

Research

Public Transport and Covid-19 in Ethiopia

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Public transport is a means of transport for passengers by group available for public travel. Covid-19 is transmitted through droplets generated when an infected person coughs, sneezes or exhales through close contact between peoples. The concern of this study was investigating the social distancing practices in Ethiopia in line with WHO and others standards in public transport. Taping was used for data collection like seat width, passageway width, longitudinal, lateral and diagonal spacing between passengers. Relative method of analysis was used in this study. In Ethiopia around 25% of population access road public transport. Ethiopia reduces by half (1/2) the number of passenger per vehicle to minimize transmission of covid-19. The study revealed that reduction by half (1/2) cannot fulfill the social distancing set by WHO and others. Based on detail analysis and investigation the study advices and recommends fifth sixth (5/6) and two third (2/3) reduction of number of passenger per vehicle for Double seat bus in both corridor, and single seat in both corridor and mixed seat (double seat at one corridor and single on the other) bus respectively with the support of protective equipment like face mask, daily hand wash practices, uses of sanitizers and etc. with a significant value of 100%, 95% and 90% respectively in respect to WHO and other standards, or fully lock the movements of people from place to place using road public transport practically. Unless and otherwise the expansion of covid-19 in Ethiopia will be in alarming rate in near future.

Key word: - Covid-19, Face Mask, Infected, Public Transport, Social Distancing

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INTRODUCTION

Public transport is a means of transport for passengers by group available for public travel (1). It also one of the social facilities which are provided with the aim of improving social welfare. According to world health organization (2020); coronavirus disease (Covid 19) is an infectious disease caused by a newly discovered coronavirus (2). Also, Africa CDC (2020) revealed that Covid-19 was a communicable respiratory disease

caused by a new strain of coronavirus that causes illness in humans (3). UNDP (2020), clearly define that Covid-19 was a global health crisis of our time and the greatest challenges we faced since World War II (4). Covid-19 pandemic disease is one of our current issue affects the social, economic, political situation in our globe. The impressing thing was no any means of treatment, vaccination and curing technique used to overcome the effect of this pandemic disease. The way and approach of transmission is other concerns that facilitate immediate

spread of the pandemic unexpectedly. Social interaction was the core means used to transmit this disease without any barrier and boundary. Covid-19 spreads mainly among peoples who are in close contact within about 6 feet (1.8288m~2m) and below for prolonged period (2) (3) (5). The disease was basically transmitted through droplets generated when an infected person coughs, sneezes or exhales (5). It also transmitted from infected person by breathing in the virus with close proximity of someone who has Covid 19 or surface contact which was contaminated by secretions from nose and mouth of an infected person (2). In order to overcome this problem social distancing, wearing face mask, hand washing activities and other personal protective equipment was recommended. A face mask of any sort may help capture some virus laden droplet before they can enter the air. But, a mask does not replace social distancing (6). Social interaction play vital role for the transmission of this disease. Life style, traditional practices and waste management in our everyday activity plays great role for the transmission of pandemic disease without any barrier in our world particularly in developing country like Ethiopia. In Ethiopia; due to outbreak of Covid-19 in 2019/2020 fiscal year it's expected that around 22.9% service growth reduction face the country (7).

The movement of people from place to place using different mode of transport bring the social interaction cordially. Unlawful means of using those transport facilities will bring the transmission of this pandemic unrestricted. Even if, in most country of the world stay at home or curfew was practiced to curb the problem; developing country like Ethiopia using public transport was open. People move from place to place without any restriction and safety except some part of the country like the capital of Addis Ababa. In order to overcome this problem since 23/April/2020; the government of Ethiopia introduce reduction of by half (1/2) the number of passenger per vehicle (8). Even in the major city of the country the rule to social distancing, use face mask, reduction of number of passenger per vehicles by half and social distancing at waiting station was to some extent practiced but, not absolute. In Ethiopia Social Interface, Physical contact, improper disposal of personal hygiene materials and other related practices was undertaken daily in public transport across the country. Particularly; in public transport like Minibus, Medium Bus, Large Bus and etc. at large in Ethiopia there was no any means of control and treatment of passenger fully practiced except capital city of the country with no absolute standards. As a result; via rough observation public transport was an area where unlawful social interaction was practiced in line with Covid-19 endanger in Ethiopia. The concern of this study was to investigate the social distancing practices in Ethiopia in line with WHO, USA CDC, AFRICA CDC guideline in road public transport. Under these circumstances the study

