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Abstract

Strengthening primary health care (PHC) is considered a priority for efficient and responsive health systems, but empirical evidence from low- and middle-income countries is limited. The stepwise introduction of family medicine across all 81 provinces of Turkey (a middle-income country) between 2005 and 2010, aimed at PHC strengthening, presents a natural experiment for assessing the effect of family medicine on health service utilisation and user satisfaction.

The effect of health system reforms that introduced family medicine on utilisation was assessed using longitudinal, province-level data for 12 years and multivariate regression models adjusting for supply-side variables, demographics, socio-economic development and underlying yearly trends. User satisfaction with primary and secondary care services were explored using data from annual Life Satisfaction Surveys. Trends in preferred first point of contact (primary vs. secondary, public vs. private), reason for choice and health services issues, were described and stratified by patient characteristics, provider type, and rural/urban settings.

Between 2002 and 2013, the average number of PHC consultations increased from 1.75 to 2.83 per person per year. In multivariate models, family medicine introduction was associated with an increase of 0.37 PHC consultations per person ($p < 0.001$), and slower annual growth in PHC and secondary care consultations. Following family medicine introduction, the growth of PHC and secondary care consultations per person was 0.08 and 0.30 respectively a year. PHC increased as preferred provider by 9.5% over 7 years with the reasons of proximity and service satisfaction, which increased by 14.9% and 11.8% respectively. Reporting of poor facility hygiene, difficulty getting an appointment, poor physician behaviour and high costs of health care all declined ($p < 0.001$) in PHC settings, but remained higher among urban, low-income and working-age populations.

Word count: 277 words

Introduction

Since the declaration of Alma-Ata in 1978 a growing body research suggests the positive effect of primary health care (PHC) on health outcomes and wider health system functions. Evidence indicates that stronger PHC in health systems is associated with reduced premature and avoidable mortality from improved management of children’s health, infectious and chronic diseases – and a more equitable distribution of these health outcomes (Macinko et al., 2003, Atun, 2004, Kruk et al., 2010, Kringos et al., 2013, Engstrom et al., 2001, Starfield et al., 2005, Kringos et al., 2010, Friedberg et al., 2010). Health systems with well-functioning PHC attain health outcomes at a lower cost (Starfield et al., 2005, Engstrom et al., 2001, Martin et al., 2010), provide improved access to and coverage of services (Kruk et al., 2010, Atun, 2004, Kringos et al., 2010), achieve more equitable service utilisation (Kruk et al., 2010, Starfield et al., 2005), and reduce avoidable hospitalizations (Kringos et al., 2013). Within country analyses of PHC reforms can provide valuable information, but studies on wider health system effects are limited especially from low- and middle-income country (LMIC) settings (Panel 1). As many LMICs seek to make progress towards universal health coverage (UHC) (World Health Organization, 2013, World Health Organization, 2010), PHC once again offers the promise of delivering ‘health for all’, but there is need for further evidence in the effect of strengthening of PHC especially in LMIC settings.

Insert here Panel 1 | Country-level evaluations of PHC reform in LMICs

Beginning in 2003, the Republic of Turkey has implemented major health system reforms, the Health Transformation Program (HTP), with a particular emphasis on expanding PHC through major organisational, financing and service delivery changes to achieve UHC. Prior to the reforms Turkey had an inequitable health system: almost a quarter of the population lacked health insurance and there were large variations in health service coverage and outcomes by regions which had big differences in income and education-levels (Atun et al., 2013) (Panel 2).

Insert here Panel 2 | Primary Health Care in Turkey before the Health Transformation Program

As part of the HTP, Turkey introduced the new family-medicine (FM) model (Panel 3), after initially piloting in the Düzce province in 2005 (Atun et al., 2013). The FM model replaced the historic PHC system with FM teams offering, free of charge, an increased range of services, including immunisations, monitoring of children and pregnant women, family planning, home visits, and regular annual health checks (Tatar et al., 2011). By 2011, the entire population of Turkey (all 74 million in 81 provinces) was covered by the FM programme, with 20,243 FM doctors working in 6,463 family health centres (World Bank, 2013). The phased roll-out of PHC centred on the new FM model in Turkey (Figure 1) provides a natural experiment to evaluate the effect on health outcomes and health system functioning in an LMIC setting. In this paper we evaluate the effect of the new FM model on service utilisation and user satisfaction.

