ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Ahmad, Hamna; Hussain, Sadia; Nazif, Muhammad Ahmed

Working Paper

Leveraging technology to promote women's health: Evidence from a pilot program

GLO Discussion Paper, No. 939

Provided in Cooperation with:
Global Labor Organization (GLO)

Suggested Citation: Ahmad, Hamna; Hussain, Sadia; Nazif, Muhammad Ahmed (2021) : Leveraging technology to promote women's health: Evidence from a pilot program, GLO Discussion Paper, No. 939, Global Labor Organization (GLO), Essen

This Version is available at:
https://hdl.handle.net/10419/242820

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

Leveraging technology to promote women's health: Evidence from a pilot program

Hamna Ahmad[1], **Sadia Hussain**[2] **and Muhammad Ahmed Nazif**[3]

[1]Research Fellow and Assistant Professor, Lahore School of Economics. Email: hamnaa@gmail.com

[2]Research and Senior Teaching Fellow, Lahore School of Economics, GLO Affiliate. Email: syedasadiahussain@gmail.com

[3]Research and Senior Teaching Fellow, Lahore School of Economics. Email: muhammad_ahmed22@hotmail.com

Address: Lahore School of Economics, Intersection Main Boulevard Phase VI DHA, Burki Road, Lahore, Pakistan.

Key Messages:

- We investigate the impact of offering telehealth services a part of a health microinsurance program on health outcomes, healthcare experience and empowerment.
- Offering telehealth services leads to an improvement in the self-reported physical and mental health status of women, a better healthcare experience; and a favorable perception of greater inclusion in household decisions.
- Our results provide support for using telehealth services to solve the challenge of limited access to healthcare facilities in Pakistan.

Acknowledgements: Financial support in this study was provided by Lahore School Research Development Fund (LSRDF). The authors wish to thank the microfinance institution for the indispensable support and cooperation.

Abstract

We investigate the causal impact of offering telehealth services to female microfinance borrowers on their health and bargaining power in the household. Using a balanced panel of 1218 female borrowers, we observe a positive impact of offering telehealth services on self-reported physical and mental health of treated relative to control women. Treated women seek healthcare more proactively; they are more likely to consult a doctor and they do so sooner, as compared to control women. In addition, treated women report greater inclusion in household decision-making. We also find positive spillover effects of offering telehealth services within the household, where we observe a greater likelihood of the spouse and children (of treated women) to seek health care.

Keywords: health microinsurance, telehealth; physical health; mental health; Pakistan

1. Introduction

Low-income households face limited access to essential health services in Pakistan. The country scores 45 on the Universal Healthcare service coverage index measuring coverage of essential health services based on 14 traceable indicators on a scale of 0 to 100, well below the global average of 66 (World Health Organization, 2017). The stark inequality in access to health care is evident in health statistics where the lowest income quintile spends 6.6 percent of household income on health, relative to 1.3 percent by households in the highest income quintile (Zaidi et al., 2016)

The dearth of health services partly explains the country's poor performance on key health indicators such as maternal and infant mortality ratios compared to its South Asian counterparts. For instance, the infant mortality in Pakistan is 67.2 per 1000 live births, twice as large as India and Bangladesh (World Development Indicators, 2019). In part, this meagre performance on health indicators is attributed to a low proportion of health spending in the overall GDP. In fiscal year 2018-19, Pakistan spent a mere 0.53 percent of GDP on health (Economic Survey 2018-19). This falls below the benchmark of 5 percent as set by World Health Organization (WHO) in order to ensure a minimum standard of health services in a country (Jowett et al., 2016). The private health sector has stepped in, to tend to unmet demand, though at a very high cost where out-of-pocket expenditure constitutes more than half of the total health expenditure (World Development Indicators, 2019).

In the last decade, innovation in the microfinance sector has led to development of creative products to mitigate the risks faced by low-income groups in developing countries. Health microinsurance, a product bundling microcredit with insurance, is one such innovation to facilitate access to universal healthcare. However, low uptake of the bundled product remains one of the key barriers to scaling up the product (Banerjee et. al., 2014). Improved technology could offer a potential solution to encourage growth of this nascent industry in developing countries such as Pakistan (Cole, 2015).

