.0%) vaccinated travellers who did not take pre-travel health consultation nor pre-travel health advice, 75 (11.8%) were partially vaccinated while 8 (9.6%) were fully vaccinated.

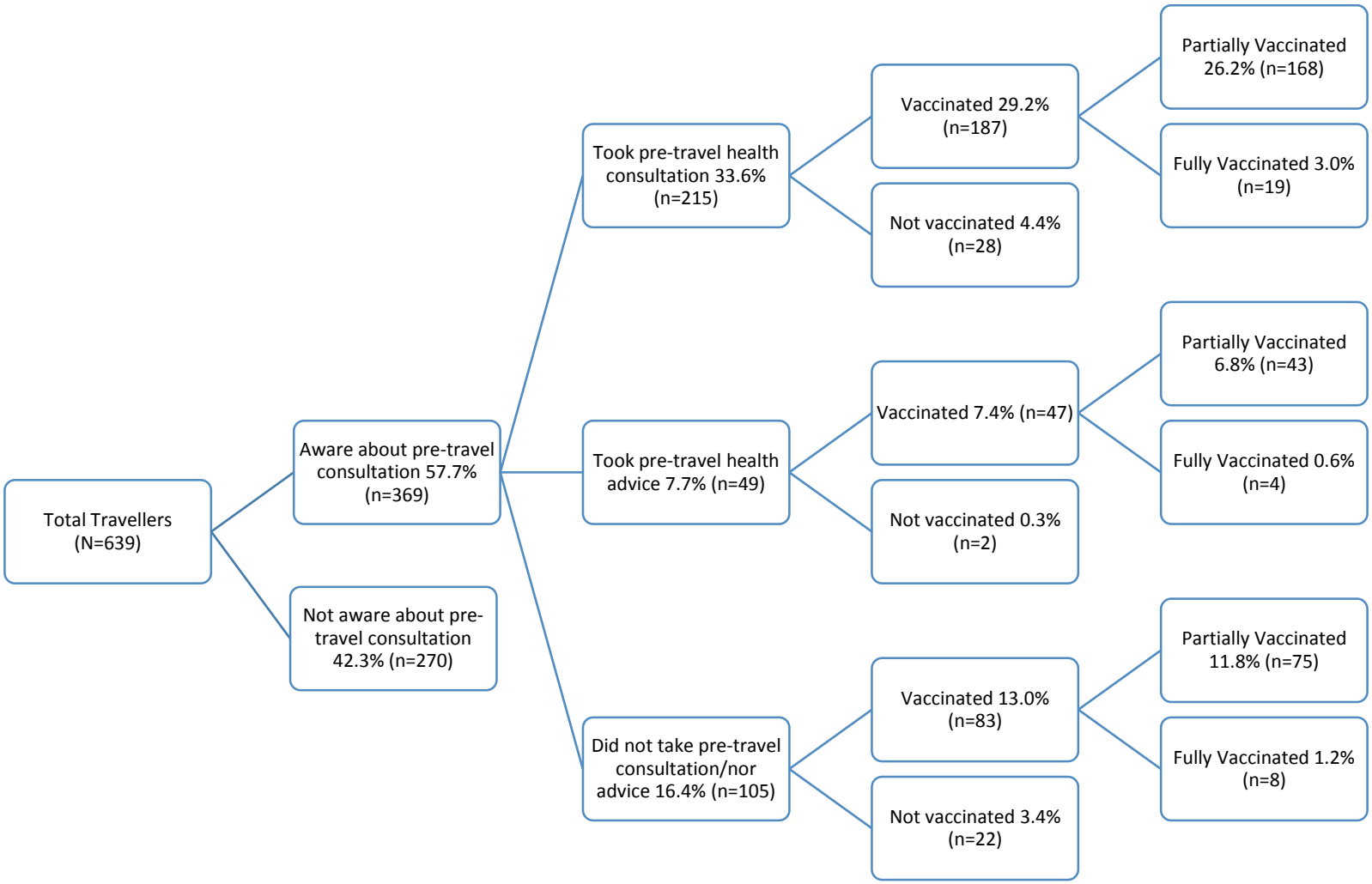

Figure 5: Flow Diagram of Awareness and Practice of Pre-travel Health Consultation and Vaccination Status of International Travellers included in the Study.

5.6 Factors Associated with Vaccination Status of Study Participants

As shown in table 7, travellers aged between 40 and 49 were 2.189 times more likely to be vaccinated compared to travellers who were 18 to 29 years of age with p-value of 0.006. In terms of marital status, the married/divorced/separated/widowed travellers were 1.733 times more likely to be vaccinated compared to travellers who were still single with p-value of 0.005. Similarly, travellers with postgraduate (Masters/PhD/Fellowship) degrees compared to those who had grade 12/high school level of education and below were 2.058 times more likely to be vaccinated with p-value of 0.003. In terms of occupational status, travellers who were self-employed/or have private business and likewise, travellers who had part-time or full time employment were 2.859 times and 3.070 times more likely to be vaccinated as compared to the unemployed (student/trainee/retiree) travellers with, p-value of <0.001; and p-value of <0.001 respectively. Travellers with religions such as Jewish, Buddhist, Atheism, Hinduism or no religion as compared to Christians were 5.015 times more likely to be vaccinated with p value of <0.001. All other variables were not statistically significant.

Table 7: Association between Socio-demographic Characteristics and Vaccination Status of International Travellers included in the Study.

Variables	n (%)	COR (95% Confidence limit)	p-value
Categorized Age			
18 to 29 *(Ref)*	188 (29.4)		
30 to 39	255 (39.9)	1.196 (0.781, 1.833)	0.410
40 to 49	138 (21.6)	2.187 (1.246, 3.840)	**0.006***
50 and above	58 (9.1)	1.505 (0.740, 3.062)	0.259
Gender			
Male *(Ref)*	427 (66.8)		
Female	212 (33.2)	0.870 (0.592, 1.279)	0.479
Marital Status			
Single *(Ref)*	201 (31.5)		
Others (Married/Divorced/ Separated/Widowed)	438 (68.5)	1.733 (1.184, 2.536)	**0.005***
Educational Status			
Grade 12/High school and below *(Ref)*	177 (27.7)		
Undergraduate/College	241 (37.7)	1.349 (0.871, 2.087)	0.180
Postgraduate (Masters/ PhD/Fellowship)	221 (34.6)	2.058 (1.280, 3.310)	**0.003***
Occupational Status			
Unemployed (Student/Trainee/Retiree)*(Ref)*	78 (12.2)		
Self-employed/ personal business	188 (29.4)	2.859 (1.621, 5.044)	**<0.001***
Part-time/Full time employment	373 (58.4)	3.070 (1.836, 5.134)	**<0.001***
Monthly income			
Less than or equal to 2000 *(Ref)*	440 (68.9)		

Greater than 2000	199 (31.1)	1.429 (0.945, 2.162)	0.091
Religion			
Christianity *(Ref)*	331 (51.8)		
Islam	201 (31.5)	0.909 (0.613, 1.348)	0.635
Others (Jewish, Buddhist, Atheist, Hinduism, None)	107 (16.7)	5.015 (2.243, 11.213)	**<0.001***

Significant variables at p-value <0.05.

This study showed (in table 8) that travellers from developing countries compared to their counterparts from developed countries were 1.659 times more likely to be vaccinated with p value of 0.010. Travellers who lived or stayed in the cities were 55.4% times less likely to be vaccinated compared to travellers who lived or stayed in the agrarian regions with p value of 0.011. Travellers on transit were 65.2% times less likely to be vaccinated compared to travellers whose purpose of coming to Ethiopia was for study/work/volunteer or humanitarian service. Travellers who stayed between 24 hours to 6 months compared to those who stayed less than 24 hours were 2.754 times more likely to be vaccinated with p value <0.001. Travelers who have not had their vaccination card checked in previous travels compared to their counterparts who have had their vaccination cards checked before were 78.9% times less likely to be vaccinated with p value <0.001. All other variables (including being treated for infection during stay in Ethiopia) were not statistically associated with travelers' vaccination status.

Table 8: Association between Travel History and Vaccination Status of International Travellers included in the Study.

Variables	n (%)	COR (95% Confidence limit)	p-value
Country of Residence			
Developed *(Ref)*	194 (30.4)		
Developing	445 (69.6)	1.659 (1.130, 2.436)	**0.010***
The area you live in your country			
Urban *(Ref)*	560 (87.6)		
Rural	79 (12.4)	1.035 (0.591, 1.813)	0.905
Region of Ethiopia travelers stayed			
Agrarian *(Ref)*	95 (14.9)		
Pastoralist	60 (9.4)	0.706 (0.294, 1.698)	0.437
Emerging regions	11 (1.7)	1.585 (0.187, 13.438)	0.673
Cities	473 (74.0)	0.446 (0.240, 0.829)	**0.011***
Purpose in Ethiopia			
Study/ Work/Volunteer/ Humanitarian service *(Ref)*	141 (22.0)		
VFR*/ Tourism/ Conference/meetings	160 (25.1)	0.609 (0.324, 1.145)	0.124
Transit	338 (52.9)	0.348 (0.202, 0.602)	**<0.001***

Duration of Stay in Ethiopia			
0 to 24 hours *(Ref)*	374 (58.5)		
Greater than 24 hours to 6 months	265 (41.5)	2.754 (1.819, 4.170)	**<0.001***
Treatment for infection before coming to Ethiopia			
Yes *(Ref)*	38 (5.9)		
No	601 (94.1)	0.870 (0.390, 1.941)	0.734
Treatment for infection during stay in Ethiopia			
Yes *(Ref)*	5 (0.8)		
No	634 (99.2)	0.821 (0.091, 7.402)	0.860
Has traveler been to Ethiopia before?			
Yes *(Ref)*	114 (17.8)		
No	525 (82.2)	1.288 (0.813, 2.042)	0.281
Traveler had vaccination card checked in previous travel			
Yes *(Ref)*	303 (47.4)		
No	336 (52.6)	0.211 (0.136, 0.325)	**<0.001***

Significant variables at p-value <0.05.

As shown in table 9 below, travellers who were not aware about pre-travel health consultation compared to those aware about it were 70.7% times less likely to be vaccinated with p value <0.001. Similarly, among those aware about pre-travel health consultation, travellers who did not seek pre-travel health consultation before coming to Ethiopia compared to those who did, were 51.6% times less likely to be vaccinated with p value <0.019. There was no significant association between travellers' awareness about pre-travel vaccination and vaccination status. All other variables were not statistically significant.

Table 9: Association between Vaccination status, and the Awareness and Practice of Pre-travel Health Consultation and Awareness about Pre-travel Vaccination among International Travellers included in the Study.

Variables	n (%)	COR (95% Confidence limit)	p-value
Heard about Pre-travel Health Consultation?			
Yes *(Ref)*	369 (57.7)		
No	270 (42.3)	0.293 (0.199, 0.430)	**<0.001***
Source of Information			
Health Professional *(Ref)*	83 (22.5)		
Other sources	286 (77.5)	1.658 (0.868, 3.169)	0.126
Pre-travel Health Consultation taken?			
Yes *(Ref)*	264 (71.5)		
No	105 (28.5)	0.484 (0.264, 0.885)	**0.019***
Reason why pre-travel health consultation was taken			
For other reasons *(Ref)*	199 (75.4)		
For pre-travel vaccination	65 (24.6)	2.292 (0.769, 6.833)	0.137

Pre-travel health consultation was taken from:			
Health professional *(Ref)*	215 (81.4)		
Non-Health Professional	49 (18.6)	3.519 (0.809, 15.300)	0.093
How long before travel was health Consultation taken?			
4 to 8 weeks or earlier *(Ref)*	68 (25.8)		
Less than 4 weeks	196 (74.2)	0.543 (0.199, 1.480)	0.232
Heard about pre-travel vaccination			
Yes *(Ref)*	580 (90.8)		
No	59 (9.2)	0.000 (0.000, 0.000)	0.997

Significant variables at p-value <0.05.

5.7 Multivariable Analysis of the Factors Associated with Vaccination Status

The variables that were significant during bivariate analysis were used for the multivariable analysis to assess individual effects after controlling for other variables and the fitness of the model. Other variables that can plausibly predict pre-travel vaccination status from previous studies(5) were considered for inclusion in the multivariable logistic regression but there was none with a significance of <0.25.