considered passengers using public transport like Minibus, Medium and Large Bus with their significant impact for the spreading of Covid-19 in Ethiopia due to improper practices of social distance (passenger seat distances) and uses of protective equipment on expansion of Covid 19 pandemic in Ethiopia and passenger uses those mode of transport for long journey. Even if daily report in Ethiopia on Covid 19 and its influence was too small while compared to other influential country like USA, UK and etc. in the world; unpredictably the consequences of this pandemic may be uncontrollable in Ethiopia in near future due to unsafe movements of people from place to place using public transport. In order to overcome this problem and its effect; proper management and unlawful social interaction protecting mechanism in public transport must be under consideration by the stake holders in the sectors, government and non-government organization, and the population at large.

MATERIALS AND METHODS

In order to undertake and analysis of the effects of Covid-19 pandemic disease in Ethiopia due to improper use of public transport and unlawful daily practices of passengers. The study collects data basically emphasize on the longitudinal, lateral and diagonal distances between passages seats in public transports from one seat corner to other. Basically; the study considers public transports facilities like minibus, medium and large bus. Taping method of data collection was incorporated in this study to define the minimum social distance (width and spacing of seat) in public transport. The raw data collected from those public transports in respect to their seat distances and passenger setup in line with social distancing practices of WHO, USA CDC AND AFRICA CDC guidelines. Under this circumstance the study consider all motorized public road transport actively involved in Ethiopia transport system. In order to undertake analysis the study uses quantitative data like seat width, passageway width, longitudinal, lateral and diagonal spacing between passengers seat with practical social distancing guideline. Method of analysis used in this study was relative analysis approach. Based on the analysis result the study conferred accordingly.

Demography and Access to public Transport in Ethiopia

In Ethiopia; road transport, air transport, rail transport and water transport were common mode of transport. Of these four types, the biggest service provider was the road transport branch that account for around 95% of the public transportation services (9). According to World

Bank report 75% and above population of Ethiopia still do not access to all weathered public transport (10). This implies that only around 25% of the society in Ethiopia access public transport. According to Worldometer Ethiopia demographic report; the total population of Ethiopia in 2020 expected 114,963,588. From this population size around 21% (24,142,354) of population size was live in urban area (11). From total population in average around 28,740,897 populations were access public transports in Ethiopia predominantly. In Ethiopia; currently, the total number of vehicles registered including motor bicycles and the locally assembled are 1,071,345 (12). Over half of the total registered 596,084 (56%) was registered in the capital of Addis Ababa followed by Oromia region with 171308, Amhara region 94,001, Southern region 52,751, Tigray region 21,938, Dire Dawa 15,160, Somali region 8,842, Benishangul Gumuz region 8,000, Harar region 6,598 and Gambella region 5,558 vehicles (12). From total vehicle locate in Ethiopia it was expected that around 15% of the vehicle where serve as private transport, while the remaining 85% serve the public at large. Total population of Addis Ababa city in 2020 was estimated around 4,793,699 (13). From total population in Addis Ababa more than 62% of the population probably access public transport (14).

