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Bypassing facilities when seeking primary and secondary public health care services in rural Guatemala

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Abstract (240 words):

Background: The organisation and provision of health care systems are important enabling factors to promote access to health care. The public health facilities in Global South countries are usually organised at three levels of care, increasing by the complexity of service delivery. The differentiated allocation of services and resources might cause variations in seeking and bypassing behaviour.

Aim and data: This research has the aim to identify the clinical reasons for seeking services at public facilities and their association with bypassing the nearest facility considering a health system perspective by including the population across age groups and for two levels of health services in selected rural areas of Guatemala. This research used administrative health care records to identify the reasons for seeking health care and bypassing the nearest facility when visiting a primary or a secondary health care facility.

Findings: Travelling further distances in rural Guatemala is related to increased need of health care resources, increased socioeconomic vulnerabilities and transport availability. Bypassing health care services is associated with the service delivery or the supply of services at a given level of the health care structure. Bypassing the nearest facility is associated with seeking services that require increased health care resources and technical capacity than the services provided at primary level facilities. Travelling further distance is associated with public policy priorities, such as the increased attention to antenatal and childcare services, interventions related to vertical policies and the Sustainable Development Goals.

Keywords:

Primary care, health services organisation, bypassing, quality of care.

Background

Health seeking behaviour and the use of health care services is a multidimensional process influenced by the need for health care, alongside patient's perceived satisfaction [1, 2]. Health seeking behaviour can be understood in terms of the spatial dimension, this relationship usually conceptualized by the "distance-decay" effect and bypassing behaviour [3, 4]. The distance decay concept test the effect of distance over the use of the health care service [5, 6], in which lower utilisation of health care services are expected at greater travel distance [5, 7, 8], effect likely to increase in rural areas [9]. This concept has been widely used to delimit service areas and to derive measures of geographic accessibility to health care services [10, 11]. Geographic accessibility analysis assumes that individuals seek health care services at the nearest public health facility [12-14]. However, seeking for health care services at the nearest facility might reflect the actual dynamic, since there is evidence of patients travelling further distances bypassing the nearest facility [15-17].

Previous research has identified different factors associated with bypassing behaviour while exploring different health care outcomes. Bypassing behaviour has been observed among individuals seeking for specialized health care services, when experiencing severe ill-health episodes [17, 18], and given the perceived quality of the services [15, 16]. Bypassing behaviour research conducted in Global South countries has been mostly been focused upon exploring variations of this phenomenon while studying antenatal and child health care services at primary facilities [15, 16, 19]. Despite the evidence, there is a gap in the literature missing to explore bypassing behaviour under the public policy context, beyond a particular health outcome or population group.

Health care services are organised at different levels providing differentiated services [20, 21]. Health care resources to provide services are usually centralized at the health facilities, these being organised at levels of care and distributed across geographies [20]. The public health facilities in Global South countries are usually organised at three levels of care, increasing the range of services and the complexity to deliver specialised care [22]. The differentiated allocation of services and resources might cause variations in the spatial dimension of seeking behaviour.

Understanding the interaction between bypassing behaviour and its relationship with the structural characteristics of the health service organisation can provide information of quality of care [23, 24]. This research has the aim to identify the clinical reasons for seeking services at public facilities and their association with bypassing the nearest facility considering a health system perspective by including the population across age groups and for two levels of health services in selected rural areas of Guatemala. Guatemala health system provides a suitable scenario to study access to health in rural context, since its performance is comparable to other African countries [25]. This research provides a unique contribution for understanding bypassing behaviour from a health system perspective in a Global South country.

Data and methods

This research uses administrative records of individuals seeking health care services at primary and secondary level public health care facilities for selected rural areas. Public health care facilities collect

individual data counts and records visits data from every individual living within the boundaries of two geo-political units in rural Guatemala [26].

The socio-demographic and household data for the population located within the catchment is collected by an annual enumeration procedure while health care records are updated when individuals visit a health care facility. Data includes pooled visits to health care services and individuals having complete records between 2013 and 2017. The total number of visits to primary and secondary level facilities registered during the five years of analysis are 351,859. The number was reduced to 320,280 visits from patients having complete demographic records.