In terms of marital status, after adjusting for the effects of other variables, travelers in the married/divorced/ separated/widowed category were 2.346 times more likely to be vaccinated as compared to travelers who were still single with p-value of 0.035. With regards to religion, after adjusting for the effects of other variables, travelers with religions such as Jewish, Buddhist, Atheism, Hinduism or no religion as compared to Christians were 33.556 times more likely to be vaccinated with p value <0.001. Travelers who have not had their vaccination card checked in previous trips compared to their counterparts who have had their vaccination cards checked before were 68.4% times less likely to be vaccinated p value 0.002 after adjusting for the effects of other variables. All other variables were not statistically significant (Table 10).

Table 10: Factors associated with Vaccination Status among International Travellers included in the Study.

Variables	N (%)	COR (95% Confidence limit)	p-value	AOR (95% Confidence limit)	p-value
Categorized Age					
18 to 29 *(Ref)*	188 (29.4)				
30 to 39	255 (39.9)	1.196 (0.781, 1.833)	0.410	1.158 (0.523, 2.565)	0.718
40 to 49	138 (21.6)	2.187 (1.246, 3.840)	**0.006**	2.978 (0.923, 9.576)	0.068
50 and above	58 (9.1)	1.505 (0.740, 3.062)	0.259	5.372 (1.021, 28.256)	0.047
Marital Status					
Single *(Ref)*	201 (31.5)				
Others (Married/Divorced/ Separated/Widowed)	438 (68.5)	1.733 (1.184, 2.536)	**0.005**	2.346 (1.062, 5.182)	**0.035***
Educational Status					
Grade 12/High school and below *(Ref)*	177 (27.7)				
Undergraduate/College	241 (37.7)	1.349 (0.871, 2.087)	0.180	2.365 (0.988, 5.658)	0.053
Postgraduate (Masters/ PhD/Fellowship)	221 (34.6)	2.058 (1.280, 3.310)	**0.003**	1.671 (0.640, 4.361)	0.295
Occupational					
Unemployed (Student/Trainee/Retiree)*(Ref)*	78 (12.2)				
Self-employed/ personal business	188 (29.4)	2.859 (1.621, 5.044)	**<0.001**	2.412 (0.742, 7.836)	0.143
Part time or full time employment	373 (58.4)	3.070 (1.836, 5.134)	**<0.001**	1.971 (0.704, 5.524)	0.197
Religion					
Christianity *(Ref)*	331 (51.8)				
Islam	201 (31.5)	0.909 (0.613, 1.348)	0.635	1.132 (0.484, 2.651)	0.774
Others (Jewish, Buddhist, Atheist, Hinduism, None)	107 (16.7)	5.015 (2.243, 11.213)	**<0.001**	33.556 (4.093, 275.125)	**0.001***
Country of Residence					
Developed *(Ref)*	194 (30.4)				
Developing	445 (69.6)	1.659 (1.130, 2.436	**0.010**	0.982 (0.462, 2.086)	0.963
Region of Ethiopia travelers stayed					
Agrarian *(Ref)*	95 (14.9)				
Pastoralist	60 (9.4)	0.706 (0.294, 1.698)	0.437	1.512 (0.303, 7.537)	0.614
Emerging regions	11 (1.7)	1.585 (0.187, 13.438)	0.673	2.176 (0.192, 24.634)	0.530

Cities	473 (74.0)	0.446 (0.240, 0.829)	**0.011**	1.015 (0.294, 3.507)	0.982
Purpose in Ethiopia					
Study/ Work/Volunteer/ Humanitarian service *(Ref)*	141 (22.0)				
VFR*/ Tourism/ Conference/meetings	160 (25.1)	0.609 (0.324, 1.145)	0.124	1.393 (0.443, 4.379)	0.570
Transit	338 (52.9)	0.348 (0.202, 0.602)	**<0.001**	1.048 (0.216, 5.094)	0.954
Duration of Stay in Ethiopia					
0 to 24 hours *(Ref)*	374 (58.5)				
Greater than 24 hours to 6 months	265 (41.5)	2.754 (1.819, 4.170)	**<0.001**	2.233 (0.517, 9.648)	0.282
Traveler had vaccination card checked in previous travel					
Yes *(Ref)*	303 (47.4)				
No	336 (52.6)	0.211 (0.136, 0.325)	**<0.001**	0.316 (0.152, 0.660)	**0.002***
Pre-travel Health Consultation taken?					
Yes *(Ref)*	264 (71.5)				
No	105 (28.5)	0.484 (0.264, 0.885)	**0.019**	0.570 (0.274, 1.187)	0.133

Significant variables at p-value <0.05 after adjusting for the effects of other variables.

6. DISCUSSIONS

This study showed that close to half (42.3%) of the participants were not aware about pre-travel health consultation and this was significantly associated with pre-travel non-vaccination status. A previous study has also documented that vaccination rates were highest when travellers consulted a health care provider (HCP) (67%).(27)

In addition, about one-third (28.5%) of those who were aware about pre-travel health consultation did not seek pre-travel health consultation prior to their trip to Ethiopia. This was a better finding compared to a study conducted at Bangkok where approximately two thirds of respondents travelled without professional medical advice.(5) Most commonly, travellers reported not finding pre-travel health consultation important as a reason for not taking it; which is similar to the finding in previous study where lack of concern about health issues was the primary reason that they did not pursue health information prior to their trips.(50) The difference in the findings could be due to the fact that pre-travel health advice was assessed in the previous study while pre-travel health consultation was checked for in this study.

Among those who sought pre-travel health consultation, about three quarter (74.2 %) did so less than 4 weeks prior to their journey. This rate is low and not in keeping with the WHO International Health Regulations (IHR) which recommended that consultation should take place at least 4–8 weeks before the journey and preferably earlier if long-term travel or overseas work is envisaged.(1),(41) This implies that only 25.8% took pre-travel health consultation at least four (4) weeks prior to their journey, a proportion which is lower than the result of the study conducted in Johannesburg, South Africa where 46% sought it more than 28 days prior to departure,(46) and another multicentre study conducted at international airports of nine (9) different countries in Europe in which travel health advice was sought more than 4 weeks before traveling in 43.8% of those who did so.(34)

Every eight out of ten (83.1%) participants took pre-travel vaccinations. This is better than the result of some previous studies. For instance, Helena C. Maltezou et al., in a study to assess the preparedness of adolescents departing from Athens International Airport, found that only 15/68 (22%) adolescents received pre-travel vaccinations.(15) This could be due to the fact that Helena C. Maltezou et al., study was conducted on a fewer sample size (68 participants) compared to this index study which used 639 participants. Also, the previous study was conducted among adolescents only whereas, this study was conducted among adults from age 18 years and above. The finding from this study, however, is in keeping with the fact that this study has earlier established that travellers from a developed country, such as Australia (where

Helena C. Maltezou et al., conducted their study) were less likely to be vaccinated compared to travellers from developing countries.

The findings of this study were similar to other travel surveys in that the most commonly reported pre-travel vaccinations were hepatitis A, hepatitis B, tetanus and typhoid.(16,34) Influenza vaccine was reported by 10.8% of travellers compared to <3% of participants in a previous study.(5) The relatively satisfactory level of documented yellow fever vaccination (72.5%), the highest level amongst all of the 14 vaccines studied, may indicate that travellers are more inclined to having the mandatory vaccinations,(10) or that vaccinators are not utilizing sufficiently the yellow fever immunization consultation to recommend the other two vaccines.

Only 64.6% participants in this study showed their vaccination cards for inspection, 1.9% reported that their vaccination cards were not with them and 9.4% reported not having a vaccination card compared to Stephen Toovey et al., study where 60% of respondents were carrying vaccination certificates, and a further 19% claimed to have a vaccination certificate in checked luggage; 21% of respondents admitted to having no vaccination certificate with them.(46)

Some travellers did not take pre-travel vaccination since some did not find it important (30.6%) and others were not aware about it (27.8%). This is in keeping with the results from Anita E. Heywood et al.'s study which found out that lack of information about vaccination schedules, was among the main reasons for not getting vaccinated.(27)

Age, marital status, educational status, occupation, religion, country of residence type, the region of Ethiopia traveller stayed, their purpose in Ethiopia, Duration of stay in Ethiopia were independently associated with vaccination status. Others were awareness about and taking of pre-travel health consultation, and traveller having had their vaccination card in previous trips.

This study found that those who were treated for infection before coming to Ethiopia were 26 times more likely to be treated for infection during stay in Ethiopia. Although being treated for infection before coming and during travellers' stay in Ethiopia were not statistically associated with vaccination status probably due to the number of counts in each cell, this finding however can be adjudged to be clinically significant.

Marital status and having had vaccination card checked at any airport before were found to be associated with pre-travel vaccination status after controlling for the effects of other variables. Despite this fact, only 29.0% of travellers reported to have had their vaccination cards checked on arrival at Ethiopia. This is not, however, different from what was obtained in some other developing countries, like Tanzania where vaccination cards check at arrival were non-

systematic.(18) This can lead to non-compliance of international travellers to International Health Regulations (IHR) and the related cross-border spread of diseases in the future if the trend continues.

Religion was also found to be associated with vaccination status as travellers of other religions other than Christianity and Islam (that is, the Buddhist, Atheist, Jewish, and travellers of the Hinduism religion) had very high vaccination status. This could be due to the fact that the Christians and Muslims might prefer to rely on divine protection when they travel rather than to get vaccinated. Other studies reviewed, however, did not find any association between vaccination status and religion.

7. STRENGHTS AND LIMITATIONS

7.1 Strengths of the Study

1) This study used a large sample size to ensure representativeness of the different WHO regions and the African sub-regions which makes this study generalizable.

2) There was a high response rate (95.4%) and the researcher ensured high data quality which assures of the internal validity of this study.

3) The use of simplified English and the provision of additional language version (French) of the questionnaire aimed to reduce language barriers and minimize selection bias of travellers.

4) This study also assessed pre-travel health consultation (where better information can be taken by travellers during travel preparations especially as it relates to pre-travel vaccinations) compared to the pre-travel health advice (which gives general information to travellers) used in other studies.

5) Vaccination was confirmed using vaccination cards in about two-third (64.6%) of the total respondents.

7.2 Limitations

1) Self-report was the only available information used to assess pre-travel health consultation in this study.

2) Some travellers were not able to recall some information correctly due to time lag between their arrival in Ethiopia and their departure time (study period), subjecting this study to recall bias.

3) Subjects who could not read nor write in English and French were excluded from this study, subjecting this study to selection bias.

8. CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

This study revealed that the practice of pre-travel health consultation among international travellers is considerably low. Similarly, the uptake level of recommended vaccinations for all travellers, especially DPT and Influenza is low. This study found that not all those that were categorized as vaccinated took all the three (3) recommended vaccinations, while a lot others did not take any of the three vaccines. Religion, marital status and having had vaccination card checked at any airport before were associated with pre-travel vaccination status.

8.2 Recommendations

To the World Health Organization:

1) The need for awareness campaign in all the WHO regions about regular pre-travel health consultation and pre-travel vaccination cannot be overemphasized. This is especially important for travellers from developed countries (EURO, AMRO and WPRO) where vaccination rate has been found to be low.

To Governments of countries:

1) In keeping with the findings of this study that travellers who received health consultation from health professionals were more likely to be vaccinated; there is a public health need to identify strategies targeting these travel groups. This underscores the need for the provision of affordable and accessible travel clinics in low resource countries as many travellers in this study reside in developing countries.

2) In the interim, as the governments of many developing countries will plan to create travel clinics, it will be essential to train general health practitioners on pre-travel medicine as this study found that many travellers tend to consult them before travel.

To Health Care Practitioners:

1) Health care practitioners are encouraged to give adequate information about pre-travel vaccinations to their clients when they come for pre-travel health consultations.

To International Airlines:

1) In line with the finding that the internet/social media is a key source of information for travellers on pre-travel health consultation, focusing education interventions at the time of online ticket purchase or through popular websites for travellers might be productive.

To religious organizations:

1) The association of religion with vaccination status underscores the need for pre-travel vaccination counselling in churches and mosques as part of health talks/ health education programs. The priests can take up the responsibility of inviting health staff (most especially port/border health staff) for the counselling sessions.