Public Transport and Covid-19 in Ethiopia

Public transport is one of an area where social interaction was attentively activated. From those means and area where Covid-19 probable transmitted between passengers was public road transport with unsafe utilization of services. In Ethiopia since covid-19 pandemic was register in March 13/2020 up to May 20/2020 around 389 personnel was infected. From those 122 and 5 personnel have been recovered and died respectively (15). The expansion of covid-19 highly aggravated in the capital, Addis Ababa. According to Ethiopia Ministry of health report on May 20/2020 from totally infected personnel around 228 were confirmed in Addis Ababa (16). This implies that more than 60% of infected inhabitant was found in Addis Ababa. In order to minimize the effects of Covid-19 in Ethiopia; social

distancing and usage of protective equipment must be obligatory. In public transport like Minibus, Medium Bus, Large Bus and other motorized vehicle implementation of social distancing and uses of protective equipment plays significant role in reduction of Covid-19 effects. In this study WHO and other standard on social distancing to overwhelm Covid-19 and Ethiopia Public road transport usage were in consideration. The study consider 6 feet or 1.8388m social distancing between passengers as guideline to analysis Ethiopian real practice of public transport usage across the country on performing social distancing. In order to undertake this investigation the study consider (Longitudinal, Lateral and Diagonal) width between one end to other end passenger seat in respect to WHO and other standards on social distancing and its significant impact on expansion of Covid-19. The study only considers all motorized public road transport for further investigation and analysis of the study. The Ethiopian reduction by half the number of passenger per vehicle in all road mode of public transport cannot fulfill the social distancing standards. As a result minibus and below public transport was under consideration in this study for further analysis and judgment of public transport on its significant impact of Covid-19 transmission in Ethiopia. Even if Minibus is a passenger carrying motor vehicle that is designed to carry more people than multi-purpose vehicle have a seating capacity of up to 15 passengers (17). While medium and large bus was a vehicle designed to carrying above 15 and more passengers at a time. The data below briefly figure out the width or (Longitudinal, Lateral and Diagonal) distance between passenger seats on public road transport. The study consider the maximum width and (Longitudinal, Lateral and Diagonal) spacing between seats as a raw input to analysis the finding. As illustrated above unsafe use of public transport and Covid-19 was interdependent due to social interaction. In order to signify the spacing between seats the figures shown below basically clarify the passageway or space between passenger seats and width of seat in public transport. Based on the illustrated information below the study associates the current situation in public transport in Ethiopia and social distancing practice stated by WHO and others due to covid-19 pandemic disease.

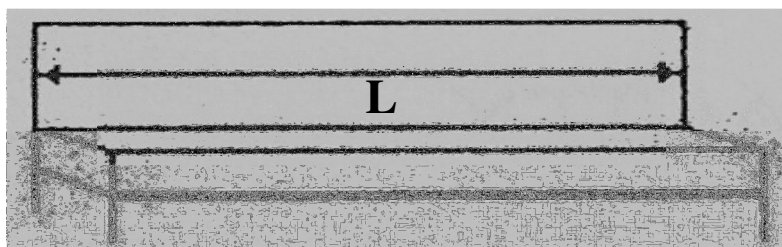


Figure 1:- Length of Seat Cushion

The figure shown above illustrated that the length of seat cushion (L) for bus should be at least 400mm per adult passenger. For school coach 275mm per child (18). The study considers the specified length of seat cushion as a maximum raw input for the analysis purpose.

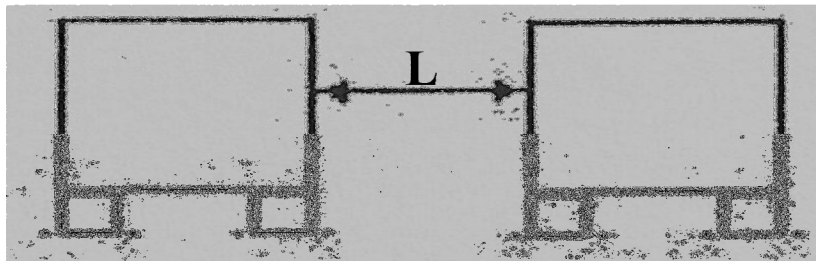


Figure 2:- Width of Aisle (Passageway)

The above figure depict that passageway width (L) of bus between seat was to be less than 380mm. Passageway width not less than 310mm in Medium and Large Bus (18). For Single seat passenger bus with recommended passageway width the transmission of Covid-19 have been highly risky while associate with those double seat using specified passageway width in line with reduction passenger by half in Ethiopia. The lateral distance between passengers were 380mm for single, 1180 for Double and 780mm for double seat that undermine WHO and other standard with 6 feet (1.8388m) minimum social distancing.