The administrative data was linked with the geographic location of the communities and health care facilities in order to estimate travel times. The two geographic points were used to create an Origin-Destination (O-D) matrix, assuming that the individuals depart from the community point and follow the least-cost-path. Travel times are estimated by the method using a road network analysis using AccessMod 5.6.0 software [27, 28].

Outcome variable

The outcome variable identifies bypassing behaviour for each visit to a primary or secondary level facilities located within the geographic area. One visit to a health care service was identified an individual going to a selected health facility health for a given day. Bypassing behaviour was identified using the estimated O-D travel times. Bypassing behaviour was identified for those visits having a travel time longer than the travel time to travel the nearest facility and represented as a binary outcome bypassing or not.

Explanatory variables

Bypassing behaviour variations was explained by predisposing and enabling factors [2]. Predisposing factors are represented by individual level data describing age, sex, ethnicity and spoken language. Enabling factors are the household socioeconomic index, weekday and the level of health care service visited. The variables selection was limited to the available data.

Reasons for seeking health services at public facilities

This research used health care records to identify the clinical reason for visiting a public health care service. Health care workers at primary and secondary level facilities registers the clinical impression using the International Classification of Diseases (ICD-10)[29]. This research used health care records of visits to primary and secondary health care facilities having only one diagnostic at the time of visit. This criteria reduced the sample size to 251,428 visits corresponding to 78.5% of the total records. The proportion of visits having one diagnostic was 75.6% of visits to primary level services and 87.1 % of the visits to secondary level services. The considerable high proportion of visits having only one diagnostic can potentially be explained by limited diagnostic capacity of public health services in rural areas.

The ICD-10 codes were grouped in categories using the list of the Global Burden of Diseases (GBD) project as reference [30], this list provides an expert assessed hierarchical classification system for fatal and non-fatal ICD-10 health outcomes [31]. This research used a variation of the level one group, the original classification follows three categories: (1) Communicable, maternal, neonatal and nutritional disorders; (2) Non-communicable diseases; and (3) Injuries [30].

This research subdivided the first category in three groups: Respiratory infections and tuberculosis (TB); other infectious diseases; antenatal, neonatal and nutritional disorders. This sub-division was essential in order to differentiate visits related to the most prevalent cause of death in the country, respiratory infections [32] and visits related to vertical equity interventions, antenatal and child care routine services. Four additional categories not consider in the reference list were included in order to account for every possible reason for visiting a public service. The nine grouping categories are listed as follows: (1) Respiratory infections and TB; (2) Other infectious diseases; (3) Maternal, neonatal and nutritional disorders; (4) Non-communicable diseases; (5) Injuries; (6) Antenatal care (ANC) routine services; (7) Contraceptive services; (8) Routine child monitoring services and (9) Visits related to general symptoms.

Analysis

The analysis begins with descriptive statistics to identify the most frequent reasons for seeking public health care services by level of health care. Descriptive statistics and bivariate analysis using chi-square and analysis of variance test was conducted for individuals bypassing or not the nearest health care facility. Bypassing behaviour model test the probability of travelling further distances associated with the reason for seeking health services provided at public health care facilities, alongside the other individual level factors. This research used a binary logistic regression to identify the individual probability of bypassing associated with the explanatory variables.

This research has the aim to explain bypassing behaviour by the health services organisation or service delivery, this relationship was tested by including an interaction effect between the reason for visiting and the level of the health care facility that provided the service. Two additional models tested the probability of bypassing independently for females and males using the same model and explanatory variables. The administrative data has a multilevel structure, with individuals nested within population settlements; this analysis tested the nested structure finding no effect of clustering.

Results

This research identified the most frequent reasons for seeking services at public facilities and their association with bypassing the nearest facility considering a health system perspective for two levels of the service delivery in selected rural areas of Guatemala. This research used nominal data from administrative health records to identify the individuals' factors and the reasons for seeking health care services at the public health care facilities located within the area of geographic coverage. Using data for a 5 years period, this research identified that the most frequent services provided at primary

and secondary public level facilities and the variables associated with the probability of bypassing the nearest facility.