To the National Government of Ethiopia:

1) As less than one-third of travellers had their vaccination cards checked at arrival and considering the fact that those who have had their vaccination cards checked before during previous trips are more likely to be vaccinated, it is pertinent that the Government of Ethiopia, through the Ministry of Health, gear up vaccination card checks at the points of entry (airports, and by extension land borders).
2) Similarly, based on the finding of this study, it will not be out of place to focus more attention on travellers from developed countries, while carrying out vaccination card checks at the ports. However, this should be cautiously done without unnecessary interference with international traffic and trade as recommended by WHO International Health Regulations (IHR).
3) Since the uptake level of recommended vaccinations for all travellers, especially DPT and Influenza is low while a few other travellers did not take any of the three recommended vaccines, the Ministry of Foreign Affairs, through the various Ethiopian embassies across the world, might need to make regulations to encourage travellers get vaccinated for at least, the three vaccines (yellow fever, DPT, and influenza) recommended for all travellers before visas are issued to travellers planning to visit Ethiopia.

To researchers:

1) There is need to conduct further studies to understand why vaccination cards are not being checked regularly.
2) A mathematical modelling study to assess the risk of cross-border disease transmission by those who were treated for infection before coming and during stay in Ethiopia will be of great necessity.

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ANNEXES

Annex 1: Informed Consent

1.1 Information Sheet

Study on *"Assessment of Awareness and Practice of Pre-Travel Health Consultation and Vaccination Status of International Travelers Departing from Ethiopia through the Addis Ababa Bole International Airport"*

Greetings,

I am ……..……..…… working as data collector in this study.

Dear respondents, here are lists of questions with different sections, which are designed for research work to be conducted in partial fulfilment of a Master Degree in Public Health by **Oluwatosin Jegede** in collaboration with Addis Ababa University, School of Public Health. The main purpose of the study is to *"to assess the pre-travel health consultation practice and vaccination status and its associated factors among international travellers departing Ethiopia after their stay in the country."* I am inviting you to contribute to the study.

I want you to answer the questions all by yourself. It will take about 15 minutes or less to answer the full questionnaire. There are no anticipated problems but in case some questions make you feel uncomfortable; you are free to express your discomfort or decide not to respond. If you chose not to participate or wish to withdraw from completing the questionnaire at any point, please feel free to do so.

Your name will not be recorded and all the information you give will be kept strictly confidential and be used only for the purpose of this study.

At this time, do you have any questions to ask about this study?

If you have any questions at any time, even after the interview, feel free to ask. You can contact **Oluwatosin Jegede on +251904177528; or E-mail: dr.jegzy1@gmail.com**

1.2 Consent Form

I understand that the purpose of the study is to *"assess the pre-travel health consultation practice and vaccination status and its associated factors among international travellers departing from Ethiopia"* I have read the above information. I consent voluntarily to participate in this study and understand that I have the right to withdraw from the study at any time without having my social life or travel care being affected.

Signature of Informant _____ Date_____

_____	_____	_____
Name of Data Collector	Date	Signature

Annex 2

2.1 Questionnaire in English

AWARENESS AND PRACTICE OF PRE-TRAVEL HEALTH CONSULTATION AND VACCINATION AMONG INTERNATIONAL TRAVELERS DEPARTING FROM ADDIS ABABA BOLE INTERNATIONAL AIRPORT

S/No	Question	Response	Remark
I	**SOCIODEMOGRAPHIC CHARACTERISTICS**		
101	Age as at last birthday (in years)		
102	Gender	A) Male B) Female C) I would rather not disclose	
103	Marital status	A) Single B) Married C) Divorced/separated D) Widow/widower E) Others Please Specify_____	
104	Educational status (Highest certificate obtained)	A) No formal B) Primary/Elementary/Grade 1-6 C) Middle School/Grade 7-9 D) Secondary/High school/Grade10-12 E) Undergraduate/College F) Postgraduate (Masters/PhD/Fellowship)	
105	Occupational Status	A) Unemployed/student/trainee B) Self-employed/Private business C) Casual worker D) Full time /fixed term employment E) Retiree	
106	Monthly income (in US dollars)	A) Less than or equal to 100 B) 101 to 1000 C) 1001 to 2000 D) 2001 to 5000 E) Greater than 5000	
107	Religion	A) Christianity B) Islam C) Others Please specify_____	

II	TRAVEL HISTORY		
201	Where is your country of residence?	_____ Country	
202	Which area of that country are you living?	A) Urban B) Rural	
203	Were you treated for any infection before arrival in Ethiopia?	A) Yes B) No	If yes, continue on question 204 If no, skip to question 205
204	If yes, which one? (Please write Diagnosis in the next column)		Continue on question 205
205	Which country are you traveling to? Final destination (Not lay over country)	_____ Country	Continue on question 206
206	Which area of that country are you going?	A) Urban B)Rural	Continue on question 207
207	What is your purpose of Traveling?	A) Study B) Work C) Visiting friends or relatives D) Tourism/vacation E) Conference/ Official meetings F) Volunteer/humanitarian G) Accompanying relatives H) Medical treatment I) Others Please specify_____	Continue on question 208
208	While in Ethiopia, which region were you staying?	A) Amhara B) Afar C) Tigray D) Somali E) Oromia F) Gambela G) Benishangui-Gumuz H) Southern nations I) Harari J) Addis Ababa K) Dire Dawa	Continue on question 209
209	For how long have you been in Ethiopia?	_____ hours _____ days _____weeks _____ months	Continue on question 210
210	What was your purpose of coming to Ethiopia?	A) Study B) Work C) Visiting friends or relatives D) Tourism/vacation E) Conference/ Official meetings F) Volunteer/humanitarian	Continue on question 211

		G) Accompanying relatives H) Medical treatment I) Transit J) Others Please specify_____	
211	Were you treated for any infection during your stay in Ethiopia?	A) Yes B) No	If yes, continue on question 212 If no, skip to question 213
212	If yes, which one? (Please write Diagnosis in the next column)		Continue on question 213
213	Have you been to Ethiopia before this index visit?	A) Yes B) No	If yes, continue on question 214 If no, skip to question 217
214	If yes, how many times?		Continue on question 215
215	When was your last visit	_____ _____ Month/ Year	Continue on question 216
216	Where (region) did you stay during your last visit?	A) Amhara B) Afar C) Tigray D) Somali E) Oromia F) Gambela G) Benishangui-Gumuz H) Southern nations I) Harari J) Addis Ababa K) Dire Dawa	Continue on question 217
217	Has your international certificate of vaccination and prophylaxis ever been inspected?	A) Yes B) No	If yes, continue on question 218 If no, skip to question 219
218	If yes, where?	_____ Country	Continue on question 219
219	Was your international certificate of vaccination and prophylaxis checked on arrival of this index visit?	A) Yes B) No	
III	**AWARENESS AND PRACTICE OF PRE-TRAVEL CONSULTATION**		
301	Have you heard about pre-travel health consultation before?	A) Yes B) No	If yes, continue on question 302

			If no, skip to question 401
302	What is the source of your information? (Multiple responses allowed)	A) Friends/ relatives B) Social media C) Internet D) Print media E) Mass media F) Embassy as part of Visa Application G) Employer H) Health professionals I) Travel medicine specialist J) Travel agent K) Travel book L) Others Please specify_____	Continue on question 303
303	Did you take pre-travel health consultation before coming to Ethiopia?	A) Yes B) No	If yes, continue on question 304 If No, skip to question 307
304	If yes, why?	A) Because it is the right thing to do B) Because my employer recommended it C) Because of requirement for pre-travel vaccination D) Because of my health condition E) The embassy recommended it F) Others Please specify_____	Continue on question 305
305	Where did you take your pre-travel consultation?	A) Travel clinic (Travel medicine specialist) B) General health centre/hospital (from General practitioners) C) Specialist hospital (Non-travel medicine specialist) D) Others Please specify_____	Continue on question 307
306	How long before travel did you seek pre-travel health consultation?	A) Less than 1 week B) 1 to 2 weeks C) 2 to 4 weeks D) 4 to 8 weeks E) More than 8 weeks	Continue on question 308
307	If No, why not?	A) Because of financial reasons (cost is high) B) Because I did not find it important C) Difficulty of geographical access	Continue on question 308

<table>
<tr><td></td><td></td><td>D) There was no time to do so before my trip/ I've been too busy
E) I did not know about it
F) I do not have full knowledge about it
G) Others
Please specify_____</td><td></td></tr>
<tr><td>308</td><td>Have you ever sought health consultation for previous overseas trip to any destination?</td><td>A) Yes
B) No</td><td>Continue on 401</td></tr>
<tr><td>IV</td><td colspan="3">VACCINATION:KNOWLEDGE AND STATUS</td></tr>
<tr><td>401</td><td>Have you heard of pre-travel vaccination before?</td><td>A) Yes
B) No</td><td>If yes, continue on question 402

If No, continue on 402</td></tr>
<tr><td>402</td><td>Have you taken any pre-vaccinations before?</td><td>A) Yes
B) No</td><td>If yes, continue on question 403

If no, skip to question 405</td></tr>
<tr><td>403</td><td>If yes, which vaccines did you take?

At the end of this questionnaire, you will be asked to show your vaccination certificate</td><td>Please mark all vaccinations taken below and write the number of doses taken
E.g. Hepatitis A (X) 2 doses

<table>
<tr><th>S/No</th><th>Vaccine type</th><th>Mark (X)</th></tr>
<tr><td>1</td><td>Hepatitis A</td><td></td></tr>
<tr><td>2</td><td>Hepatitis B</td><td></td></tr>
<tr><td>3</td><td>Typhoid</td><td></td></tr>
<tr><td>4</td><td>Cholera</td><td></td></tr>
<tr><td>5</td><td>Yellow fever</td><td></td></tr>
<tr><td>6</td><td>Rabies</td><td></td></tr>
<tr><td>7</td><td>Meningitis</td><td></td></tr>
<tr><td>8</td><td>Measles Mumps Rubella</td><td></td></tr>
<tr><td>9</td><td>Tetanus, Diphtheria &Pertusis</td><td></td></tr>
<tr><td>10</td><td>Chicken pox</td><td></td></tr>
<tr><td>11</td><td>Shingles</td><td></td></tr>
<tr><td>12</td><td>Pneumonia</td><td></td></tr>
<tr><td>13</td><td>Influenza</td><td></td></tr>
<tr><td>14</td><td>Polio</td><td></td></tr>
</table></td><td>Continue on question 404</td></tr>
<tr><td>404</td><td>If yes to question 402, why?</td><td>A) Because it is the right thing to do
B) My employer recommended it
C) As part of requirements for Visa
D) To safeguard my health</td><td>Continue on question 407</td></tr>
</table>

		E) Others Please specify_____	
405	If No to question 402, why not?	A. Because of financial reasons (cost is high) B. Because I did not find it important C. Difficulty of geographical access D. There was no time to do so before my trip E. I did not know about it F. To avoid side effects G. I refused it H. Required vaccine(s) not available I. Contraindicated because of pregnancy J. Contraindicated because of my state of health K. Others Please specify_____	Continue on question 406
406	If vaccine was refused, what is the reason for refusal? List reasons in the next column	A) B) C)	
407	Can you show us your international certificate of vaccination?	A) Yes B) No C) I do not have vaccination card D) I am not with my vaccination card.	***For Interviewer use only*** Shown____ Not shown____

WE APPRECIATE YOUR TIME AND COOPERATION SIR/MA. WISHING YOU A SAFE TRIP!