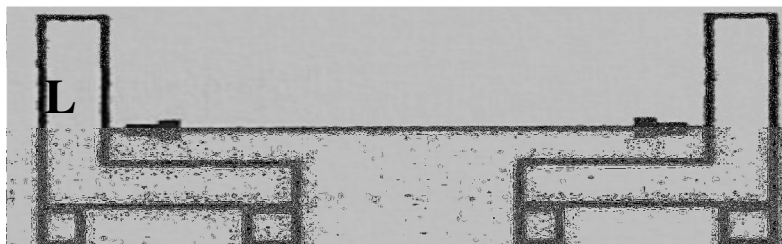


Figure 3:- Space Between Facing Seats

From the above figure space between facing seats (L) not less than 1200mm (18). For both Single, double and mixed seat passenger bus with recommended width between fronts facing seats the transmission of Covid-19 have been highly risky. That undermine WHO and other standard of 6 feet (1.8388m) minimum social distancing.

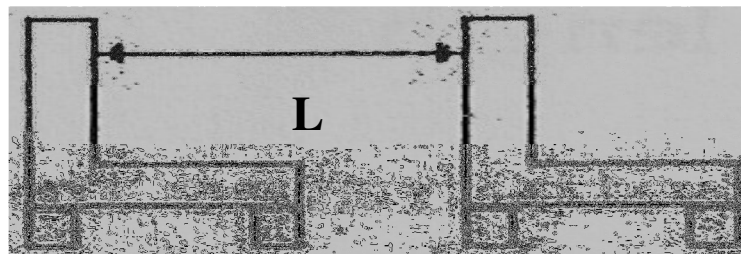


Figure 4:- Width between Front Facing Seat

From the above figure the spacing between front facing seat (L) not to be less than 660mm (18). For both Single, double and mixed seat passenger bus with recommended width between fronts facing seats the transmission of Covid-19 is highly risky. The longitudinal distance between passenger for single and double seat 660mm undermine WHO and other standard of 6 feet (1.8388m) minimum social distancing. In line with this; the real practice in Ethiopia under estimate the WHO and other standards in controlling the Covid-19 through social distancing practices in road public transport.

Based on the above information the minimum diagonal width (spacing) between two parallel end seats in medium and large bus with single, double and mixed passenger seats was 1352 mm, 1770mm and 2087mm respectively. Even if the diagonal distance was maximum between end seat passengers for double seat bus, the longitudinal space between passengers was below the standard of WHO. In consideration to public transport; the spacing between seats and the information stated by tasbus used for the analysis of the risk and its significance in Ethiopia practices with the specified standard depicted by WHO and others. As a result; In order to overcome the expansion of covid-19 in public transport the study recommend that the minimum spacing between passenger longitudinally, laterally and diagonally at minimum spacing of 6 feet or 1.8388 as per WHO and others recommendation. Based on the above investigation the study recommends formation of passenger spacing in public transport was diagrammatically depicted below both for single, double and mixed seat arrangement of buses in Ethiopia. On the figure 5, 6 and 7 shown below X and depicts the passenger and seat formation.