The administrative health records including the clinical impression at the time of the visit were used to identify the most frequent reasons for seeking services at public facilities in rural areas. Under-five years old children and women at reproductive age are the most frequent users of public health care facilities. The two main reasons for visiting a primary level facility are respiratory diseases and TB (33.5%) and other communicable diseases (17.2%), while the two most frequent reasons for visiting a secondary level facility are respiratory diseases and TB (24.1%) and antenatal supervision (22.3%). There are differences in the distribution of the reasons for visiting related to the age and sex profile. Respiratory infections and other infectious diseases at childhood are the most frequent categories diagnosed for both sex groups, while women seek for antenatal care services, contraceptive services, general symptoms and non-communicable diseases. Figure 1 illustrates the reasons for visiting primary and secondary level facilities by age and sex group.

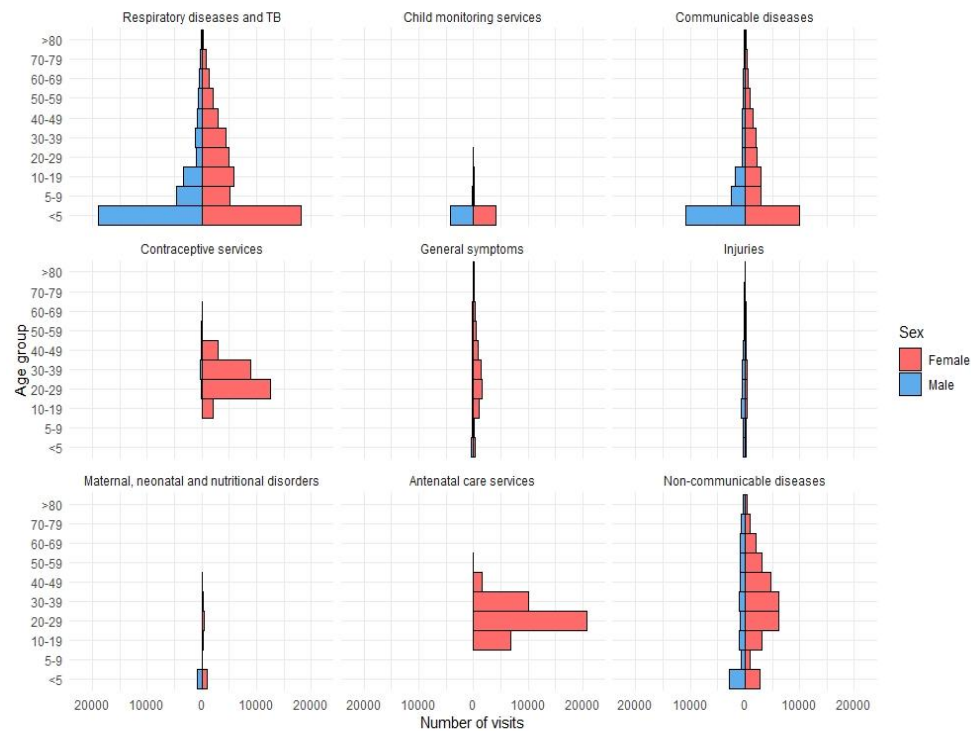


Figure 1: Number of visits classified by the reasons for seeking services at primary and secondary public health care facilities for selected rural areas, Guatemala between 2013 and 2017

This research identified that 30.7% of the visits to primary and secondary health care services bypassed the nearest facility. There are significant differences between groups and the frequency of bypassing behaviour associated with age, sex, household socioeconomic status. The results identified that 58.2% of visits to secondary levels facilities corresponds to an individual bypassing the nearest facility, while 19.8% of visits to primary level facilities have bypassed. The exploratory analysis identified an increased proportion of bypassing behaviour among females and at a greater household socioeconomic status. Results from the reasons for visiting identified that the most frequent service

that was reported at the time of bypassing was services related to antenatal care supervision, followed by non-communicable diseases, these findings are further explored by the multivariate analysis.

This research used a binary logistic regression to identify the factors associated with the odds of bypassing the nearest facility in selected rural areas of Guatemala; the results of this model are described at Table 1. The odds for bypassing the nearest facility when seeking primary or secondary health care services are associated with the following predisposing factors: age, sex, ethnic group and spoken language. The odds of bypassing the nearest facility increases at older age groups, the odds for bypassing at older age groups increase up to 43% more for individuals between 60 to 69 years old compared to under five years old children. This analysis identified that indigenous individuals have increased odds of bypassing than non-indigenous population, however declining 31% among those individuals speaking only a Mayan language compared to the odds of Spanish speakers.