2.2 Questionnaire en Français

PRATIQUES DE CONSULTATION MEDICALE AVANT LE VOYAGE ET VACCINATION PARMI LES VOYAGEURS INTERNATIONAUX VENANT PAR L'AÉROPORT INTERNATIONAL ADDIS ABABA BOLE

S/No	Question	Réponse	Remarque
I	**CARACTÉRISTIQUES SOCIODÉMOGRAPHIQUES**		
101	Âge révolu (en années)		
102	Sexe	i. Homme ii. Femme iii. Je préférerais ne pas divulguer	
103	Statut Matrimonial	A) célibataire B) marié C) Divorcé / séparé D) Veuve / veuf E) Autres Veuillez préciser_____	
104	Statut scolaire (Plus grand diplôme obtenu)	A) Sans Education scolaire B) Élémentaire / Primaire / CM2 C) Collège D) Lycée E) Premier et deuxième cycle universitaires F) Troisième cycle (Maitrise / Doctorat / Programme d'échange)	
105	Profession	A) Sans emploi / Etudiant / Stagiaire B) Travailleur indépendant / Privé C) Travailleur occasionnel D) Travailleur à plein temps ou à temps partiel E) Retraité	
106	Revenu mensuel (en dollars américains)	A) moins de 100 B) 100 à 1000 C) 1001 à 2000 D) 2001 à 5000 E) Supérieur à 5000	
107	Réligion	A) Chrétien B) Musulman C) Autres Veuillez préciser _____	
II	**HISTORIQUE DE VOYAGE**		
201	Quel est votre pays de résidence?	_____ Pays	
202	De quelle région de ce pays êtes-vous?	A) Urbaine B) Rurale	

203	Avez-vous été traité pour une infection avant votre arrivée en Éthiopie?	A) Oui B) Non	Si oui, continuez avec la question - 204 Si non, passez à la question 205
204	Si oui laquelle? (Veuillez écrire le diagnostic dans la colonne suivante)		continuez avec la question 205
205	Dans quel pays partez-vous? Destination finale (pas pays de transit)	_____ Pays	continuez avec la question 206
206	Dans quelle région de ce pays allez-vous?	A) Urbaine B) Rurale	continuez avec la question 207
207	Que lest le but du voyage?	A) Etudes B) travail C) Visite d'amis ou de parents D) Réunions officielles E) Tourisme / vacances F) Conférence G) Bénévole / humanitaire H) Accompagnants I) Autres Veuillez préciser _____	continuez avec la question 208
208	En Éthiopie, dans quelle région séjourniez-vous?	A) Amhara B) Afar C) Tigré D) somali E) Oromia F) Gambela G) Benishangui-Gumuz H) Region du sud I) Harari J) Addis Abeba K) Dire Dawa	continuez avec la question 209
209	Depuis combien de temps êtes-vous en Ethiopie?	_____ jours _____semaines _____ mois	continuez avec la question 210
210	Dans quel but êtes-vous venu en Ethiopie?	A) Etudes B) Travail C) Visite d'amis ou de parents D) Réunions officielles E) Tourisme / vacances F) Conférence G) Bénévole / humanitaire H) Accompagnants I) Transit J) Autres Veuillez préciser _____	Si oui, continuez avec la question 211 Si non, passez à la question 212

211	Avez-vous été traité pour une infection pendant votre séjour en Éthiopie?	A) Oui B) Non	continuez avec la question
212	Si oui laquelle? (Veuillez écrire le diagnostic dans la colonne suivante)		Si oui, continuez avec la question 213 Si non, passez à la question 216
213	Avez-vous été en Ethiopie auparavant ?	A) Oui B) Non	continuez avec la question 214
214	Si oui combien de fois?		continuez avec la question 215
215	A Quand remonte votre dernière visite?	_____ _____ Mois/ Annee	continuez avec la question 214
216	Dans quelle région avez-vous séjourné lors de votre dernière visite?	A) Amhara B) Afar C) Tigré D) somali E) Oromia F) Gambela G) Benishangui-Gumuz H) Region du sud I) Harari J) Addis Abeba K) Dire Dawa	Si oui, continuez avec la question 217 Si non, passez à la question 218
217	Votre carnet international de vaccination et de prophylaxie a-t-il jamais été vérifié?	A) Oui B) Non	continuez avec la question 218 Si non, passez à la question 219
218	Si Oui, OU?	_____ Pays	continuez avec la question 218
219	Votre carnet international de vaccination et de prophylaxie a-t-il été vérifié à l'arrivée lors de cette visite?	A) Oui B) Non	
III	**CONNAISSANCES ET PRATIQUES SUR LA CONSULTATION AVANT LE VOYAGE**		
301	Avez-vous entendu parler de conseils / consultations Médicales avant le voyage auparavant?	A) Oui B) Non	Si oui, continuez avec la question 302

			Si non, passez à la question 401
302	Quelle est la source de votre information? (Réponses multiples autorisées)	A) Amis / parents B) Médias sociaux C) Internet D) Presse écrite E) Masse Médias F) Ambassade dans le cadre de la demande de visa G) employeur H) Professionnels de la santé I) Spécialiste en médecine de voyage J) Agent de voyages K) Durant la Réservation de vol L) Autres Veuillez préciser _____	continuez avec la question 303
303	Avez-vous consulté ou reçu des conseils de santé avant de venir en Ethiopie?	A) Oui B) Non	Si oui, continuez avec la question 304 Si non, passez à la question 307
304	Si Oui, Pourquoi?	A) Parce que c'est la bonne chose à faire B) Parce que mon employeur l'a recommandé C) En raison de l'obligation de vaccination avant le voyage D) A cause de mon état de santé connu E) L'ambassade l'a recommandé F) Autres Veuillez préciser _____	continuez avec la question 305
305	Où avez-vous consulté avant votre départ en voyage?	A) Clinique de voyage (spécialiste en médecine de voyage) B) Centre de santé général / hôpital (des médecins généralistes) C) Hôpital spécialisé (spécialiste en médecine autre que de voyage) D) Autres Veuillez préciser _____	continuez avec la question 307
306	Combien de temps avant votre voyage avez-vous consulté?	A) moins d'une semaine B) 1 à 2 semaines C) 2 à 4 semaines D) 4 à 8 semaines E) plus de 8 semaines	continuez avec la question 308

<table>
<tr><td>307</td><td>Si non, pourquoi pas?</td><td>A) Pour des raisons financières (le coût est élevé)
B) Parce que je ne l'ai pas trouvé important
C) Difficulté d'accès géographique
D) Il n'y avait pas le temps de le faire avant mon voyage
E) Je ne savais rien à ce sujet
F) J'ai été trop occupé
G) Autres
Veuillez préciser _____</td><td>continuez avec la question 308</td></tr>
<tr><td>308</td><td>Avez-vous déjà consulté un médecin pour un voyage précédent à l'étranger, quelle que soit la destination?</td><td>A) Oui
B) Non</td><td>continuez avec la question 401</td></tr>
<tr><td></td><td colspan="3">HISTORIQUE ET STATUT DE VACCINATION</td></tr>
<tr><td>401</td><td>Avez-vous entendu vacciné avant ce voyage?</td><td>A) Oui
B) Non</td><td>Si oui, continuez avec la question 402

Si non, passez à la question 402</td></tr>
<tr><td>402</td><td>Avez-vous été vacciné avant ce voyage?</td><td>A) Oui
B) Non</td><td>Si oui, continuez avec la question 403

Si non, passez à la question 405</td></tr>
<tr><td>403</td><td>Si oui, de quels vaccins s’agit-il ?

* A la fin de ce questionnaire, il vous sera demandé de montrer votre carnet de vaccination *</td><td>Veuillez énumérer tous les vaccins pris ci-dessous et indiquer le nombre de doses.
Exemple : Hépatite A(X) 2 doses

<table>
<tr><th>S/No</th><th>Vaccine type</th><th>Mark (X)</th></tr>
<tr><td>1</td><td>Hepatitis A</td><td></td></tr>
<tr><td>2</td><td>Hepatitis B</td><td></td></tr>
<tr><td>3</td><td>Typhoid</td><td></td></tr>
<tr><td>4</td><td>Cholera</td><td></td></tr>
<tr><td>5</td><td>Yellow fever</td><td></td></tr>
<tr><td>6</td><td>Rabies</td><td></td></tr>
<tr><td>7</td><td>Meningitis</td><td></td></tr>
<tr><td>8</td><td>Measles Mumps Rubella</td><td></td></tr>
<tr><td>9</td><td>Tetanus, Diphtheria &Pertusis</td><td></td></tr>
<tr><td>10</td><td>Chicken pox</td><td></td></tr>
</table></td><td>continuez avec la question 404</td></tr>
</table>

		11	Shingles			
		12	Pneumonia			
		13	Influenza			
		14	Polio			
404	Si oui à la question 403, pourquoi?	A). Parce que c'est la bonne chose à faire B).Parce que mon employeur l'a recommandé C). En raison de l'obligation de vaccination avant le voyage D). À cause de mon état de santé connu E). Autres Veuillez préciser _____				continuez avec la question 407
405	Si non à la question 403, pourquoi pas?	A). Pour des raisons financières (le coût est élevé) B). Parce que je ne l'ai pas trouvé important C). Difficulté d'accès géographique D). Il n'y avait pas le temps de le faire avant mon voyage E). Je ne savais rien à ce sujet F). Pour éviter les effets secondaires G). je l'ai refusé H). Le ou les vaccins requis ne sont pas disponibles I). Contre-indiqué à cause de la grossesse J). Contre-indiqué en raison de mon état de santé K). Autres Veuillez préciser _____				continuez avec la question 406
406	Si le vaccin a été réfusé, quelle en est la raison ? Listerles raisons dans la colonne suivante	A) B) C)				
407	Pouvez-vous nous montrer votre carnet international de vaccination?	A) Oui B) Non				*** Réservé à l'intervieweur *** Montré____ Pas montré____

NOUS APPRÉCIONS VOTRE TEMPS ET VOTRE COOPÉRATION Monsieur/ Madame. Je vous souhaite un bon voyage

Annex 3: List of the International Airlines, their Flight Schedule, Flight Volume and Flight Destination as Obtained from the Commercial Travel Section of the Operation Unit of Addis Ababa Bole International Airport

3.1 List of International Airlines and Their Days of Operation

NO.	CARRIER	DAYS OF OPERATION	VALID UPTO	FLT NO	ARRIVAL	DEPARTURE	REMARK/EQUIPMENT
2	EGYPT AIR, MS	1,3,5,6,7	29OCT2018-30MAR2019	MS851/2	03:15	04:15	CAI-ADD-CAI// B738
3	EMIRATES, EK	1,2,3,4,5,6,7	28OCT2018-30MAR2019	EK723/4	12:40	15:05	DXB-ADD-DXB// B777*B747F(74Y)/B777F(77X)
4	FLY DUBAI, FZ	2,5,7	29OCT2018-30MAR2019	FZ646/7	19:35	20:50	DXB-ADD-DXB// B73H
5	GULF AIR, GF	1,3,6	29OCT2018-30MAR2019	GF705/6	04:20	05:05	BAH-ADD-BAH// A319/A320/A321/A330/A332/A340
6	KENYA AIRWAYS, KQ	1,2,3,4,5,6,7	28OCT2018-30MAR2019	KQ400/1	09:10	09:50	NBO-ADD-NBO// E190/B733/B737/B738/E90
	KENYA AIRWAYS, KQ	1,2,3,4,5,6,7	29OCT2018-30MAR2019	KQ404/5	02:50	03:30	NBO-ADD-NBO// E190/B733/B737/B738/E90
7	LUFTHANSA, LH	1,3,4,5,6	29OCT2018-30MAR2019	LH598/9	19:55	21:55	FRA-JED-ADD & VV// LH33P
8	TURKISH, TK	1,2,3,4,5,6,7	29OCT2018-30MAR2019	TK676/7	00:55	01:50	IST-ADD-IST// B737-800/900/A321
	Eritrea Airline	4,7	29OCT2018-30MAR2019	B8709	14:45	15:45	ASM-ADD-ASM/With Any Type of Aircraft
	EMIRATES CARGO**	1	28OCT2018-30MAR2019	EK9757	13:30	15:30	B777F/B747F(77X)
10	EMIRATES CARGO**	6	28OCT2018-30MAR2019	EK9749	13:30	15:50	B777F/B747F(77X)
	FLT HANDLED BY ICAS						
1	BADR AIRLINE	1,2,3,4,5,6	29OCT2018-30MAR2019	TBA	17:30	18:30	KRT-ADD-KRT// B735/B733
		7	29OCT2018-30MAR2019		11:00	12:00	KRT-ADD-KRT//A300/A310/A320/A330/B737/B757/B767
1	QATAR AIRWAYS, QR	1,3,6	29OCT2018-30MAR2019	QR1427/8	23:55	01:10	DOH-ADD-DOH// A330-600/A330-300/A350-900/A320-200/A330-200/A319-133
2	SAUDIA,SV	2,4,6,7	29OCT2018-30MAR2019	SV421/0	01:45	03:20	JED-ADD-JED// A33D/A321/A320/A330/B777/B747
	SAUDIA, SV	1,3,6	29OCT2018-30MAR2019	SV425/4	23:25	01:00	RUH-ADD-RUH // A33D/A321/A320/A330/B777/B747
3	SAUDIA CARGO, SV	3	31OCT2018-30MAR2019	SV0947	13:40	16:40	B747-400F/MD11,B747-800/B777F/AB343
4	Etihad Cargo,EY	TBA	TBA	TBA	TBA	TBA	TBA
5	Air Djibouti	TBA	TBA	TBA	TBA	TBA	TBA