Insert here Panel 3 | Key changes to health system functions related to primary health care implemented in Turkey (2003-2010)

Insert here Figure 1 | Roll-out of family medicine across Turkish Provinces and population (2005-10)

Materials and Methods

The analysis was undertaken in two parts. First, a longitudinal panel regression was employed to evaluate the impact of FM introduction on healthcare utilisation. This was followed by descriptive analysis of responses to the Turkish Life Satisfaction Survey to understand changes in the public usage and perception of health services occurring at the same time.

Health service utilisation

Data Sources

Province-level data on health care resources (number of health professionals and healthcare facilities) and utilisation (number of consultations) for the years 2002-2013 were provided by the Turkish Ministry of Health (MoH), Directorate General of Health Research (Republic of Turkey, 2013a). These data are routinely collected by all primary, secondary and tertiary healthcare providers in provincial administration units and transferred electronically each month to the MoH's central database (Health-Net information network). The MoH Directorate General also provided the date of introduction in each province and demographic data including population estimates derived from census data. This demographic data was only available for 2007-2012.

Socio-economic development indices for each province for 2011, based on 61 indicators, were collated from a report published by the Ministry of Development (Turkish Ministry of Development, 2013). These indicators are used to judge the development of each province and were used in stratified analysis.

Analysis

The number of consultations in primary care and secondary care per person and the ratio of primary to secondary care consultations were generated as main outcome variables. Two province-year data-points were excluded, Bingöl in 2009 and Siirt in 2006, as both had highly

inconsistent number of consultations for single years. The erroneous points represented a 430% increase in PHC consultations in Bingöl and a reduction in secondary care consultations of 85% in Siirt. The number of included province-year data-points in the analysis was 971 for both primary and secondary care consultations.

Multiple regression models were utilised to measure the effect of the introduction of FM model, controlling for health system variables (public primary physicians per 10,000; public hospital specialists per 10,000; public hospitals per 10,000; public PHC centres per 10,000; and the presence of a university hospital in the province) as well as population characteristics (rural population (%); population aged 65 and over (%); population aged 14 and under (%); and the province population). Because demographic data was available only for the years 2007-2012, it was linearly extrapolated for the years 2002-2006 and 2013. The penetration of family medicine model in each province was measured by an indicator variable (0,1) for whether the FM model was introduced, and the number of years since the introduction of the FM model (0,1,2,3....).

Insert here Table 1 | Overview of data sources and variables used in longitudinal panel regression on healthcare service utilisation

We used fixed effect model to remove unobserved heterogeneity in each province (model specification in Appendix 1). The Hausmann test indicated the appropriateness of a fixed effect model ($X^2 = 508.58$, $p < 0.0000$). Random effects and a mixed-level model (with region clustering of provinces) were also undertaken (results not shown) demonstrating consistent coefficients to the preferred fixed-effect model. The same model was run for each outcome variable (primary care consultations per person, secondary care consultations per person and the ratio of PHC to secondary care consultations). Sequential addition of the health system and demographic covariates are shown in appendix 2. We undertook supplementary analyses through stratification of the regression models by three development index groups (31

provinces in the lowest, 29 in the intermediate, and 21 in the highest) to investigate whether there was any differential effect of the FM model by socio-economic deprivation categories.

Preferred Health Care Provider, Reasons for Choice and Barriers to Access

Data Sources

Data for the analysis of user satisfaction were derived from the Life Satisfaction Surveys for the years 2005-2012. This is an annual cross-sectional carried out annually by TURKSTAT (Turkish Statistical Institute) using a geographical representative (at the national, urban/rural, and region level) sample of households selected through two-stage stratified cluster sampling (Republic of Turkey, 2013b). About 7,000 individuals are interviewed each year (Table 1). Demographic information (e.g. age, sex, urban/rural location, and educational status) is obtained from all members of the household. The survey questions cover a wide range of topics, including preferred provider as first point of contact when ill, reasons for choosing the provider, and specific issues around access to the preferred provider of care. The patient experience questions include whether there were any issues getting an appointment, with hygiene/sanitation of the facility, with physician's behaviour and with the cost of examination or medicines.