Table 1: Binary logistic regression coefficients for bypassing the nearest public health care facility for selected rural areas, Guatemala between 2013 and 2017

	Odds ratio	95% CI		P value
Intercept	0.337	0.324	0.351	<0.0001
Sex				
Female	1.000			
Male	1.040	1.015	1.065	<0.01
Age				
<5	1.000			
5-9	0.949	0.912	0.988	0.0111
10-19	1.144	1.104	1.185	<0.0001
20-29	1.214	1.171	1.259	<0.0001
30-39	1.195	1.152	1.240	<0.0001
40-49	1.194	1.143	1.247	<0.0001
50-59	1.222	1.158	1.290	<0.0001
60-69	1.441	1.355	1.533	<0.0001
70-79	0.958	0.881	1.040	0.321
79>	1.007	0.890	1.137	0.818
Socioeconomic group				
Lower	1.000			
Middle	0.859	0.840	0.879	<0.0001
Upper	0.754	0.736	0.772	<0.0001
Language				
Spanish	1.000			
Mayan	0.684	0.652	0.718	<0.0001
Spanish and Mayan	1.027	0.968	1.089	0.3794
Ethnicity				
Non-indigenous	1.000			
Indigenous	1.203	1.148	1.260	<0.0001
Diagnostic category				
Respiratory infections and TB	1.000			
Child monitoring	0.900	0.833	0.971	<0.001
Antenatal care services	1.268	1.216	1.322	<0.0001
Communicable diseases	1.087	1.050	1.126	<0.0001
Contraceptive management	0.909	0.866	0.954	<0.01
General symptoms	0.986	0.921	1.054	0.6756
Injuries	0.796	0.723	0.876	<0.0001
Maternal, neonatal and nutritional disorders	1.157	1.042	1.283	<0.01
Non-communicable diseases	1.036	0.997	1.077	0.068
Interaction* level 2				

	Odds ratio	95% CI		P value
Child monitoring	0.893	0.786	1.014	<0.0001
Antenatal care services	1.266	1.192	1.345	<0.0001
Communicable diseases	0.979	0.920	1.041	0.0812
Contraceptive management	0.735	0.685	0.789	<0.0001
General symptoms	0.933	0.835	1.043	0.221
Injuries	2.024	1.767	2.321	<0.0001
Maternal, neonatal and nutritional disorders	1.606	1.290	2.006	<0.0001
Non-communicable diseases	1.183	1.112	1.258	<0.0001
Weekday				
Monday	1.000			
Tuesday	0.973	0.946	1.001	0.055
Wednesday	0.974	0.946	1.002	0.071
Thursday	1.047	1.016	1.078	<0.01
Friday	1.018	0.986	1.051	0.243
Saturday	1.247	1.146	1.357	<0.0001
Sunday	1.064	0.969	1.167	0.131
Level of health care service				
First level	1.000			
Second level	5.909	5.685	6.142	<0.0001
Site				
Site 1	1.000			
Site 2	0.338	0.322	0.354	<0.0001
Year				
2013	1.000			
2014	0.987	0.957	1.017	0.386
2015	0.965	0.935	0.996	0.026
2016	1.049	1.017	1.081	0.001
2017	1.161	1.128	1.195	<0.0001

Results for the multivariate analysis identified some enabling factors associated with bypassing behaviour. This research found that travelling further distance is associated with the household socioeconomic index, weekday of the visit and the health service organisation. The odds of bypassing is associated with the household socioeconomic status, individuals living in a household classified at the upper socioeconomic group have lower odds of bypassing than users from the lowest socioeconomic group. The probability of travelling further distances or bypassing the nearest facility is associated with the day of the week; the odds for bypassing increasing Saturdays and Thursdays compared bypassing on Mondays.