In this setting, a renowned microfinance institution (MFI), introduced an add-on feature to its existing health microinsurance porgram. Previously, the health microinsurance package only covered hospitalization visits up to PKR. 30,000 (approximately USD 180) per person, per annum. Complementing its existing health microinsurance program, the MFI launched a pilot program with two novel features: (i) expanded *scope* of services – providing coverage for outpatient care and doctor consultations (whereas previously only hospitalization was covered under the MFI's health microinsurance program) and (ii) new *mode* of delivery – virtually connecting MFI borrowers with a doctor (whereas previously only in-person services were provided at a designated health facility). To sum, the pilot program provided borrowers with outpatient health solutions for consultative, diagnostic and treatment services at the MFI branch by virtually connecting them to doctors who would be based at a remote location.

The MFI launched the pilot program in one of its 25 branches in Lahore – the second largest metropolitan city in Pakistan with a population of approximately 11 million people (Population Census-2017). This initiative provides an innovative approach by the private sector to accrue benefits to the disadvantaged groups in the society, especially women, at an affordable price. By leveraging technology to provide healthcare, the program intends to ease binding constraints of access, distance and availability of a nearby health facility as highlighted in a study by Hussain et. al. (2019) using in-depth focus group discussions with borrowers from this MFI.

In this paper, we study the causal impact of offering telehealth services to female microfinance borrowers on their health and bargaining power within the household. A bulk of literature investigating the impact of telehealth services is from the developed world, so our study adds on to the limited evidence there is on the impact of telehealth services in a developing country context. Moreover, this study is unique as it does not only evaluate the impact of offering telehealth services on health outcomes and healthcare expenditure but also investigates the impact of such services on female empowerment. Using a balanced panel of 1218 female borrowers, we find treated women report an improvement in their self-reported physical and mental health status. Second, for the most recent illness episode in the household, treated

women and their family members are more likely to consult a doctor relative to control women. We find evidence to suggest that improvements in the self-reported physical and mental health status of women is driven by a more pro-active approach in seeking consultation as well as their perception of greater inclusion in household decisions. Out findings about the effect of the pilot program on borrower well-being, can guide insurer decision-making about the optimal design of its health microinsurance program. Insights from this study can also inform the MFI's decision about whether to scale it up across all of its branches or whether to adapt it on the basis of lessons from the pilot program. Understanding the effects of telehealth services on well-being is important for two reasons: low and middle-income families face limited access to healthcare in Pakistan and the burden on frontline workers in the health sector due to the ongoing pandemic has called for innovative ways of providing healthcare coverage to the masses.

Our study relates to two strands of literature. The first examine how technology can be leveraged to improve service delivery. With the advancement of technology, we see Health Information Technology (HIT) gaining popularity and expanding all over the world. HIT can potentially improve access to health care through two mechanisms (Liu et al., 2014). Firstly, by promoting successful referrals as the old paper-based process of referral often encounters the problem of missing medical records (Digiacomo et al., 2010) whereas HIT with the use of technology in terms of patient's health information being electronically recorded and real time sharing of that information can make referrals among different health professionals easier (Graetz et al., 2008; Liu et al., 2014; McKenna, 2010). Secondly, telemedicine/telehealth which is part of the HIT can improve access to healthcare for those persons residing in remote/rural areas (Dorsey et al., 2010; Sudan et al., 2011; Khairat et al., 2019; Wang et al., 2019). In addition, telehealth can also lead to cost savings as well as improved clinical outcomes such as physical and mental health (Hersh et. al., 2006; Pan et al., 2008; Wade et al., 2010; Webb et. al., 2013; Young & Badowski, 2017; Grecu & Sharma, 2019; Jamal, 2020). However, use of technology may lead to wrong diagnoses as compared to the diagnoses done by an on-site specialist or be as effective as standard home care (Free et al., 2013; Mehrotra et al., 2013; Resneck et al., 2016; McFarland et. al., 2019). Moreover, use of technology can improve service

delivery in education sector as well. Technology can be effective in expanding access to education for the elderly and children with disabilities (Burgstahler, 2003; Hansen et al., 2020).