Insert Table 2 here | Number and Characteristics of respondents to Turkish Life Satisfaction Survey (2005-2012)

Analysis

There were 56,232 respondents to the Life Satisfaction Survey over 8 years. The number of respondents per year ranged from 6,442 to 7,956. Respondents could only provide one answer to each fixed-choice question. In addition to the questions of interest, urban or rural

location, self-rated sufficiency of income, education attainment and source of payment for healthcare of respondents were included in the analysis.

The responses for first point of contact when ill were grouped as public primary, public secondary, private, or other, to ensure consistency of measurement across years. Time trends over 8 years of preferred choice of provider were examined for the total survey and stratified by rural or urban location. Trends were tested for significance with unadjusted linear regression.

The reasons for choice of provider were also grouped for clarity and consistency. These groups were necessity (meaning no other choice), proximity (or closeness to service provider), service satisfaction and other. The first three groups represented 93.4% of responses. Other groups included potential responses of “based on recommendation”, “knowing someone in the service”, “habit” and “low co-payment”. The responses were analysed over time and by preferred provider (public primary, public secondary and private). Again, trends were tested for significance with unadjusted linear regression.

Responses to the problems encountered whilst accessing healthcare were recorded as “yes”, “no” or “do not know”. Yes/no responses accounted for 93.9% to 97.0% of responses. The questions of interest were: problem getting an appointment; problem with hygiene or sanitation of the facility; problem with the physician’s behaviour; problem with the cost of examination; and problem with the cost of medicines. We merged responses to the two questions on costs leaving four questions in total. The response were stratified by preferred healthcare provider and analysed over time. We examined whether there were significant changes in the proportion of respondents reporting problems encountered between 2005 and 2012 with the Student’s t-test. Logistic regression, controlling for urban or rural location, self-rated sufficiency of income, education attainment and source of payments for healthcare, was

employed to further support the time trends in problems encountered with healthcare, but is not reported as the results are congruent.

Results

Health Service Utilisation

Service utilisation in both primary and secondary care increased over the period of analysis. Between 2002 and 2013, PHC consultations increased on average by 0.17 consultations per person per year (from 1.3 in 2002 to 2.8 consultations in 2013, $p < 0.001$). Secondary care consultations also increased, but at a higher rate of 0.33 (from 1.9 in 2002 to 5.2 in 2013, $p < 0.001$) (Figure 2). The ratio of PHC to secondary care decreased over the study period indicating a greater utilisation of secondary care than PHC. On average, the ratio fell by 28% (from 0.75 in 2002 to 0.54 in 2013).

Insert here Figure 2 | Time trends in service utilisation (2002-2013)

The results from the longitudinal panel regression examining the effect of FM introduction on PHC and secondary care consultations, and the ratio of PHC to secondary care are shown in Table 1. After controlling for the underlying increase in utilisation, health system variables and population characteristics (model 3), FM introduction is significantly associated with a 0.37 increase in PHC consultations per person per year ($p < 0.001$). This translates to an increase in the ratio of PHC to secondary care consultations of 0.13 ($p < 0.001$). There was no significant immediate effect of FM introduction on secondary care utilisation, but there was for the time period after introduction. For each year after introduction of FM, the increase in PHC and secondary care consultations per person were lower by 0.16 ($p < 0.001$) and 0.09 ($p < 0.01$) respectively, resulting a slower growth of 0.08 PHC and 0.30 secondary care consultations per person a year. The PHC ratio declined by 0.03 ($p < 0.001$) each year (demonstrating the greater reduction in annual growth in PHC than secondary care). Although the effect of FM in the

years since its introduction is significant, the increasing average yearly trend is greater than the decreases for both primary care and secondary care (with yearly increasing trends of 0.24 and 0.37 consultations per person respectively). The stepped increase in primary care utilisation, and slow down in growth in utilisation is shown in Figure 3.