This research found that bypassing behaviour is associated with the organisation of the health services delivery organisation, this relationship being tested by the interaction effect between the reason for seeking services and the level of the public health care facility visited. This analysis identified that the odds for bypassing significantly increases 5.0 times the odds of bypassing a primary level facility. This analysis identified that bypassing when visiting another primary level facility increases for individuals seeking for antenatal care services and communicable diseases, while declining for child monitoring and injuries, compared to the odds of bypassing when seeking for services related to respiratory infections. Travelling further to visit a secondary level facility is associated with seeking for services related to injuries, antenatal care, maternal and neonatal disorders and non-communicable diseases. The odds for bypassing seeking for a secondary services decline for contraceptive management and child monitoring compared to the odds of bypassing a primary level facility seeking for services related to respiratory infections. Figure 2 illustrates the O-D flows for the most frequent reasons associated with bypassing the nearest public health care facility.

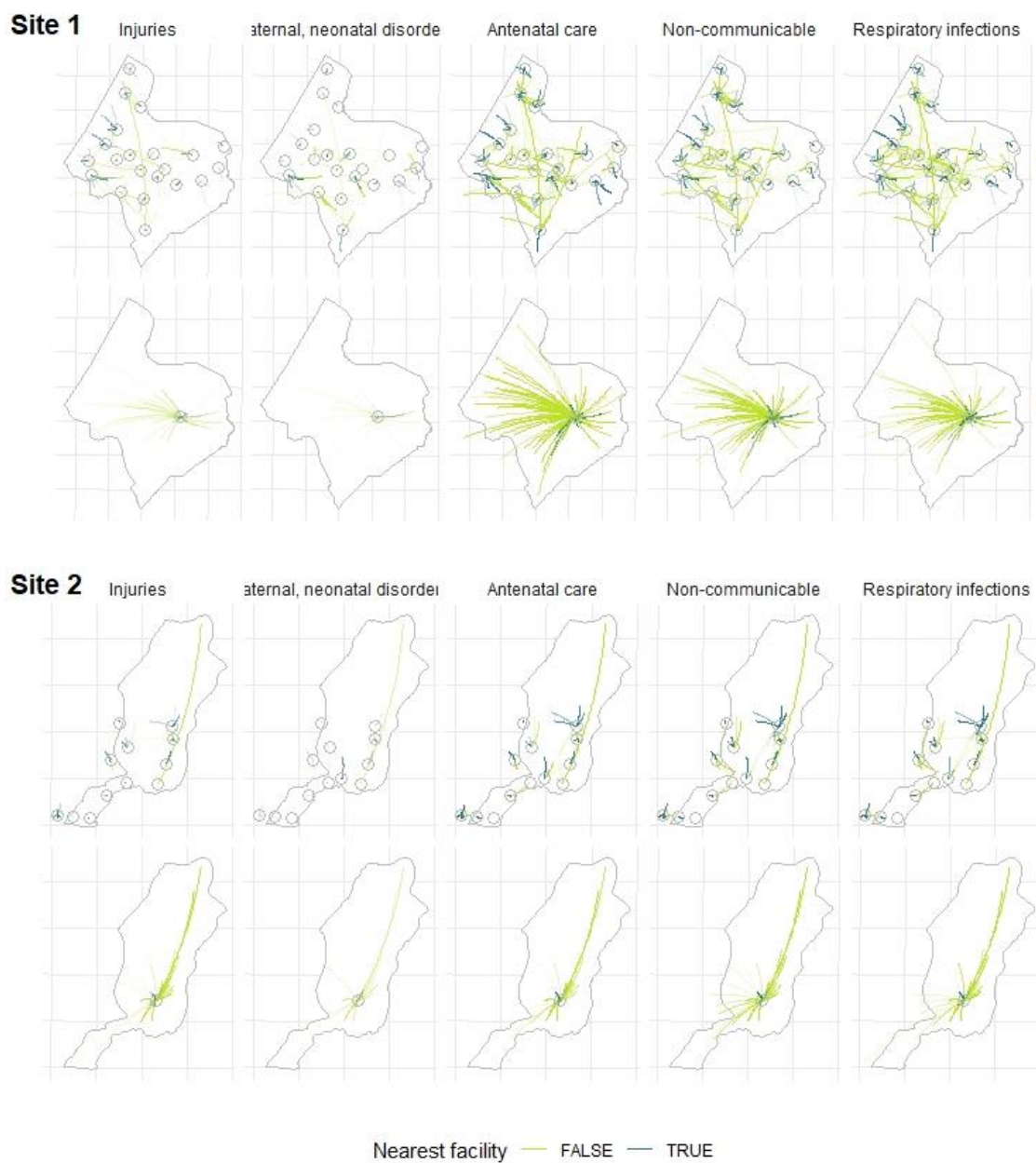


Figure 2: Origin-destination flows for the most frequent reasons to bypass the nearest health care facilities in selected rural areas, Guatemala, 2017