3.2 Flight Schedule, Flight Volume and Flight Destination of International Airlines Operating at Addis Ababa Bole Airport

Flight Date	Division	Registration	Aircraft	Operator	Flight NO	From	Arrival	Departure	To	Pax	Purpose	Touch	From	To	Bridge	STAND	M/R Name	IN	OUT
01.01.2019	21	ETARL	Q400	Ethiopian Airlines	ETHARL	HAAB	23:59				SP					12			
01.01.2019	21	ETARL	Q400	Ethiopian Airlines	ETH376			06:03	HCMH	146/7	SP								
01.01.2019	21	ETAQF	Q400	Ethiopian Airlines	ETHAQF	HAAB	00:10				SP					39			
01.01.2019	21	ETAQF	Q400	Ethiopian Airlines	ETH110			04:14	HASM	55/5	SP								
01.01.2019	21	ETAUZ	Q400	Ethiopian Airlines	ETHAUZ	HAAB	00:12				SP					44			
01.01.2019	21	ETAUZ	Q400	Ethiopian Airlines	ETH210			04:55	HAJJ	77/5	SP								
01.01.2019	21	HZAQ20	A333	SAUDYIA AIRLINE	SVA420			00:18	OEJN	101/13	SP				X	1			SY
01.01.2019	21	ETANW	Q400	Ethiopian Airlines	ETHANW	HAAB	00:33				SP					18/46			
01.01.2019	21	ETANW	Q400	Ethiopian Airlines	ETH184			04:45	HASM	48/5	SP								
01.01.2019	21	ETANX	Q400	Ethiopian Airlines	ETHANX	HAAB	00:35				SP					HR/47			
01.01.2019	21	ETANX	Q400	Ethiopian Airlines	ETH112			04:45	HAMK	72/5	SP								
01.01.2019	21	ETARN	Q400	Ethiopian Airlines	ETHARN	HAAB	00:58				SP					HR/19			
01.01.2019	21	ETARN	Q400	Ethiopian Airlines	ETH118			04:58	HADC	47/5	SP								
01.01.2019	21	ETANV	Q400	Ethiopian Airlines	ETHANV	HAAB	01:00				SP					13/7			
01.01.2019	21	ETANV	Q400	Ethiopian Airlines	ETH126			04:14	HABD	76/4	SP								
01.01.2019	21	ETANJ	Q400	Ethiopian Airlines	ETHANJ	HAAB	01:10			0	SP					HR/11			
01.01.2019	21	ETANJ	Q400	Ethiopian Airlines	ETH155			05:05	HALA	53/4	SP								
01.01.2019	21	ETALK	B737	Ethiopian Airlines	ETH339	HUEN	01:20			62/7	SP					35	SM		

01.01.2019	21	ETALK	B737	Ethiopian Airlines	ETH344			06:42	HSSS	75/7	SP								
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETHAVR	HAAB	01:23				SP					HR/6			
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH206			04:05	HADR	63/4	SP								
01.01.2019	21	ETARH	B772	Ethiopian Airlines	ETH3717	EBLG	01:40			0/3	CK					CT	MC		
01.01.2019	21	ETARH	B772	Ethiopian Airlines	ETH3911			05:03	DNMM	0/5	CK								
01.01.2019	21	ETAVA	Q400	Ethiopian Airlines	ETHAVA	HAAB	01:50			0	SP					HR/9			
01.01.2019	21	ETAVA	Q400	Ethiopian Airlines	ETH122			05:05	HAGN	75/5	SP								
01.01.2019	21	ETAVM	B7M8	Ethiopian Airlines	ETH858	FAOR	02:30			127/11	SP					49	HT		
01.01.2019	21	ETAVM	B7M8	Ethiopian Airlines	ETH829			05:40	FVFA	105/8	SP								
01.01.2019	21	ETASA	Q400	Ethiopian Airlines	ETH820	HRYR	02:31			23/4	SP					13	MC		
01.01.2019	21	ETASA	Q400	Ethiopian Airlines	ETH374				HCMA		SP								
01.01.2019	21	ETAPY	B773	Ethiopian Airlines	ETH607	ZGGG	02:39			235/16	SP					51	AG	AG	
01.01.2019	21	ETAPY	B773	Ethiopian Airlines	ETH847			06:00	FACT	309/11	SP								
01.01.2019	21	ETAVI	B7M8	Ethiopian Airlines	ETH405	LLBG	02:51			92/9	SP					50	AAW		
01.01.2019	21	ETAVI	B7M8	Ethiopian Airlines	ETH853			06:05	FMMI	74/8	SP								
01.01.2019	21	ETATJ	B788	Ethiopian Airlines	ETH725	LOWW	03:10			153/10	SP					29			
01.01.2019	21	ETATJ	B788	Ethiopian Airlines	ETH861			06:15	FCPP	106/11	SP								
01.01.2019	21	ETAUB	A359	Ethiopian Airlines	ETH707	EDDF	03:17			307/11	SP					1/23	HT	AAW	HT
01.01.2019	21	ETAUB	A359	Ethiopian Airlines	ETHAUB			04:10	HAAB	0	SP								
01.01.2019	21	ETATH	B788	Ethiopian Airlines	ETH705	LFPG	03:15			84/15	SP					31/2	AG		

01.01.2019	21	ETATH	B788	Ethiopian Airlines	ETHATH			07:00	HAAB	0	SP								
01.01.2019	21	ETAUC	A359	Ethiopian Airlines	ETH685	ZSPD	03:20			201/12	SP					22/HR	GA		
01.01.2019	21	ETAUC	A360	Ethiopian Airlines	ETHAUC			06:55	HAAB	0	SP								
01.01.2019	21	ETANO	B772	Ethiopian Airlines	ETH703	LIRF	03:26			237/10	SP					2	AAW	HT	AAW
01.01.2019	21	ETANO	B772	Ethiopian Airlines	ETHANO			05:00	HAAB	0	SP								
01.01.2019	21	ETATQ	A359	Ethiopian Airlines	ETH701	EGLL	03:29			306/11	SP					4	AG		
01.01.2019	21	ETATQ	A359	Ethiopian Airlines	ETH921			06:10	DGAA	185/10	SP								
01.01.2019	21	ETAUO	B789	Ethiopian Airlines	ETH715	ESSA	03:32			289/13	SP					3	SM	HT	
01.01.2019	21	ETAUO	B789	Ethiopian Airlines	ETH931			06:21	DNEN	301/10	SP								
01.01.2019	21	ETAVB	A359	Ethiopian Airlines	ETH605	ZGGG	03:35			138/13	SP					52	SM		
01.01.2019	21	ETAVB	A359	Ethiopian Airlines	ETH809			06:00	FAOR	323/12	SP								
01.01.2019	21	ETAQL	B772	Ethiopian Airlines	ETH713	LEMD	03:37			184/13	SP					53	GA	HT	
01.01.2019	21	ETAQL	B772	Ethiopian Airlines	ETH911			06:40	DNAA	229/12	SP								
01.01.2019	21	ETATL	B788	Ethiopian Airlines	ETH639	WSSS	03:40			197/12	SP					28	MC		
01.01.2019	21	ETATL	B788	Ethiopian Airlines	ETH332			05:30	HUEN	97/11	SP								
01.01.2019	21	ETAQN	B738	Ethiopian Airlines	ETH413	OERK	03:42			113/7	SP					34	SM		
01.01.2019	21	ETAQN	B738	Ethiopian Airlines	ETH875			06:15	FWCL	73/9	SP								
01.01.2019	21	ETALP	B763	Ethiopian Airlines	ETH687	VIDP	03:46			109/9	SP					20/HR	MC		
01.01.2019	21	ETALP	B763	Ethiopian Airlines	ETHALP			05:40	HAAB	0	SP								
01.01.2019	21	ETARE	B788	Ethiopian Airlines	ETH609	VAHH	03:47			203/10	SP					5	AAW	HT	

01.01.2019	21	ETARE	B788	Ethiopian Airlines	ETH508			05:58	DXXX	146/8	SP								
01.01.2019	21	ETALN	B737	Ethiopian Airlines	ETH826	HTDA	03:51			49/8	SP					14	GK		
01.01.2019	21	ETALN	B737	Ethiopian Airlines	ETH939			07:00	FTTJ	81/7	SP								
01.01.2019	21	ETAQM	B738	Ethiopian Airlines	ETH309	HKJK	03:54			105/9	SP					33	SM		
01.01.2019	21	ETAQM	B738	Ethiopian Airlines	ETH879			06:30	FSIA	62/10	SP								
01.01.2019	21	ETAVC	A359	Ethiopian Airlines	ETH611	VABB	03:57			337/12	SP					24	MC		
01.01.2019	21	ETAVC	A359	Ethiopian Airlines	ETH815			07:12	HTKJ	170/12	SP								
01.01.2019	21	ETAQQ	B738	Ethiopian Airlines	ETH453	HECA	04:00				SP					36			
01.01.2019	21	ETAQQ	B738	Ethiopian Airlines	ETH905			06:21	FGSL	62/8	SP								
01.01.2019	21	ETAOA	B738	Ethiopian Airlines	ETH100			04:06	HAMK	100/9	SP					8			GK
01.01.2019	21	ETAPL	B738	Ethiopian Airlines	ETH621	OMDB	04:08			1128/8	SP					8	MC	KM	KWM
01.01.2019	21	ETAPL	B738	Ethiopian Airlines	ETH362			06:21	HADR	42/9	SP								
01.01.2019	21	ETAUB	A359	Ethiopian Airlines	ETHAUB	HAAB	04:10			0	SP					23			
01.01.2019	21	ETAUB	A359	Ethiopian Airlines	ETH602			07:30	OMDB	96/12	SP								
01.01.2019	21	ETAOB	B738	Ethiopian Airlines	ETH124			04:10	HAGN	73/9	SP					10			
01.01.2019	21	ETAOS	B788	Ethiopian Airlines	ETH673	RKSI	04:20			249/13	SP					30			
01.01.2019	21	ETAOS	B788	Ethiopian Airlines	ETH865			06:50	HTDA	144/12	SP								
01.01.2019	21	ETAQO	B738	Ethiopian Airlines	ETH407	OLBA	04:27			82/8	SP					6	SM		
01.01.2019	21	ETAQO	B738	Ethiopian Airlines	ETH841			07:10	FZAA	50/10	SP								
01.01.2019	21	ETAOQ	B788	Ethiopian Airlines	ETH637	ZUUU	04:29			122/11	SP					1	SM	SM	

01.01.2019	21	ETAOQ	B788	Ethiopian Airlines	ETH863			06:42	FVHA	190/11	SP								
01.01.2019	21	ETANP	B772	Ethiopian Airlines	ETH601	OMDB	04:37			312/12	SP					32			
01.01.2019	21	ETANP	B772	Ethiopian Airlines	ETH506			06:35	SBGR	141/14	SP								
01.01.2019	21	ETAUR	B789	Ethiopian Airlines	ETH403	OEJN	05:08			138/14	SP					21/HR	MS		
01.01.2019	21	ETAUR	B789	Ethiopian Airlines	ETHAUR			06:45	HAAB	0	SP								
01.01.2019	21	ETALO	B763	Ethiopian Airlines	ETHALO	HAAB	05:15				SP					HR/25			
01.01.2019	21	ETALO	B763	Ethiopian Airlines	ETH322			06:16	HUEN	213/11	SP								
01.01.2019	21	ETASK	B773	Ethiopian Airlines	ETH501	KIAD	05:21			382/16	SP					2	KM	DK	MS
01.01.2019	21	ETASK	B773	Ethiopian Airlines	ETH901			06:55	DNMM	349/13	SP								
01.01.2019	21	ETAUD	Q400	Ethiopian Airlines	ETHAUD	HAAB	05:34				SP					HR/11			
01.01.2019	21	ETAUD	Q400	Ethiopian Airlines	ETH372			06:54	HCMA	81/6	SP								
01.01.2019	21	ETAOT	B788	Ethiopian Airlines	ETH511	KORD	05:55			226/10	SP					5/51			
01.01.2019	21	ETAOT	B788	Ethiopian Airlines	ETHAOT			09:18	HAAB	0	SP								
01.01.2019	21	ETALJ	B763	Ethiopian Airlines	ETH613	OMDB	06:10			201/10	SP					26	KM		
01.01.2019	21	ETALJ	B763	Ethiopian Airlines	ETH909			09:20	GABS	89/10	SP								
01.01.2019	21	5YFFC		KENIYA AIRWAYS	KQ458	HKJK	06:05			75/5	SP					49			
01.01.2019	21	5YFFC		KENIYA AIRWAYS	KQ459			06:55	HKJK	77/5	SP								
01.01.2019	21	ETATH	B788	Ethiopian Airlines	ETHATH	HAAB	07:03				SP					2			
01.01.2019	21	ETATH	B788	Ethiopian Airlines	ETH935			07:30	DIAP	123/10	SP								
01.01.2019	21	ETAOA	B738	Ethiopian Airlines	ETH101	HAMK	07:10			119/10	SP					49			