The supply of health system factors had a significant effect on PHC and secondary care consultations. The availability of public PHC physicians was associated with an increase in PHC consultations per person. Public hospital specialist availability was associated with an increase in secondary care use. Public hospitals density was associated with a decrease in PHC usage, whilst the presence of a university hospital in the region was associated with lower secondary usage. Primary care facility availability – in the form of FM centre, health centres and health houses per 10,000 – was associated with reductions in secondary care usage. Notably, the effect on utilisation of secondary care availability – for both doctors and facilities – was much greater than PHC availability (Table 3).

Insert here Table 3 | Results from longitudinal regression analysis on primary and secondary care consultations (2005-2013)

Insert here Figure 3 | Modelled primary care utilisation for pre- and post- family medicine introduction

Supplementary analysis (Table 4) was performed through stratification of provinces into 3 development index groups. The same model as above was used (controlling for yearly trend, health system factors, and population characteristics). There was no difference in yearly trend increases for PHC between developmental groups. For secondary care usage, the most developed provinces had a slower growth rate (0.30 consultations per person per year compared to 0.39 and 0.40 in the middle- and least-developed provinces respectively). The effect of FM was greater in middle- and higher-development provinces – both the immediate effect (non-significant effect on lowest development provinces) and a greater reduction in

PHC usage in years following introduction (Appendix 3). There was no significant immediate effect of FM introduction on secondary care usage, but the reductions over following years were concentrated in middle- and lower-development provinces.

Insert here Table 4 | Results from longitudinal regression analysis on primary and secondary care consultations (2005-2013) stratified by development Index

Preferred Health Care Provider, Reasons for Choice and Barriers to Access

Provider choice

Findings from responses from the Life Satisfaction Survey showed public secondary care (MoH funded hospitals) remained the predominant reported choice of usual source of healthcare, but this began to change after 2009. Between 2005 and 2009, secondary care as the reported choice of provider remained fairly constant averaging 62.7% of respondents, but after 2009 this fell to 53.8% by 2012 ($p=0.002$) (Figure 4). For public PHC there was little change between 2005 and 2009 (averaging 22.8%), with a notable increase after 2009 to 31.9% in 2012 ($p=0.003$). Private care as a choice of provider remained fairly constant over the time period (2005-2012) averaging 12.5% of respondents.

Insert here Figure 4 | Health provider preference from respondents from the Life Satisfaction Survey (2005-2012)

Stratification of these trends by rural and urban populations reveals a higher level of preference for public PHC in rural populations compared to urban (Appendix 4). Between 2005 and 2012, respondents in urban locations have increased preference for public provided PHC (from 18.6% to 30.9% ($p=0.001$)), whilst the increase in rural respondents was non-significant (from 30.3% to 34.9% ($p=0.402$)) between 2005 and 2012. None-the-less, public secondary

care remains the preferred option for healthcare for both groups with no significant change for both urban and rural respondents over the period 2005-2012.

Reasons for provider preference

The reasons for choice of health service provider changed substantially over the period 2005-2012 (Figure 5). For public PHC, necessity as the reason for choice declined from 42.6% to 12.9% of respondents ($p=0.001$) with proximity (to service) and service satisfaction growing from 50.6% to 65.5% ($p=0.054$) and 4.5% to 16.3% ($p<0.001$) respectively. For public secondary care necessity also declined (75.6% to 29.1% ($p=0.001$)) with increases in proximity (from 10.6% to 30.6% ($p=0.017$)) and service satisfaction (from 8.8% to 27.8% ($p=0.001$)). For those who choose private care, service satisfaction has stayed as the main reason for choice (at 66.5%).