This research tested bypassing behaviour independently for males and females in order to account for differences in the reasons for visit health care facilities. The independent models for each sex identified similar a similar association of the regression coefficients of the overall model, however observing some differences in bypassing related to the service. The odds for females bypassing the nearest facility seeking care at a secondary level facility increases for antenatal services and maternal, neonatal and nutritional disorders, while males bypassing to secondary facilities are seeking care for injuries and non-communicable diseases. There are differences in the odds of bypassing associated with the contextual dynamic of the study sites, site two having reduced odds for bypassing the nearest

facility compared to site one. Finally, this research identified that the odds for bypassing have increased over the analysed period.

Discussion

This research identified the most frequent reasons for seeking services at public facilities and their association with bypassing the nearest facility considering the health service organisation for selected rural areas of Guatemala. The most frequent services provided at public health care facilities in rural Guatemala for females and males are related to under-five year's old morbidities, nevertheless, having reduced health care services to reach males, adults and older age groups. Antenatal care and contraceptive services are the two most frequent reasons for seeking public health services for women at reproductive age, the most frequent users of public services. The increased demand of services or diagnostics related to the biological role of women highlight non-neutral gender public policies, outcome of a social welfare system that reinforces gender differences [33]. The emphasis of maternal and child health care public policies likely to be relevant for agrarian societies, promoting fertility to support the economic social structure [34].

The bypassing behaviour analysis identified predisposing and enabling factors associated with individuals traveling longer distances than the nearest health care facility in rural Guatemala. This research identified that age, sex and ethnic background are predisposing factors associated with the probability of bypassing. This research found that bypassing behaviour increases for males, indigenous populations and older age groups, findings potentially indicating an increased need for health care services. Bypassing behaviour at older age groups can be interpreted as an indicator of individuals seeking for services that require a greater technical capacity than the services provided by auxiliary nurses at primary health facilities. It is expected to find increased utilisation of health care services at older age groups, individuals likely to be diagnosed multiple conditions or co-morbidities [35], having chronic conditions increases the likelihood of bypassing lower levels of the health care services while seeking for specialised services [17, 36].

This research identified that bypassing behaviour is highly associated with seeking for health care services provided at a secondary level facility. This analysis found that most part of the individuals in rural areas visit the nearest facility or primary care service, while the probability of bypassing increases for secondary level services. Reduced bypassing behaviour at primary level facilities was associated with seeking for child monitoring and contraceptive services compared to bypassing the nearest primary health care facility when seeking for services related to respiratory diseases. These findings are aligned to previous research conducted in rural Mozambique, finding that women seeking for sexual and reproductive health care services tends to visit the nearest primary health care facility [37]. Increased bypassing behaviour when seeking for secondary level services in rural Guatemala indicates an increased need for services that are provided by professional health care services or that require greater resources than the ones available at primary level facilities. This relationship is further tested by the interaction effect between the reasons for visiting a primary or a secondary level facility.

The aim of this research was to explore bypassing behaviour under a health system perspective, across age groups and for two levels of the health service organisation. This relationship was tested by an

interaction effect between the reasons for seeking health care services at public facilities and the level of the health care service attended. This research identified that visits to secondary level services are related to seeking for services that require an increased specialisation or treatment capacity than the services provided at primary health care facilities. The probability of bypassing to visits secondary level facilities increases for individuals seeking care for injuries and non-communicable diseases, services that are likely to require health care resources beyond the capacity of auxiliary nurses located at primary health facilities. Bypassing to visit secondary level services was associated with public policy priorities, relationship being observed among those individuals seeking services related to antenatal care and maternal, neonatal and nutritional disorders. These findings are aligned to previous research, identifying bypassing when seeking for services provided at specialised clinics, hospitals [38-40] and greater supply of resources in Global South settings [15]. Furthermore, the interdependence between the health system organisation and bypassing behaviour in Global South settings is usually conceptualised within the quality of care framework [41-43].