01.01.2019	21	ETAOA	B738	Ethiopian Airlines	ETH304			08:15	HKJK	151/8	SP						MS		
01.01.2019	21	ETAOB	B738	Ethiopian Airlines	ETH125	HAGN	07:51			106/9	SP					2	KM	KWM	KM
01.01.2019	21	ETAOB	B738	Ethiopian Airlines	ETH817			09:23	WSSA	87/9	SP								
01.01.2019	21	ETANW	Q400	Ethiopian Airlines	ETH185	HABD	08:30			59/5	SP					9	MS		
01.01.2019	21	ETANW	Q400	Ethiopian Airlines	ETH106			09:02	HAMK	82/4	SP								
01.01.2019	21	ETANJ	Q400	Ethiopian Airlines	ETH154	HALA	07:55			30/4	SP					11	MS		
01.01.2019	21	ETANJ	Q400	Ethiopian Airlines	ETH135			08:46	HAAM	77/5	SP								
01.01.2019	21	ETAVH	Q400	Ethiopian Airlines	ETH138	HAGM	08:14			78/5	SP					14	AK		
01.01.2019	21	ETAVH	Q400	Ethiopian Airlines	ETH144			09:03	HABD	72/5	SP								
01.01.2019	21	ETARN	Q400	Ethiopian Airlines	ETH119	HADC	08:01			59/5	SP					16	AK		
01.01.2019	21	ETARN	Q400	Ethiopian Airlines	ETH188			08:47	HABD	60/4	SP								
01.01.2019	21	ETAQF	Q400	Ethiopian Airlines	ETH111	HASM	08:16			62/5	SP					8	MS		
01.01.2019	21	ETAQF	Q400	Ethiopian Airlines	ETH131			08:48	HAJM	58/4	SP								
01.01.2019	21	ETANV	Q400	Ethiopian Airlines	ETH126	HAGN	08:09			78/4	SP					12	AK		
01.01.2019	21	ETANV	Q400	Ethiopian Airlines	ETH120			08:54	HALL	77/4	SP								
01.01.2019	21	ETANJ	Q400	Ethiopian Airlines	ETH135	HAAM	12:23			76/5	SP					12*	AK		
01.01.2019	21	ETANJ	Q400	Ethiopian Airlines	ETH208			13:20	HADR	73/5	SP								
01.01.2019	21	ETANI	Q400	Ethiopian Airlines	ETH129	HAAX	08:04			64/4	SP					17	AK		
01.01.2019	21	ETANI	Q400	Ethiopian Airlines	ETH102			09:22	HAMK	80/5	SP								
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH207	HADR	08:06			82/4	SP					10	KWM		

01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH137			08:50	HAOS	73/5	SP								
01.01.2019	21	ETARJ	B772	Ethiopian Airlines	ETH3906	FKKD	08:30			0/6	SP					CT	MS		
01.01.2019	21	ETARJ	B772	Ethiopian Airlines	ETH						SP								
01.01.2019	21	ETANZ	B738	Ethiopian Airlines	ETH313	HHAS	09:51			127/9	SP					52	AK	KM	KW
01.01.2019	21	ETANZ	B738	Ethiopian Airlines	ETH849			12:50	FAOR	132/8	SP								
01.01.2019	21	ETARN	Q400	Ethiopian Airlines	ETH189	HABD	11:13			66/4	SP					14	DK		
01.01.2019	21	ETARN	Q400	Ethiopian Airlines	ETH140			12:10	HABD	60/5	SP								
01.01.2019	21	ETAUD	Q400	Ethiopian Airlines	ETH373	HCMH	10:12			43/4	SP					10	BA		
01.01.2019	21	ETAUD	Q400	Ethiopian Airlines	ETH151			11:38	HAGM	56/5	SP								
01.01.2019	21	A6-EPH	B773	EMIRATE	EK723	OMDB	10:05			364/16	SP				X	2	MS	KM	KM
01.01.2019	21	A6-EPH	B773	EMIRATE	EK724			12:00	OMDB	164/16	SP				X				
01.01.2019	21	ETANX	Q400	Ethiopian Airlines	ETH113	HAMK	10:09			77/4	SP					7	BA		
01.01.2019	21	ETANX	Q400	Ethiopian Airlines	ETH142			10:50	HABD	78/5	SP								
01.01.2019	21	ETASJ	B738	Ethiopian Airlines	ETH303	HKJK	10:17			125/7	SP				X	4	KM		
01.01.2019	21	ETASJ	B738	Ethiopian Airlines	ETH346			13:20	HSSS	65/7	SP				X				
01.01.2019	21	ETAUZ	Q400	Ethiopian Airlines	ETH211	HAJJ	10:22			78/5	SP					9	KM		
01.01.2019	21	ETAUZ	Q400	Ethiopian Airlines	ETH204			11:15	HADR	74/5	SP								
01.01.2019	21	ETAPL	B738	Ethiopian Airlines	ETH363	HDAM	10:25			145/5	SP				X	11	AK	AK	AK
01.01.2019	21	ETAPL	B738	Ethiopian Airlines	ETH104			11:50	HAMK	151/7	SP				X				
01.01.2019	21	ETALK	B737	Ethiopian Airlines	ETH345	HSSS	10:42			63/7	SP				X	8	AK	AK	KW

01.01.2019	21	ETALK	B737	Ethiopian Airlines	ETH364			13:00	HDAM	90/8	SP				X				
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH136	HASO	11:52			75/5	SP					10	AK		
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH157			12:48	HALA	42/9	SP								
01.01.2019	21	ETAVL	B738	Ethiopian Airlines	ETH415	LLBG	10:54			142/8	SP					6	AK		
01.01.2019	21	ETAVL	B738	Ethiopian Airlines	ETH306			13:25	HKJK	122/8	SP								
01.01.2019	21	ETANW	Q400	Ethiopian Airlines	ETH107	HAMK	12:03			79/4	SP					11	AK		
01.01.2019	21	ETANW	Q400	Ethiopian Airlines	ETH212			12:50	HAJJ	32/4	SP								
01.01.2019	21	ETARL	Q400	Ethiopian Airlines	ETH377	HCMA	11:27			43/8	SP					15	AK		
01.01.2019	21	ETARL	Q400	Ethiopian Airlines	ETH182			13:45	HABD	56/4	SP								
01.01.2019	21	ETALO	B763	Ethiopian Airlines	ETH325	HUEN	1136			0/11	SP				X	1	DK	KM	MS
01.01.2019	21	ETALO	B763	Ethiopian Airlines	ETH334			12:48	HUEN	104/9	SP				X				
01.01.2019	21	OO-SCT	C30J	HADD AIRWAYS	OO-SCT	HKJK	11:32			3/2	SP					39	DK		
01.01.2019	21	OO-SCT	C30J	HADD AIRWAYS	OO-SCT						SP								
01.01.2019	21	ETAVJ	B738	Ethiopian Airlines	ETH848	FAOR	11:47			107/8	SP				X	5	KM	DK	
01.01.2019	21	ETAVJ	B738	Ethiopian Airlines	ETH414			13:27	LLBG	68/8	SP				X				
01.01.2019	21	ETAVH	Q400	Ethiopian Airlines	ETH145	HABD	11:50			82/5	SP					9	AK		
01.01.2019	21	ETAVH	Q400	Ethiopian Airlines	ETH166			12:35	HAGN	71/9	SP								
01.01.2019	21	ETANV	Q400	Ethiopian Airlines	ETH121	HALA	12:39			76/4	SP					14	AK		
01.01.2019	21	ETANV	Q400	Ethiopian Airlines	ETH114			13:30	HAGN	76/4	SP								
01.01.2019	21	ETAOR	B788	Ethiopian Airlines	ETH617	ZGGG	12:34			106/116	SP				X	2	DK	KM	

01.01.2019	21	ETAOR	B788	Ethiopian Airlines	ETHAOR			16:20	HAAB		SP				X				
01.01.2019	21	ETANO	B772	Ethiopian Airlines	ETHANO	HAAB	13:35				SP					29	AAB		
01.01.2019	21	ETANO	B772	Ethiopian Airlines	ETH702			21:28	LIRF	257/11	SP								
01.01.2019	21	ETATL	B788	Ethiopian Airlines	ETH333	HUEN	10:02			127/10	SP					25	DK		
01.01.2019	21	ETATL	B788	Ethiopian Airlines	ETH726			22:08	LIMC	232/11	SP								
01.01.2019	21	A6EFE	B772	EMIRATE	UAE9745	HKJK	13:40			0/3	CK					C/T	YS		
01.01.2019	21	A6EFE	B772	EMIRATE	UAE9745			14:50	HKJK	0/3	CK								
01.01.2019	21	ETAVA	Q400	Ethiopian Airlines	ETH123	HAGN	12:10			83/5	SP					16	AK		
01.01.2019	21	ETAVA	Q400	Ethiopian Airlines	ETH133			12:30	HAJM		SP								
01.01.2019	21	ETANI	Q400	Ethiopian Airlines	ETH103	HAMK	12:30			76/5	SP					13	AK		
01.01.2019	21	ETANI	Q400	Ethiopian Airlines	ETH148			16:36		79/5	SP								
01.01.2019	21	ETAQF	Q400	Ethiopian Airlines	ETH130	HAJM	10:47			56/5	SP					12	DK		
01.01.2019	21	ETAQF	Q400	Ethiopian Airlines	ETH216			11:20	HAJJ		SP								
01.01.2019	21	ETANX	Q400	Ethiopian Airlines	ETH143	HABD	13:18			78/5	SP					11	KWM		
01.01.2019	21	ETANX	Q400	Ethiopian Airlines	ETHANX			14:25	HAAB		SP								
01.01.2019	21	ETAUZ	Q400	Ethiopian Airlines	ETH205	HADR	13:43				SP					9	TN		
01.01.2019	21	ETAUZ	Q400	Ethiopian Airlines	ETH168			15:15	HAGN		SP								
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH156	HALA	14:34			32/9	SP					8	EA		
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH108			15;20	HAMK	83/4	SP								
01.01.2019	21	ETAVH	Q400	Ethiopian Airlines	ETH167	HADC	14:36			48/9	SP					10	TN		

01.01.2019	21	ETAVH	Q400	Ethiopian Airlines	ETH146			15:10	HABD	71/4	SP								
01.01.2019	21	ETANJ	Q400	Ethiopian Airlines	ETH209	HADR	15:33			75/6	SP					14	YS		
01.01.2019	21	ETANJ	Q400	Ethiopian Airlines	ETH						SP								
01.01.2019	21	ETAUD	Q400	Ethiopian Airlines	ETH150	HAGM	14:27			82/4	SP					12	TN		
01.01.2019	21	ETAUD	Q400	Ethiopian Airlines	ETHAUD			15:22	HAAB		SP								
01.01.2019	21	ETAQF	Q400	Ethiopian Airlines	ETH217	HAJJ	14:20			54/4	SP					15	TN		
01.01.2019	21	ETAQF	Q400	Ethiopian Airlines	ETHAQF			14:55	HAAB		SP								
01.01.2019	21	ETARN	Q400	Ethiopian Airlines	ETH141	HABD	14:32			59/5	SP					16	TN		
01.01.2019	21	ETARN	Q400	Ethiopian Airlines	ETHARN			15:52	HAAB		SP								
01.01.2019	21	UPF1009	F100	AIR DJBUTY	K3301	HDAM	14:13			28/6	SP					47	TN		
01.01.2019	21	UPF1009	F100	AIR DJBUTY	K3301						SP								
01.01.2019	21	ETAPL	Q400	Ethiopian Airlines	ETH105	HAMK	14:43			132/8	SP					49	TN		
01.01.2019	21	ETAPL	Q400	Ethiopian Airlines	ETH452			19:05	HECA	96/7	SP								
01.01.2019	21	ETAVA	Q400	Ethiopian Airlines	ETH132	HAJM	15:20			73/5	SP					18	EA		
01.01.2019	21	ETAVA	Q400	Ethiopian Airlines	ETH						SP								
01.01.2019	21	ETANW	Q400	Ethiopian Airlines	ETH213	HAJJ	15:44			78/4	SP					15	AAD		
01.01.2019	21	ETANW	Q400	Ethiopian Airlines	ETHANW			16:09	HAAB		SP								
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH109	HAMK	18:22			78/4	SP					9	YS		
01.01.2019	21	ETAVR	Q400	Ethiopian Airlines	ETH						SP								
01.01.2019	21	ETAVH	Q400	Ethiopian Airlines	ETH147	HABD	18:12			82/4	SP					19	YS		