The second strand of literature that this study relates to is the impact of health insurance/microinsurance on health outcomes and well-being. There is moderate evidence present on health insurance schemes positively impacting the health of the clients in low- and middle-income countries as well as in developed ones (Sommers et al., 2017; Erlangga et. al., 2019;). However, there is ambiguous evidence present on the impact of health insurance on physical health. While analyzing the impact of the same insurance scheme, insured individuals showed improvement in self-reported physical health but no improvement in measured physical health (Finkelstein et. al., 2012; Baicker et. al., 2013), Moreover, health insurance leads to better mental health outcomes (Baicker et. al., 2013; Haushofer et. al., 2020). Also, microinsurance is seen as a powerful tool to empower poor and if microcredit is bundled with microinsurance then the benefit of it is enhanced in terms of welfare improvement (Hamid et. al, 2011; Mathur, 2012; Akotey & Adjasi, 2016); Janzen et. al, 2021), though problems of adverse selection and moral hazard have been widely documented as important challenges to be dealt with for effective provision of health microinsurance programs (Yao et. al., 2017).

The rest of the paper is organized as follows: Section 2 presents the research methodology that is used in the paper, Section 3 describes the data, Section 4 discusses the results of the study and finally, Section 5 concludes.

2. Methods

2.1 Research Design

In this paper, we evaluate the impact of providing telehealth services to microfinance borrowers. Telehealth services were launched in July 2019 as an add-on to their existing health microinsurance services. The add-on feature comprised of providing telehealth services i.e. virtually connecting patients with a doctor at the MFI branch. This service was available for use by both MFI borrowers as well as non-borrowers at a

nominal price[1]. The branch was staffed with a healthcare professional who would welcome the patient, record vital statistics such as weight, blood pressure etc., and note down the patient's history. Thereafter the patient would be virtually connected with a doctor who would provide a medical consult and prescribe diagnostic testing and (or) medication (if needed) at a competitive price.

At the outset, telehealth services were rolled out in one branch in Lahore with the aim of pilot testing the program. We assess the impact of this pilot program, which provides telehealth clinic facilities on the well-being of women in the context of an urban, developing country setting. The control branch was randomly selected from a list of remaining 24 branches in Lahore. The primary consideration for selecting the control group was to balance the treatment and control group on branch-level characteristics such as number of clients enrolled, branch age and utilization rate of the health microinsurance program. For the purposes of our analysis, we consider borrowers belonging to the pilot branch as treated individuals (who were offered telehealth services) and borrowers from the other branch (where telehealth services were not offered) as control individuals.

2.2 Estimation

We use the Ordinary Least Squares (OLS) regression technique to estimate the intent-to-treat (ITT) impact of the telehealth clinic program on female borrowers in the balanced sample of 1218 borrowers. Our key outcomes of interest (y) are: use of telehealth services, self-reported physical health, mental health and empowerment measured for female borrower (i) at branch (j), and time (t). The basic estimating specification (1) uses ANCOVA with age cohort dummies. The baseline values of key outcomes are denoted by (y_{i0}). In specification (1) T_j equals 1, if the client belongs to a branch where telehealth services were offered and zero otherwise. Our parameter of interest is (β) which measures the ITT impact of telehealth services on the welfare of women. Z is a vector of controls that denotes the borrower's socio-economic background.

[1] The cost of consultation was PKRS. 100(less than US$ 1 @ at exchange rate of $1: PKRS. 167 as of 22nd July, 2020) for clients and members of their nuclear family while for non-borrowers it was PKRS. 150.

These include indicator variables to capture whether the borrower or another family member owns the house she lives in, and whether the borrower has more than the median level of education in this sample. μ_i represent age fixed effects while ε_{ijt} is the standard idiosyncratic error term. We cluster standard errors at the client level.

$$y_{ijt} = \beta . T_j + \alpha . y_{i0} + \mathbf{Z}_i . \delta + \mu_i + \varepsilon_{ijt} \qquad (1)$$

3. Data

We use data from a baseline (May to June 2019) and endline (January to July 2020) survey with female borrowers in which we collected information about self-reported health outcomes, perceptions about their status in the household, health-seeking behavior and socio-economic status. Both surveys were carried out over the phone.

Panel A of Table 1 shows the baseline characteristics of borrowers by treatment status. Panel A shows measures of self-reported physical and mental health. For physical health status, we asked female borrowers to report on a scale of 1 to 5 how they felt on most days of the last week where 1 denoted "Well" and 5 denoted "Extremely sick". We used this data to construct an indicator variable 'Felt sick' equal to 1 if the respondent reported feeling sick or extremely sick and 0 otherwise. At baseline, around one fourth of all respondents reported feeling sick over most days of the last week. More than 20% of the sample also reported to have suffered from symptoms of illness/injury over the last 30 days.

