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Mobility Factors For Reducing Self-Reported Travel Times to Health Services

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Reducing barriers to health services access is imperative in Latin America. This study carried out in Colombia shows that the reduction of commuting time, transport expenses, along with greater Internet access, are predictors of a shorter travel time to the health services.

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EXTENDED ABSTRACT

The spatio-temporal dimension related to mobility and transportation can facilitate or inhibit the physical access to health services. The organization of transportation systems affects travel times to health services as well as individuals' desired mobility as it makes less attractive for them to take additional routes for reaching health center. Thus, transportation means, travel times and other factors that affect the mobility in general, are said to be contextual aspects that facilitate access or become barriers to the use of health services (Arcury et al., 2005). As such, this is a topic of multidisciplinary interest in the areas of transformative consumer research (Anderson et al., 2013), public policy and management of health care services (Syed, Gerber, & Sharp, 2013). Understanding the factors that facilitate mobility and access to health services enables the design of more flexible, adaptable and integrated services in specific consumption contexts, reducing both service barriers and consumers' vulnerability (Grabovschi, Loignon, & Fortin, 2013).

The study of access to health services calls the attention of different perspectives, including the geographic one. From the spatial perspective, one subject of study consists of analyzing the impact of residence areas on the development of morbidity and mortality. From the temporal perspective, other topic entails the relationship between travel times, environmental stress, and population health (Black & Black, 2009; Linard, Gilbert, Snow, Noor, & Tatem, 2012). In particular, previous research have found that travel time to the care setting is a barrier to health care delivery in different populations, especially for the poor, children, the elderly and the young (Syed, Gerber, & Sharp, 2013). When travel time is too extended it is more likely that the person decides not to go to the health service. These studies showed external factors (enabling factors) affecting access to health services that increase health inequities among populations. However, there is less knowledge about the factors that facilitate the reduction of commuting time to health services, when there are mobility problems.

In Bogotá there is a mobility problem that affects the access of the population to health services. The identification of the most vulnerable populations and their associated travel times, as well as the factors that contribute to their speeding, or slowing, can help health service providers and policy-makers to facilitate the access to health centers, especially in those populations with a greater risk of morbidity and mortality. This study tackles this problem, by identifying factors that are good predictors of shorter travel times to health services, from a population perspective.

FACILITATING FACTORS AND THE USE OF HEALTH SERVICES

Travel time to health services can be affected by several factors. Studies in health geography show that both predisposing and enabling factors are the two central aspects affecting the access to health services. Among the predisposing factors are demographic characteristics such as age, gender or ethnicity, and socio-familial characteristics, such as the composition of the household or the number of people with income. The enabling factors include the level of income, the existence of public transport, the type of medical insurance (Arcury et al., 2005), access to telecommunication media. In this context, the transport and its associated dimensions are the enabling factors.

The people mobility is facilitated or restricted by the transport type used, the number of different transportation means required and the mode of transport: public, private, motorized or non-motorized. Other geographical aspects such as home residence and workplace locations, as well as the expense derived from the use of different transportation means, also affect the access to the health center location (Lilienthal, Possemato, Funderburk, & Beehler, 2016). In general, it can be said that enabling factors can include the means available to individuals for the use of health services, they include resources, structures, institutions, procedures and regulations through which they can access or interact with health services (Levesque, Harris, & Russell, 2013). Enabling factors can include individual's resources to access the services or to facilitate their own mobility. Thus, owning a vehicle or consulting information online can also be considered within this group.

Both predisposing and enabling factors have been extensively studied as determinants of health (Kelly et al., 2016), but these factors can have an impact on travel times. In this regard, these factors help to understand the reasons what decreases barriers to consumer access to health services and the differences between populations, as it is shown in the following.

METHOD

The study was conducted with a sample of 2130 habitants of three towns (n=1745) and six small villages (n=385) in Cundinamarca department of Colombia. The three cities included the capital city (Bogotá) and two nearby intermediate cities (Facatativá and Girardot). The villages were in some cases with more urban characteristics (Chía, Ubaté and Soacha) and, in other cases, they were populations more distant of rural type (Pacho, Bituima and Villa Gómez). The regions included in the sample were selected for their high rates of maternal and infant morbidity and mortality, according to statistics from the Ministry of Health. Multi-stage sampling was used and a survey-type questionnaire was developed with a section of predisposing variables and other of enabling factors and the information about the time that the person takes in the displacement from the house to the health service. The first section included socio-demographic characteristics and family features such as age, sex, income, family size and composition, children in gestation and under five years of age. The second section was about enabling factors related to transportation and telecommunications systems used. Subjects were asked to report the use of different modes of transport employed in a typical day (i.e., the public and private motorized and non-motorized transport and walking); the frequency of use and the total expenses per week of each modality. In addition, subjects were asked to report their areas of residence and workplace as well as the usual commuting time. Finally, we inquired about the telecommunications systems used by each person, whether they had text messaging systems, Internet at home or near the residence and prepaid or postpaid cell phones.