01.01.2019	21	ETAVH	Q400	Ethiopian Airlines	ETH						SP								
01.01.2019	21	ETAUZ	Q400	Ethiopian Airlines	ETH169	HAGN	18:01			53/4	SP					15	YS		
01.01.2019	21	ETAUZ	Q400	Ethiopian Airlines	ETH155			05:05		63/4	SP								
01.01.2019	21	ETANV	Q400	Ethiopian Airlines	ETH114	HAAX	17:16			74/4	SP					46	EA		
01.01.2019	21	ETANV	Q400	Ethiopian Airlines	ETH118			05:00		69/5	SP								
01.01.2019	21	ETANI	Q400	Ethiopian Airlines	ETH149	HAMK	17:24			47/4	SP					7	YS		
01.01.2019	21	ETANI	Q400	Ethiopian Airlines	ETH						SP								
01.01.2019	21	ETAUY	E145	NATIONAL AIR	ETHAUY	HDAM	15:28			15/5	SP					38	EA		
01.01.2019	21	ETAUY	E145	NATIONAL AIR	ETH						SP								
01.01.2019	21	ETASA	Q400	Ethiopian Airlines	ETH375	HCMH	15:30			43/6	SP					43	AAD		
01.01.2019	21	ETASA	Q400	Ethiopian Airlines	ETH						SP								
01.01.2019	21	A6RJC	GL5T	ROYAL JET	ROJ022	OMDB	15:37			6/4	SP					7-G/A	YS		
01.01.2019	21	A6RJC	GL5T	ROYAL JET	ROJ						SP								
01.01.2019	21	ETAVI	B738	Ethiopian Airlines	ETH852	FNLU	16:05			150	SP					6	TN		
01.01.2019	21	ETAVI	B738	Ethiopian Airlines	ETH404			20:16	LLBG	33/9	SP								
01.01.2019	21	ETARD	B737	Ethiopian Airlines	ETH836	FMCH	16:23			106/8	SP					48	EA		
01.01.2019	21	ETARD	B737	Ethiopian Airlines	ETH827			21:30	HTDA	39/7	SP								
01.01.2019	21	ETASH	B788	Ethiopian Airlines	ETH507	SBGR	15:24			244/14	SP					31	AAD		
01.01.2019	21	ETASH	B788	Ethiopian Airlines	ETH672			19:25	RKSI	154/13	SP								
01.01.2019	21	ETARL	Q400	Ethiopian Airlines	ETH183	HABD	16:00				SP					44/HR	TN		

01.01.2019	21	ETARL	Q400	Ethiopian Airlines	ETHARL			00:15	HAAB		SP								
01.01.2019	21	ETATV	B738	Ethiopian Airlines	ETH337	HUEN	16:07			123/8	SP				X	11	AAB	DM	AAB
01.01.2019	21	ETATV	B738	Ethiopian Airlines	ETH412			19:55	OERK	138/7	SP				X				
01.01.2019	21	ETARM	Q400	Ethiopian Airlines	ETH357	HSSJ	16:12			37/7	SP					45/HR	EA		
01.01.2019	21	ETARM	Q400	Ethiopian Airlines	ETH			00:45	HAAB		SP								
01.01.2019	21	ETAOA	B738	Ethiopian Airlines	ETH305	HKJK	16:25			121/8	SP					12/8	YS		
01.01.2019	21	ETAOA	B738	Ethiopian Airlines	ETHAOA			23:20	HAAB		SP								
01.01.2019	21	ETALN	B737	Ethiopian Airlines	ETH938	FTTJ	16:18			56/7	SP					34	AAD		
01.01.2019	21	ETALN	B737	Ethiopian Airlines	ETH338			19:36	HUEN	54/7	SP								
01.01.2019	21	ETAQP	B738	Ethiopian Airlines	ETH936	DRRN	16:28			121/10	SP					17	YS		
01.01.2019	21	ETAQP	B738	Ethiopian Airlines	ETH302				HKJK		SP								
01.01.2019	21	ETAQQ	B789	Ethiopian Airlines	ETH904	FGSL	16:17			67/7	SP					7			
01.01.2019	21	ETAQQ	B789	Ethiopian Airlines	ETH624			19:10	OOMS	66/8	SP						YS		
01.01.2019	21	ETAOB	B738	Ethiopian Airlines	ETH817	WSSA	16:35			72/9	SP				X	9	YS	DM	DM
01.01.2019	21	ETAOB	B738	Ethiopian Airlines	ETH422			18:26	OEDF	75/11	SP				X				
01.01.2019	21	ETASJ	B738	Ethiopian Airlines	ETH347	HSSS	17:21			115/7	SP					4	EA		
01.01.2019	21	ETASJ	B738	Ethiopian Airlines	ETH612			19:50	OMDB	114/7	SP								
01.01.2019	21	ETALM	B737	Ethiopian Airlines	ETH833	FZIC	17:05			37/8	SP					37	TN		
01.01.2019	21	ETALM	B737	Ethiopian Airlines	ETH821			19:40	HRYR	45/6	SP								
01.01.2019	21	ETATJ	B788	Ethiopian Airlines	ETH861	FCPP	17:07			137/11	SP					28	YS		

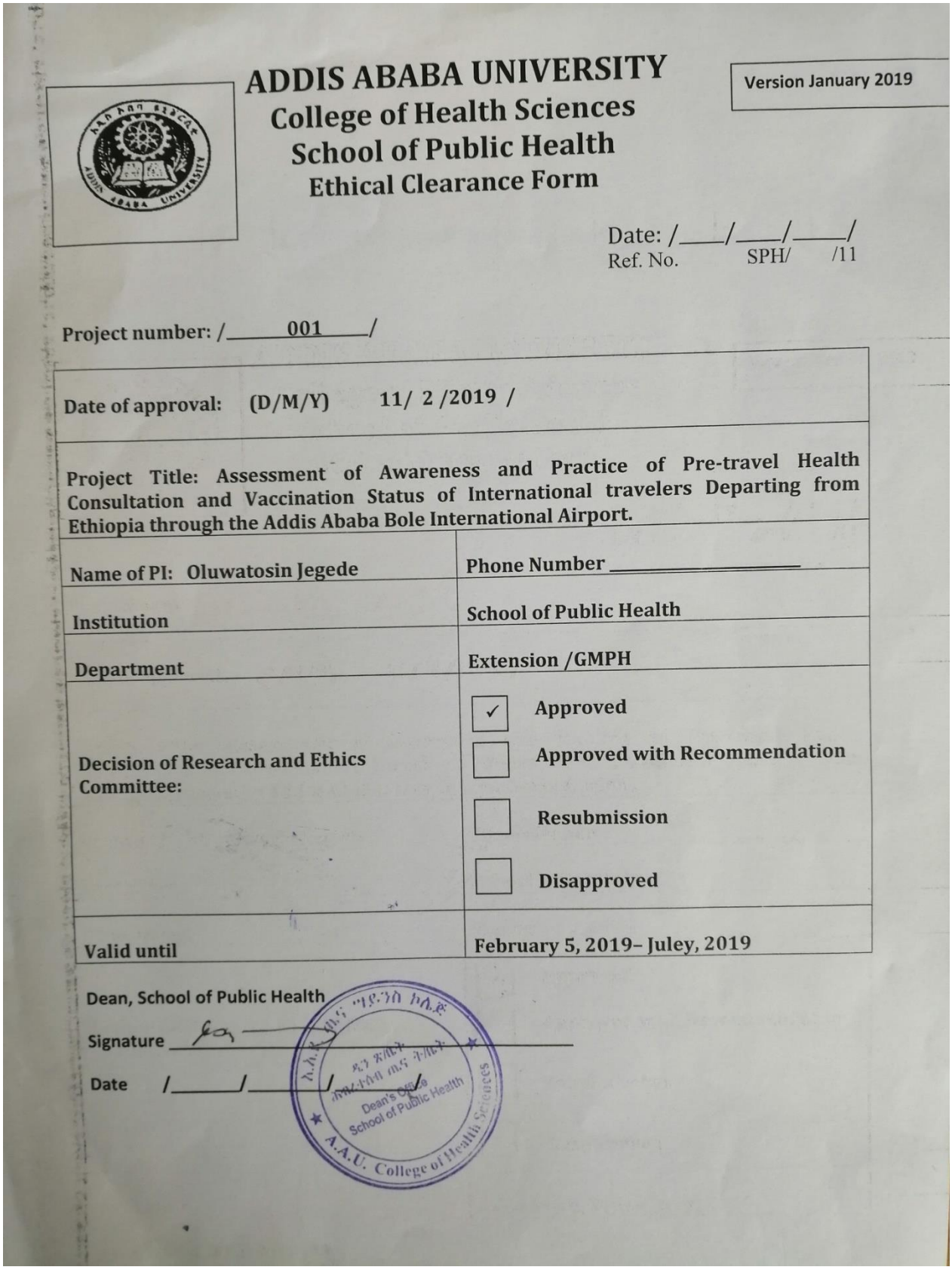
01.01.2019	21	ETATJ	B788	Ethiopian Airlines	ETH712			21:32	LEMD	180/17	SP								
01.01.2019	21	ETAVB	A359	Ethiopian Airlines	ETH808	FAOR	17:24			304/12	SP				X	1	TN	AAD	EA
01.01.2019	21	ETAVB	A359	Ethiopian Airlines	ETH706			21:11	EDDF	129/11	SP				X				
01.01.2019	21	ETAPO	B738	Ethiopian Airlines	ETH818	FQMQ	17:29			69/14	SP					36	YS		
01.01.2019	21	ETAPO	B738	Ethiopian Airlines	ETH308			21:25	HKJK	147/10	SP								
01.01.2019	21	ETAUB	A359	Ethiopian Airlines	ETH603	OMDB	17:38			352/12	SP				X	53	AAD	EA	AAD
01.01.2019	21	ETAUB	A359	Ethiopian Airlines	ETH610			19:58	VABB	238/13	SP				X				
01.01.2019	21	ETAQO	B772	Ethiopian Airlines	ETH840	FZAA	16:38			97/11	SP				X	10	YS	YS	YS
01.01.2019	21	ETAQO	B772	Ethiopian Airlines	ETH432			19:05	OTHH	146/7	SP				X				
01.01.2019	21	ETAUO	B789	Ethiopian Airlines	ETH930	DNEN	16:32			283/10	SP				X	2	EA	AAD	TN
01.01.2019	21	ETAUO	B789	Ethiopian Airlines	ETH714			21:04	ESSA	295/11	SP				X				
01.01.2019	21	ETALP	B767	Ethiopian Airlines	ETHALP	HAAB	17:00				SP					HR/27	AAB		
01.01.2019	21	ETALP	B767	Ethiopian Airlines	ETH406			18:34	OLBA	67/9	SP								
01.01.2019	21	ETAUC	A359	Ethiopian Airlines	ETH910	DNAA	17:41			210/12	SP				X	3	AAD	EA	TN
01.01.2019	21	ETAUC	A359	Ethiopian Airlines	ETH600			18:35	OMDB	303/11	SP				X				
01.01.2019	21	ETAOO	B788	Ethiopian Airlines	ETH908	GABS	17:48			118/13	SP					26	YS		
01.01.2019	21	ETAOO	B788	Ethiopian Airlines	ETH608			21:07	VAHH	215/10	SP								
01.01.2019	21	A6-UG	B738	FLY DUBAI	FDB647	OMDB	17:56			98/6	SP				X	8	YS	DM	DM
01.01.2019	21	A6-FGF	B738	FLY DUBAI	FDB648			18:09	OMDB	76/6	SP				X				
01.01.2019	21	ETAQN	B738	Ethiopian Airlines	ETH875	FWCL	16:47			87/9	SP					35			