Insert here Figure 5 | Reasons for choosing a particular service by preferred provider choice

Barriers to accessing health services

Substantial declines in issues encountered with healthcare services were noted over the period 2005-2012 for both PHC and secondary care (Figure 6). For PHC, reporting of problems declined for getting an appointment from 27.0% to 13.8% ($p=0.001$); with facility hygiene from 25.0% to 13.2% ($p<0.001$); with physician behaviour from 37.6% to 16.7% ($p=0.003$); and with the cost of diagnosis or drugs from 75.0% to 51.4% ($p=0.001$). These trends were similar for issues with secondary care, although there were a greater proportion of individuals reporting a problem with getting an appointment in secondary care compared to PHC (21.7% versus 13.8% in 2012). Logistic regression (analysis not shown), controlling for age, education, income, urban/rural location and healthcare payment mechanism confirmed these time trends are significant, but highlighted that younger, urban and low-income populations all reported more problems encountered in healthcare

Insert here Figure 6 | Proportion of individuals reporting problems encountered with general healthcare broken down by preferred healthcare provider (primary or secondary)

Discussion

The introduction of FM was associated with a small, but significant increase in PHC utilisation and a modest shift in utilisation from secondary to primary care. The long-term effects of the FM model also indicate a reduction in both PHC and secondary care utilisation (with a greater reduction in PHC) over the years following introduction. There is some evidence that these effects have not been heterogeneous across provinces, with greater increases in PHC utilisation in the middle- and highest-developed provinces, and limited shifts from secondary to PHC in most developed provinces.

With regard to citizens' perceptions of healthcare, secondary care remains the health service of choice for the majority of the Turkish population, but PHC has increased as a preferred provider since 2005. Most of this increase, and a concomitant decrease in preference for secondary care, happened after 2009 coinciding with the full roll-out of FM. Preference for PHC was greater in rural populations than urban populations, but urban populations demonstrated larger levels of changes (in increasing PHC and declining secondary care preference) compared to rural populations.

The underlying reasons for service choice demonstrate that proximity and service satisfaction have become increasingly important reasons for the choice of PHC a healthcare provider with necessity (meaning no other choice or requirement to do so) declining over recent years. Lastly, there has been substantial decline in reporting of issues encountered with healthcare – appointments, facility hygiene, physician behaviour and costs – for both PHC and secondary care.

Strengths and Limitations

This study provides a novel evaluation of the effect of PHC reform in a field where evidence is limited. The natural experiment and comprehensive data in Turkey allow elucidation of the effects of health system reform, which introduced a new FM model PHC, and health service utilisation. Evaluation of the Turkish experience is both timely and informative given that is a rapidly growing upper-middle income country that has undergone wider health system reform to achieve UHC – a priority for most low- and middle-income countries.

The ecological analyses we used represent only a weak form of evidence, which precludes causal inference. Nonetheless, the phased introduction on FM across multiple provinces serves as a unique natural experiment permitting sophisticated panel regression modelling with a time varying exposure. The compiled dataset with 3 years of data pre- and post- policy implementation, and 12 years of data is of high quality for assessing the effect of FM introduction. Available data on covariates have been used to adjust for many factors likely to effect on utilisation. An absence of province level data for the lifestyle survey meant that modelling approaches used for the administrative data was not feasible. Further, the number of covariates available in the survey dataset was limited, so omitted-variable bias remains a possibility and the results must be interpreted with this in mind. While access to and healthcare usage is vital for health outcomes, any increases in utilisation resulting from FM introduction may not necessarily mean better health outcomes in this setting. Further research will be required to evaluate the new FM model's service quality and its effect.

The life satisfaction survey data did not permit analysis that could link changes in service preference with FM reforms, but the timing of increasing preference for PHC and decreasing preference for secondary care, which occurred mostly after 2009, coincides with the expansion of the FM model across the country. Furthermore, the range of questions provides a valuable insight into the why users' attitudes are changing.

Interpretation

These results offer an indication that the FM model has had effect on health system utilisation and user attitudes. There are underlying trends of increasing primary and secondary care utilisation which are likely to be due to increased access to and availability of services (Tatar et al., 2011, Atun et al., 2013). Our analysis looks at the impact of FM over and above these trends. The increase in PHC utilisation and reduction in secondary care may be explained by the attractiveness of a novel service to individuals and perhaps covering untapped demand for healthcare. Evidence from Estonia (Atun et al., 2006) and Lithuania (Liseckiene et al., 2007) demonstrate similar increases in service utilisation post PHC reform, although the effect of new PHC models in these studies were not evaluated in an experimental or quasi-experimental way. Expansion of the Family Health Program (community-based health-professional teams delivering basic care) in Brazil led to greater use of PHC (Rocha and Soares, 2010), but the introduction of co-payments for secondary care in 2011 may explain some of the observed changes.