In order to elaborate the model of the factors that predict shorter travel times, a decision tree method was used, with the CART growth method. It was employed the division into two halves of the model validation sample. We took a sample of 100 cases as the minimum for the filial node and 50 for the parental. We used for the pruning process, a standard error of zero, so that the risk of error was minimized.

RESULTS

Of the different variables included for the analysis in the predictive model, only three factors allowed to identify the populations with different durations to attend the health services: i.) commuting time between home residence and workplace, ii.) the access to Internet near to home and iii) the weekly expense in transportation. The importance of these variables was 100% in the time of travel, 47.2% having Internet and 32.9% in weekly transportation expenditure. The risk of the model obtained in the contrast sample was of 804.5, the sample deviation of 28.4, leading to a coefficient of determination of 99.6%. This is a good predictive model of the commuting times to the health service place.

The resulting hierarchical tree shows that the commuting time between home and work is the best predictor of travel times to health service. The first node indicates that travel times to the health service improve when the workplace is less than 82.5 minutes away from home. On average, the time of access to the health service decreases in 7 minutes in comparison with those who need to cover longer distances to move from home to work. Those who reported shorter commuting times from home to work and have Internet access reduce travel time to health services by an average of 5 minutes. Finally, those who have Internet near their homes and a transport cost cheaper than US\$ 12 in their weekly trips, showed the shortest travel times to health services. As for the transport expenditure, this is correlated in 43.6% with the number of public transport modalities used, this result indicates that the greater public transport expenditure generates a greater expenditure on transport in general. The results can be seen in figure 1.

On the other hand, it should be noted that none of the predisposing variables was a good predictor of travel times to the health service. Neither the individual characteristics nor the familiar aspects facilitate the access time to health services. Living in rural areas or towns close to cities is not a predictor of travel time to the health service, nor social class. In addition, the correlations between these factors and travel times between the residence and work sites are low (Chi-square = 1291 sig., 0.000, Eta = 0.24 and Chi-square = 324 sig. 0.000, Eta= 0.23, respectively).

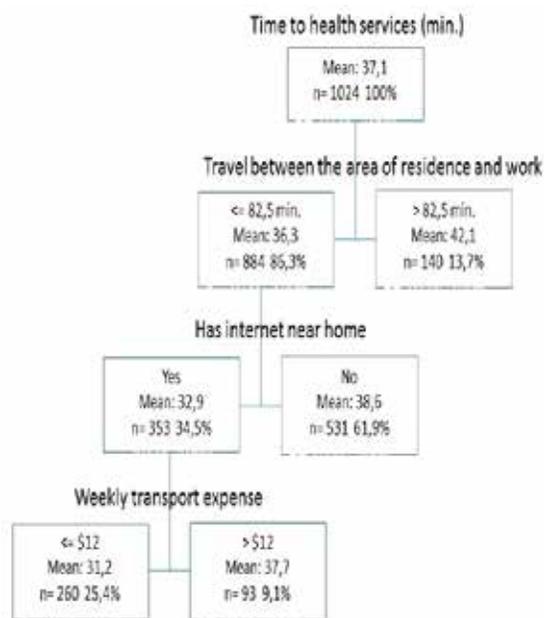


Figure 1. Predictors for the time of travel to the health service

DISCUSSION AND CONCLUSIONS

The results show that travel times to the health service are determined by spatio-temporal factors and by access to information. From the geographic variables, the commuting times from home to workplace are the best predictors of travel times to the health service. However, neither the place of residence nor the place of work are predictors of travel times to health services, this suggests that access to the health service is more related to time than to distance from the source, this is a factor more related to mobility than to the spatial location of the origin of the displacement. These findings are consistent with transport studies that show the differential role of spatial and temporal dimensions in explaining transport and mobility phenomena (Janelle & Gillespie, 2004).

This result shows that health care policies and services should consider the temporal logic of the service for their organizations. Priority must be given to commuting time as well as spatial or social class factors. The temporary convenience to access the service facilitates it in different populations, of all kinds of social classes and rural or urban zones. In this particular case, the locations from the home to the work that are superior to 84 minutes, generate populations with greater vulnerability and with a greater risk of non-physical assistance to the services, increasing the access barrier. Although each case is particular, it is necessary to deepen both the distribution of users' journeys and the relationship between travel times from different areas of origin and the network of health care centers. This information helps to create models of health care attention networks which in turn are more sensitive to users' needs as they capture travel demand (Geurs & Van Wee, 2004). From the viewpoint of consumer psychology, it is necessary to understand the time thresholds that are convenient or inconvenient for different services and conditions, so more objective measures can be established on the conditions in which travel times become barriers to access.

Finally, mobility-facilitating factors are associated with increased access to mobile information, such as that provided through the internet, and the decrease in transportation costs. The proximity to urban transport lines and information become facilitators of access and mobility towards health services, these two aspects need to be considered within the barriers to remove to increase access to health services, in addition of others factors that have been studied as financial barriers (Mcpake et al., 2013). The result also highlights the need to increase access by mobile means such as telehealth and health informatics, as well as services in homes.

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