This research identified that household socioeconomic status and mobility are some enabling factors associated with seeking for health care at a facility located at a further distance than the nearest service. Bypassing decline among individuals classified at the upper socioeconomic category compared to those at the lowest group. This relationship is expected, the most frequent users of public health care services in rural Guatemala are likely to have lower socioeconomic status and reduced financial means to afford private health care services. Increased bypassing behaviour among individuals at the lowest socioeconomic group can potentially be explained by the health status or increased need for health care services [44], exemplified by children and adults in rural Guatemala experiencing acute respiratory infectious having increased hospitalisation rates [45]. Bypassing the nearest facility is associated with mobility, finding increased odds of bypassing for two days of the week. Increased bypassing on Thursdays and Saturday can be interpreted as an indicator of increased transport availability; these are “market days” for bartering at the urban centre of the administrative unit. This finding is aligned to previous research finding that the use of health services is associated to transport availability [46, 47] and highlights the need to consider service provision with the local context and the habitual geographic space [48, 49].

The probability of bypassing differs at the two study sites, this variation might be related to differences to environmental or socio-political context of the study sites, site two having reduced bypassing behaviour compared to site one. These findings might be explained by the characteristics of the population, being almost exclusively indigenous and speaking mostly a Mayan language. Indigenous populations in Guatemala, particularly women, are less likely to use institutional sexual and reproductive health services [50, 51], having experienced racism and increased mistrust to health care providers [50, 52]. These factors can potentially negatively influence individuals satisfaction [53] and therefore influence the willingness to travel to seek public health care services. Additionally, this research identified that bypassing behaviour has increased over the period of analysis; this might be due to different factors, including a change in the demographic structure, a change in the epidemiological profile or increased public policy interest to improve maternal and child health care.

The strength of this research relies on using individual level data across age groups, as well as considering visits to two levels of the health care services for a five years period in a Global South

country context. The findings of this research identified that bypassing behaviour is associated with the health care service provision and travelling further distances is associated with seeking care that require greater capacity and resources. This research highlighted the limited capacity of primary health care services to provide health care services across age groups and for acute and chronic conditions. Despite providing evidence for two geographic administrative units only, the findings of this research are representative of the provision of health care services for two levels of services.

This research is not conducted without limitations. This research used visits data from those individuals having only one ICD-10 at the time of visit, disease-by-disease records might provide a distorted view of the morbidities and the population health profile [54], given that the health status is a dynamic process with multiple stages and multiple diagnostics. A summary measure using multiple ICD-10 codes from vital registration data can be estimated, procedure requiring complete medical records [54, 55]. This summary measure was not possible to apply in the context of this research; since there is no information about the complete medical history and the majority of the visits had only one ICD-10. Furthermore, this research used data for individuals living and seeking care at public facilities located within the geographic boundaries of the administrative unit, ignoring the influence of other health care providers. Despite this limitation, the findings of this research provide a unique contribution to understanding bypassing behaviour under a health system perspective in a Global South context.

Conclusion

The users of public health services in rural Guatemala are likely to seek health care services following a rational behaviour, most part of visits to primary health care facilities correspond to individuals travelling to the nearest facility. Bypassing behaviour increases at older age groups and when seeking for secondary health care, services provided by professional healthcare workers. Travelling further distances in rural Guatemala is related to increased need of health care resources, increased socioeconomic vulnerabilities and transport availability.

Bypassing health care services is associated with the service delivery or the supply of services at a given level of the health care structure. Bypassing the nearest facility is associated with seeking services that require increased health care resources and technical capacity; this is observed by the increased probability of visiting a secondary level facilities for injuries, acute conditions and non-communicable diseases. These findings highlight increased barriers to access to professional health care workers, diagnosis and other health care resources in rural areas, and likely to increase in remote areas or with increased social and financial vulnerabilities.

Bypassing behaviour was observed in relationship to the structural characteristics of the health care system provision, allowing understanding this phenomenon as an indicator of the limited provision of health care services at primary facilities or reduced quality of care. Furthermore, this research provided evidence that bypassing behaviour and the spatial dimension of access can be modified by public policy priorities, such as the increased attention to antenatal and childcare services, interventions related to vertical policies and the SDGs.

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