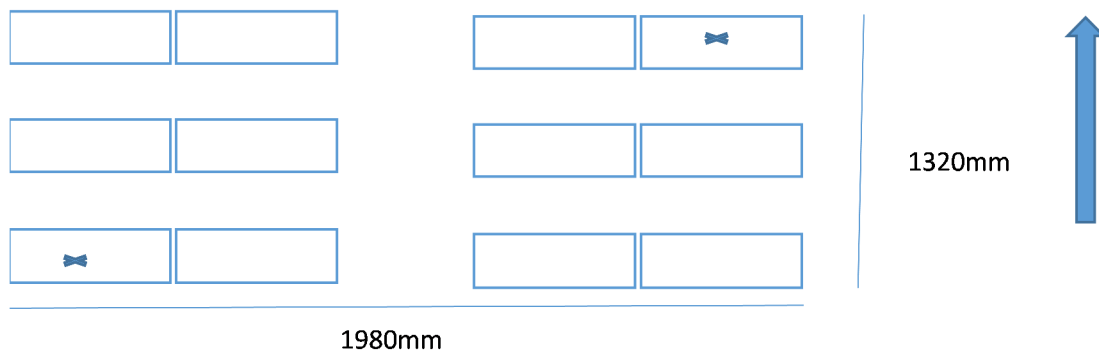


Figure 5:- Passenger seat formation for Double seat Bus

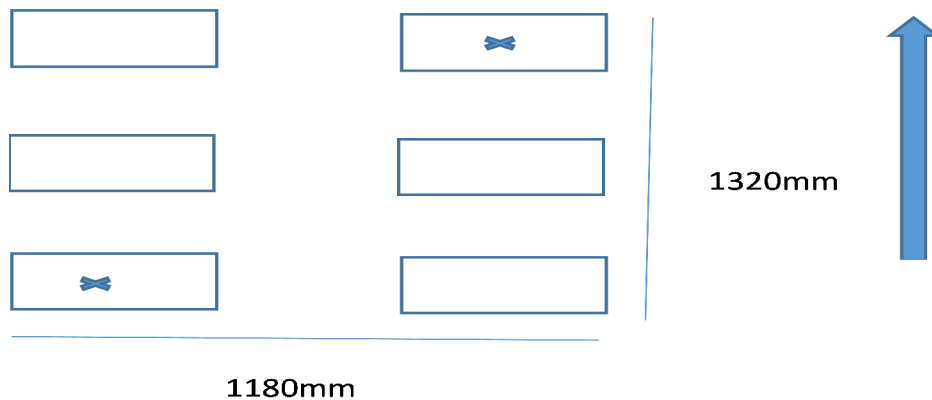


Figure 6:- Passenger seat formation for Single seat Bus

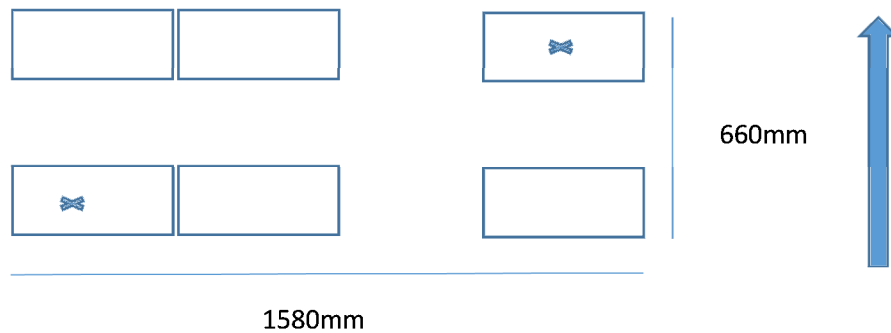


Figure 7:- Passenger seat formation for Single and Double mixed seat Bus

Based on the above analysis reduction by half the number of passenger per vehicle in road public transport cannot fulfill the standards depicted by WHO and others. As a result; the study fully define that through current government practice on road public transport utilization and in near future the transmission of Covid-19 will be at maximum rate due to improper use of social distancing guideline stated by WHO and others in use of road public transport in Ethiopia. In line with the above statement the study recommend that passenger seat formation to minimize covid-19 transmission should look figure 5, 6, and 7. This implies that the reduction of passenger by half must be changed to fifth sixth (5/6) and two third (2/3) reduction principle for Double seat bus in both corridor, and single seat in both corridor and mixed seat (double seat at one corridor and single on the other) bus respectively. This formation of seat meets 100%, 95% and 90% significant value of social distance criteria recommended by WHO and others standards in Double, Single and Mixed seat bus respectively. As a result; in order to keep more than 25% of the population that accounts 28 million plus from probable Covid-19 infection due to use of road public transport and the society at large, the government and other stake holders must implement passenger seat formation as depicted in the figure 5, 6 and 7 with the support of other protective equipment like face mask, daily hand wash practices, sanitizers and etc. or must lock the movement of people from place to place using road public transport practically.

DISCUSSION AND CONCLUSION

Covid-19 was a pandemic disease that causes for huge loss of life and economic devaluation in our planet. Particularly; in developing country like Ethiopia, 2019/2020 fiscal year due to this disease it's expected that around 11.1% of GDP growth reduction may face the country (7). In line with this, due to outbreak of Covid-19 in 2019/2020 fiscal year expected that around 22.9%

service growth reduction can face the country (7). From those services public transport was one of the activity govern Economic growth of the country. As per the investigation; use of road public transport in Ethiopia; probable have a great role to transmit Covid-19 in near future. In Ethiopia more than 28 million population access road public transport. Particularly in the capital of Addis Ababa, access to public transport was at maximum level. Implies that; from total population in the city more than 62% have a chance to access road public transport. In order to overcome Covid-19 transmission applying social distance and other protective equipment was governing issues. In line with this; the situation in Ethiopia and uses of public