Increased preference of PHC and reductions in reporting of issues encountered with PHC allude to increases in PHC service quality and availability that are changing individuals' usage patterns. The pre-existing trends of falling problems reported suggest wider health system improvement alongside FM introduction. This is evidenced by positive attitudes in the Turkish population to health system improvement – including access, resourcing, and quality – in 2003-2013 (Jadoo et al., 2014). Evidence suggests improvements in PHC and a new model of FM may be conducive to changes in provider preference. A comparison of FM PHC centres and non-FM PHC centres in Egypt demonstrated higher patient satisfaction with facility hygiene, waiting time and health professionals in the centres adopting FM (Gadallah et al., 2010). Furthermore, patients in Thailand reported better continuity of care, communication and enablement (the patient's knowledge of a self-care plan) in care provided by FM doctors

compared to those without post-graduate FM training (Jaturapatporn and Dellow, 2007). Increases in preference for primary care services following improvements in quality and availability, and reductions in issues encountered are highly plausible scenarios. None-the-less, a more thorough evaluation of the quality of services provided under the FM models and patients perceptions is required.

The effect of FM over the years following introduction may longer term changes in healthcare utilisation. The yearly trend of increasing usage in both PHC and secondary care is reduced, but not reversed following FM introduction. Potentially, the growth of secondary care usage may have slowed over time as the effects of better PHC services attract more users. Although, the lower growth of PHC usage following FM introduction could be due to lower usage through reasons such as poor service availability or quality, the concurrent slowing of secondary care usage growth and declined reporting of problems suggest that this is not the case. Also, the changes in utilisation seen following FM introduction may not be desirable, for example if they are unnecessary or the reductions are mediated through patient forgoing necessary care. Although we have no way to judge this from this analysis, the user satisfaction results do not indicate inappropriate use, but this is still a point for further analysis. Indeed, it could be concluded that the introduction of FM may have resulted in resolution of un-tapped health needs and better management of conditions, resulting in less necessity for both PHC and secondary care consultations. The role out of the Family health programme in Brazil was associated with lower unnecessary hospitalizations (Macinko et al., 2010) and lower mortality from cardiovascular diseases (Rasella et al., 2014) suggesting improvements in access or use of PHC may lead to improvements in overall health system effectiveness. Drawing conclusions on improvements in efficiency and effectiveness of FM in Turkey from this study is problematic, as we have no knowledge of the types of consultations, patients and services that are affected.

The results show only a modest effect size of the effect of FM introduction. This may be due to the rapid roll out and difficulties in implementing the comprehensive FM model. Areas such as the care coordination, service quality, involvement of physicians in policy-making and community-based approaches have been highlighted as insufficiently well implemented in the FM model (Kringos et al., 2011, Ocek et al., 2014). Although this may deter some policy-makers from introducing similar changes, a small increase in the number of consultations per person may have large consequences across the health system. Effects on health and the wider health system may take time before they are seen due to long time scales of health conditions and the effect of the service arrangements. Further analysis of the effect of FM and new forms of PHC on other health system indicators, including health outcomes is necessary. Additionally, there is need for further research on how the FM program has changed clinical practice (e.g. the types of consultations, referrals patterns and quality) and the wider health system (e.g. costs).

Lastly, the differential effect of FM model introduction by development index indicates the need for further research. There is a need to understand which aspects of province development – e.g. household income, education or existing public service infrastructure – have contributed to the differential impact. There is also a need for robust quantitative analysis on how health policies and reforms are introduced, their impact and interactions with local situations.

Conclusion

Evidence on the benefit of the Turkish PHC reforms provides encouragement and impetus for policy-makers worldwide who are embarking on health system reform to achieve UHC. This analysis demonstrates that even without a gatekeeping and a referral system, the introduction of a new FM model has resulted in changes in health service utilisation and user preferences over a relatively short time scale. This study contributes to the evidence on PHC

reform at a time when many countries are returning to the principles of Alma-Ata on the pathway towards UHC.