01.01.2019	21	ETAQN	B738	Ethiopian Airlines	ETH416			19:27	OLBA	27/7	SP						TN		
01.01.2019	21	ETAVC	A3359	Ethiopian Airlines	ETH814	HTKJ	17:16			339/12	SP				X	52	EA	EA	
01.01.2019	21	ETAVC	A359	Ethiopian Airlines	ETH684			21:10	ZSPD	169/13	SP				X				
01.01.2019	21	ETAOS	B788	Ethiopian Airlines	ETH864	HTKJ	17:00			246/12	SP					32	AAD		
01.01.2019	21	ETAOS	B788	Ethiopian Airlines	ETH510			19:28	KORD	246/11	SP								
01.01.2019	21	ETAQM	B738	Ethiopian Airlines	ETH878	FSIA	17:35			158/10	SP					13	YS		
01.01.2019	21	ETAQM	B738	Ethiopian Airlines	ETH						SP								
01.01.2019	21	ETAVM	B7M8	Ethiopian Airlines	ETH829	FVFA	18:29			87/8	SP					50	TN		
01.01.2019	21	ETAVM	B7M8	Ethiopian Airlines	ETH859			20:33	FAOR	101/8	SP								
01.01.2019	21	ETAOQ	B772	Ethiopian Airlines	ETH863	FVHA	17:45			232/11	SP				X	51	EA	AAD	AW
01.01.2019	21	ETAOQ	B772	Ethiopian Airlines	ETH704			21:35	LFPG	267/12	SP				X				
01.01.2019	21	ETASK	B773	Ethiopian Airlines	ETH900	DNMM	17:47			379/17	SP				X	5	TN	EA	EA
01.01.2019	21	ETASK	B773	Ethiopian Airlines	ETH500			19:54	KIAD	380/14	SP				X				
01.01.2019	21	ETAPF	B738	Ethiopian Airlines	ETH877	FWKI	17:51			137/9	SP					16	YS		
01.01.2019	21	ETAPF	B738	Ethiopian Airlines	ETH342			21:24	HSSS	15/8	SP								
01.01.2019	21	ETAVQ	B772	Ethiopian Airlines	ETH3629	VAHH	15:17			0/3	CK					C/T	YS		
01.01.2019	21	ETAVQ	B772	Ethiopian Airlines	ETH3724			21:50	EBLG	0/6	CK								
01.01.2019	21	ETALK	B737	Ethiopian Airlines	ETH365	HDAM	16:43			95/5	SP					33	YS		
01.01.2019	21	ETALK	B737	Ethiopian Airlines	ETH						SP								
01.01.2019	21	ETALH	B767	Ethiopian Airlines	ETH8799	FSIA	17:41			0/9	SP					20	YS		

01.01.2019	21	ETALH	B767	Ethiopian Airlines	ETHALH			23:10	CT	0	SP								
01.01.2019	21	ETATQ	A359	Ethiopian Airlines	ETH920	DGAA	17:58			182/11	SP					24	YS		
01.01.2019	21	ETATQ	A359	Ethiopian Airlines	ETH				HAAB		SP								
01.01.2019	21	ETAOT	B788	Ethiopian Airlines	ETH323	HUEN	18:05			225/10	SP					30	TN		
01.01.2019	21	ETAOT	B788	Ethiopian Airlines	ETH728			22:21	HAAB	194/8	SP								
01.01.2019	21	ETAVL	B7M8	Ethiopian Airlines	ETH307	HKJK	18:17			148/8	SP					8*	YS		
01.01.2019	21	ETAVL	B7M8	Ethiopian Airlines	ETHAVL			20:26	HAAB		SP								
01.01.2019	21	ETALO	B767	Ethiopian Airlines	ETH335	HUEN	18:21			167/10	SP					21	YS		
01.01.2019	21	ETALO	B767	Ethiopian Airlines	ETH686			21:37	VIDP	164/14	SP								
01.01.2019	21	ETAVK	B7M8	Ethiopian Airlines	ETH9201	HHAS	19:03			0/4	SP					10	AAD		
01.01.2019	21	ETAVK	B7M8	Ethiopian Airlines	ETHAVK			19:45	HAAB		SP								
01.01.2019	21	ETAVS	Q400	Ethiopian Airlines	ETH9202	HHAS	21:06			0/4	SP					11/HR			
01.01.2019	21	ETAVS	Q400	Ethiopian Airlines	ETHAVS			23:45	HAAB		SP								
01.01.2019	21	ETAPY	B773	Ethiopian Airlines	ETH846	FACT	20:32			380/13	SP				X	3*	AAD	YS	AM
01.01.2019	21	ETAPY	B773	Ethiopian Airlines	RTH606			21:58	ZGGG	390/16	SP				X				
01.01.2019	21	ETATQ	A359	Ethiopian Airlines	ETHATQ	HAAB	20:31				SP				X	5*	TN	AAD	MC
01.01.2019	21	ETATQ	A359	Ethiopian Airlines	ETH700			22:20	EGLL	332/12	SP				X				
01.01.2019	21	ETAOV	B788	Ethiopian Airlines	ETH513	DIAP	21:20			104/10					X	1*	GK	MC	GK
01.01.2019	21	ETAOV	B788	Ethiopian Airlines	ETH636			22:55	ZUUU	132/10	SP				X				
01.01.2019	21	TCJHT	B738	TURKISH Airlines	THY38Y	LTBA	21:45			151/16	SP				X	2*	GK	MC	AM

01.01.2019	21	TCJHT	B738	TURKISH Airlines	THY28J			22:50	LTBA	105/6	SP				X				
01.01.2019	21	ETAOT	B788	Ethiopian Airlines	ETHAOT	HAAB					SP					4			
01.01.2019	21	ETAOT	B788	Ethiopian Airlines	ETH728				EGCC		SP								
01.01.2019	21	ETAUR	B789	Ethiopian Airlines	ETHAUR	HAAB					SP					HR/23			
01.01.2019	21	ETAUR	B789	Ethiopian Airlines	ETH402				OEJN		SP								
01.01.2019	21	ETAUC	A359	Ethiopian Airlines	ETHAUC	HAAB	21:30				SP				X	53	AG	AG	AW
01.01.2019	21	ETAUC	A359	Ethiopian Airlines	ETH604			23:40	ZBAA	167/15	SP				X				
01.01.2019	21	HZAQ16	A333	SAUDIA Airlines	SVA425	OERK	23:28			275/13	SP				X	1	MC	AW	
01.01.2019	21	HZAQ16	A333	SAUDIA Airlines	SVA424				OERK		SP				X				
01.01.2019	21	ETAOA	B738	Ethiopian Airlines	ETHAOA	HAAB	03:20				SP				X	8	AM	AM	
01.01.2019	21	ETAOA	B738	Ethiopian Airlines	ETH						SP				X				
01.01.2019	21	ETARI	B772	Ethiopian Airlines	ETH3739	VIDP	08:20			0/6	SP					C/T			
01.01.2019	21	ETARI	B772	Ethiopian Airlines	ETH3720			21:55		0/5	SP								

Annex 4: Ethical Clearance from Addis Ababa University



ADDIS ABABA UNIVERSITY
College of Health Sciences
School of Public Health
Ethical Clearance Form

Version January 2019

Date: /____/____/____/
Ref. No. SPH/ /11

Project number: /____001____/

Date of approval: (D/M/Y) 11/ 2 /2019 /	
Project Title: Assessment of Awareness and Practice of Pre-travel Health Consultation and Vaccination Status of International travelers Departing from Ethiopia through the Addis Ababa Bole International Airport.	
Name of PI: Oluwatosin Jegede	Phone Number _____
Institution	School of Public Health
Department	Extension /GMPH
Decision of Research and Ethics Committee:	☑ Approved ☐ Approved with Recommendation ☐ Resubmission ☐ Disapproved
Valid until	February 5, 2019– Juley, 2019

Dean, School of Public Health

Signature _____

Date /____/____/____/

A.A.U. College of Health Sciences Dean's Office School of Public Health

Annex 5: Supplementary Methodology and Results

5.1 Sample Size Determination

The sample size was determined using the proportion of outcomes from previous studies. This study used the Steven Toovey et al.,(46) proportion that gave the largest sample size as shown in table 11 below.

Table 11: Table of Sample size determination using proportion of outcomes from previous studies

S/No	Variable	Percentage of outcome	Sample size	Reference
1	Awareness about pre-travel vaccination	57.3	587	Min Zhang et al., 2016(51)
2	Awareness about pre-travel vaccination	77	425	Pramil Tiwari et al., 2017(26)
3	Pre-travel health seeking practice	86	289	Steven Toovey et al.,(46)
4	Pre-travel health advice sought 2 to 4 weeks	19	596	Steven Toovey et al.,(46)
5	Pre-travel yellow fever vaccination status	80	384	Steven Toovey et al.,(46)
6	Pre-travel vaccination status	26.6	300	Pavli A et al., 2014(52)

5.2 Expected Travellers' Volume for the Month of February, 2019.

The table 12 below shows the expected travellers' volume stratified by the WHO regions for the month of February, 2019. The daily expected flight volume is the cumulative for each day of the week for the four (4) weeks in the month of February.

Table 12: Expected Travellers' Volume at the Addis Ababa Bole International Airport by the WHO Region for the month of February, 2019

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Total
AFRO	26,988	17,396	24,016	28,132	27,272	27,752	30904	**182,460**
EMRO	8,616	8,792	10,996	11,004	13,928	12,584	10,568	**76,488**
AMRO	3,780	3,068	3,404	3,352	4,552	3,604	3,328	**25,088**
SEARO	5,456	1,608	4,460	2,160	4,864	5,640	2,828	**27,016**
EURO	10,776	7,576	8,376	11,540	9,208	14,908	10,020	**72,404**
WAPRO	5,268	4,048	5,852	7,640	5,172	5,940	6,748	**40,668**
Total	**60,884**	**42,488**	**57,104**	**63,828**	**64,996**	**70,428**	**64,396**	**424,124**

5.3 Travel Pattern of International Travellers included in the Study.

Table 13 shows the travel pattern of international travellers included in the study. Travellers from a developing country were 6.22 times more likely to return to developing counties than for travellers from developed countries to travel to developing countries (p <0.001; CI 4.230-9.143).

Table 13: Travel Pattern of International Travellers included in the Study.

Variable	Traveling to (N= 639)		P-Value	OR	95% CI
	Developed (%)	Developing (%)			
Country of Residence					
Developed	100 (15.6)	94 (14.7)			
Developing	65 (10.2)	380 (59.5)	<0.001	6.22	(4.230,9.143)

5.4 Reported Infections among International Travellers included in the Study.

Thirty eight (5.9%) of the total travellers were treated for infections before arriving in Ethiopia. Diagnosis of these include but not limited to 1 (0.2%), 4 (0.6%), 2 (0.3%), and 12 (1.9%) cases of common cold, Hepatitis B, measles and yellow fever respectively. A total of 5 (0.8%) out of the 639 travellers reported being treated for infection (common cold (0.2%), and yellow fever (0.3%)) during their stay in Ethiopia (Table 14).

Table 14: Treatment for Infections before Coming and During Stay in Ethiopia among International Travellers included in the Study.

Variable	Frequency	Percent (%)
Treatment for Infection before coming to Ethiopia		
Yes	38	5.9
No	601	94.1
Diagnosis:		
Common cold/flu	1	0.2
Gingivitis	1	0.2
Hepatitis	4	0.6
Malaria	2	0.3
Measles	2	0.3
Yellow fever	12	1.9
Treatment for Infection during stay in Ethiopia		
Yes	5	0.8
No	634	99.2
Diagnosis:		
Common cold/flu	1	0.2
Eye infection	1	0.2
Yellow fever	3	0.3

Table 15 shows the odds of travellers being treated for infection during their stay in Ethiopia. The odds of being previously treated for infection before coming to Ethiopia is about 26 times higher among those that were treated for infection during their stay in Ethiopia than among those who were not treated for infection during their stay in Ethiopia with 95% C.I of OR (4.154- 154.657) and p-value of 0.002.

Table 15: Odds of Being Treated for Infection during Stay in Ethiopia among International Travellers included in the Study.

Variable	Treatment for Infection During Stay (N= 639)		X^2	P-Value	OR	95% CI
	Yes (%)	No (%)				
Treatment for infection before						
Yes	3 (0.5)	35 (5.5)		0.002	25.7	(4.154, 158.657)
No	2 (0.3)	599 (93.7)				