transport was a core means for the transmission of Covid-19 in the coming future. Even if, the government of Ethiopia apply reduction by half the number of passenger per vehicle to keep the social distance between users in bus and in some part of road public transport station. The study cannot support proclamation stated by the government. The current situation in Ethiopia road public transport; the spacing between passenger for single, double and mixed seat formation of bus; the longitudinal, lateral and diagonal distance between passengers was less than 6 feet or 1.8388m. This implies that social distancing stated by WHO and others were not fulfilled. The study on reduction of number of passenger per vehicle by half prevailed that the situation was dangerous and risky for the transmission of covid-19. In Ethiopia from total population around 25% those uses public transport have a chance to be challenged by Covid-19 infected person that uses public transport without any use of protective equipment except some major city of the country uses face mask. Particularly; in capital of Addis Ababa the situation was also risky. It means from total population of the city around 62% of the population in Addis Ababa have affinity to be infected by covid-19 due to unlawful use of public transport and lack of social distancing between passenger. To signify the study; according to Ethiopia Ministry of Health report of May 20/2020, from the total

infected personnel in Ethiopia around 60% was existing in Addis Ababa. This implies that if the government, stakeholder and population at large not practicing social distancing and use of protective equipment as rule and regulation stated by government in Ethiopia, from total population; road public transport users around 25% (28,740,897) of the inhabitants have a tendency to be infected by covid-19 in near future from infected personnel due to use of road public transport in Ethiopia. The study advises and recommends fifth sixth (5/6) and two third (2/3) reduction of passenger per vehicle for Double seat bus in both corridor, and single seat in both corridor and mixed seat (double seat at one corridor and single on the other) bus respectively with the support of protective equipment like face mask, daily hand wash practices, uses of sanitizers and etc., or fully lock the movements of people from place to place using road public transport practically. Unless and otherwise the situation and expansion of covid-19 in Ethiopia will be in alarming rate in near future. As a result; the concerning body must practice and implement WHO and others social distancing standards and protective equipment usage while performing their day to day activity in public road transport.

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STATEMENT OF DECLARATION

I declare that the research entitled “**Public Transport and Covid 19 in Ethiopia**” was our original work and it hasn't been presented for the award of any other similar titles by other researchers.

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