This study adds to the existing literature of the role of PHC in changing utilisation and user preferences for health services, but goes further with a strong methodological analysis and exploration of underlying reasons. None-the-less, there is greater need for further research into the services provided in the FM model and potential modes of effect. This analysis provides evidence for countries transitioning to UHC underpinned by PHC as envisioned in the Alma-Ata Declaration.

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Panels, Figures and Tables Legend

Panel 1 | Country-level evaluations of PHC reform in LMICs

Overview of other studies that evaluate the impact of Primary healthcare reforms in low- and middle-income countries.

Panel 2 | Primary Health Care in Turkey Before the Health Transformation Program

Outlines the structures and issues with primary care in Turkey before family medicine introduction

Panel 3 | Key changes to health system functions related to primary health care implemented in Turkey (2003-2010)

Outlines the key changes in health system organisation and governance, financing and resourcing related to primary care and the introduction of family medicine in Turkey

Figure 1 | Roll-out of family medicine across Turkish Provinces and population (2005-10)

The percentage of provinces that have introduced family medicine for each year (grey bars) and the percentage of the Turkish population covered by the family medicine program (black bars) are shown for the year 2005-2012.

Table 1 | Overview of data sources and variables used in longitudinal panel regression on healthcare service utilisation

The various data sources, variables selected, years available and adjustments made are shown for the healthcare service utilisation panel regression.

Table 2 | Number and Characteristics of respondents to Turkish Life Satisfaction Survey (2005-2012)

The number of individuals and households sampled, the percentage of individuals living in urban locations and the percentage of female respondents are shown for each year for 2005-2012.

Figure 2 | Time trends in service utilisation (2002-2013)

The mean number of consultations per person is shown for the years 2002-2013 for primary care (triangles) and secondary care (squares). In addition, the ratio of primary to secondary care consultations is shown as a bar graph.

Table 3 | Results from longitudinal regression analysis on primary and secondary care consultations (2005-2013)

The association of primary care and secondary care consultations per person, and the ratio of primary to secondary care consultations with the introduction of family medicine in the province and years since the introduction of family medicine. This association is controlled for socio-demographic and health-system variables, and the underlying time-trend of increasing consultations.

Figure 3 | Modelled primary care utilisation for pre- and post- family medicine introduction

Change in modelled primary care consultations per person are shown for 4 years pre- and 4 years post family medicine introduction, alongside the step change in utilisation from family medicine introduction in year 0.

Table 4 | Results from longitudinal regression analysis on primary and secondary care consultations (2005-2013) stratified by development Index

The association of primary care and secondary care consultations per person, and the ratio of primary to secondary care consultations with the introduction of family medicine in the province and years since the introduction of family medicine stratified into three groups by development index. This association is controlled for socio-demographic and health-system variables, and the underlying time-trend of increasing consultations.

Figure 4 | Health provider preference from respondents from the Life Satisfaction Survey (2005-2012)

The proportions of respondents from the life satisfaction survey are shown by choice of preferred provider of first-contact healthcare (public primary healthcare, public secondary healthcare, private healthcare, or other) for each year (2005-2012).

Figure 5 | Reasons for choosing a particular service by preferred provider choice

The percentage of responses to the life satisfaction survey for the main reasons for choice of preferred first-contact provider are shown for each year (2005-2012). The main reasons for

choice are necessity (white bar), proximity (light grey), expected satisfaction with the service (mid-grey), or other (dark-grey). The responses are separated by preferred healthcare provider – public primary (top left), public secondary (right), and private (bottom left).

Figure 6 | Proportion of individuals reporting problems encountered with general healthcare broken down by preferred healthcare provider (primary or secondary)

The percentage of individuals reporting problems with physician behaviour (top left), getting an appointment (top right), the cost of diagnosis or drugs (bottom left) and the hygiene of the healthcare facility (bottom right) are shown. For each problem, the percentages are shown for each year (2005-2012) and by percentage of respondents selecting either primary care (dark-grey line) or secondary care (light-grey line) as their preferred first-contact healthcare provider.