We gauge mental health using a standardized 7-item General Anxiety Disorder (GAD-7)2 scale: The scale is a sum of responses to a series of questions and ranges between 0 and 21. These questions ask

[2] (Spitzer et al., 2006)

for the frequency with which a respondent felt nervous, anxious, on the edge, irritable, afraid, restless, worried and unable to relax over the past 2 weeks. A cumulative score less than 5 indicates no anxiety, between 5 and 10 mild anxiety, between 10 and 15 moderate anxiety and more than 15 severe anxiety. At baseline, respondents do not report symptoms of anxiety: the average cumulative GAD-7 score for the sample is around 3, which is below the minimum threshold of 5 to be classified as suffering from mild anxiety. This is true for both treated and control respondents.

Panel B shows measures of empowerment depicting the status of female borrowers within their household. At baseline, more than 80% of the respondents report that they have permission to visit a relative's house alone and also that their husband listens to them and respects their opinion.

Lastly, Panel C shows respondent's personal and background characteristics such as age, education and asset ownership. On average, respondents are between 38-39 years of age. Around 35% have completed high school education or more, while the rest have either completed primary or secondary school. More than 70% report that they own the house they are presently residing in and 83% report owning a personal vehicle (such as a bicycle, motorbike, car, etc.). From this information, we can observe that the respondents under study belong to the lower-middle socioeconomic class.

Furthermore, Table 1 also shows that on most of the dimensions, treatment and control samples are balanced; the null hypothesis of equal means is rejected for only 2 out of 9 variables.

Table 1: Descriptive Statistics on Microfinance Clients, By Treatment Status

	(1)	(2)	t-test

	Treatment Mean/SE	Control Mean/SE	Difference (1)-(2)
A. Physical and Mental Health			
On most days of last week, did you feel tired, worn-out, sick or extremely sick? (Yes =1)	0.272	0.258	0.015
	[0.014]	[0.013]	
Have you suffered from symptoms of illness/injury in the last 30 days? (Yes=1)	0.236	0.211	0.025
	[0.014]	[0.012]	
Mental health: General anxiety disorder (GAD-7)	3.358	3.342	0.016
	[0.135]	[0.132]	
B. Empowerment			
You have permission to visit a relative's house alone (Yes=1)	0.829	0.804	0.024
	[0.012]	[0.012]	
Husband listens to you and respects your opinion (Yes=1)	0.802	0.792	0.009
	[0.013]	[0.012]	
C. Client Characteristics			
Client's Age (in years)	39.196	38.134	1.062**
	[0.307]	[0.298]	
Completed high school education or more (Yes =1)	0.373	0.347	0.026
	[0.015]	[0.015]	
Own house (Yes=1)	0.724	0.676	0.048**
	[0.014]	[0.014]	
Own personal vehicle (Yes=1)	0.830	0.831	-0.001
	[0.012]	[0.011]	
N	988	1079	

Note: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

4. Results and Discussion

4.1 Results

In this section, we present results on the impact of providing telehealth services to female borrowers and their families as part of a pilot program in Lahore, Pakistan. We estimate the causal impact of the pilot program in the MFI branch where the program was offered relative to the branch where it was not offered. We start with presenting the first stage to assess whether study respondents use the telehealth program. Next, we study average treatment effects on women's health, status in the household, and health-seeking behavior. In addition, we study health effects on the woman's nuclear family; spouse and children.

A. *Program use*

At baseline, 96% of the respondents in the treated branch said they were aware of the MFI's health insurance program. However, out of these, 34 percent reported that they had requested to be exempt from the health insurance program because they were already availing health insurance from an alternative source. We present the first stage results of offering telehealth services on usage in Table 2. Treated borrowers are almost 4 percent points more likely to use the program relative to control borrowers. We asked a series of questions to gauge perceptions of the respondents about the program. We find that two-thirds of those who used telehealth services reported an improved perception about their ability to prioritize their health, to avail health services and about an improvement in their health status as a result of using these services.

Table 2: First stage: Use of telehealth services

	(1) Used telehealth services
Treated	0.0383***
	(0.0081)
Constant	-0.0022
	(0.0022)
Observations	1218
Adjusted R-sqr	0.017
Age fixed effects	Yes
HH controls	Yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors are clustered at the individual level. The table shows OLS ITT estimates on an indicator variable equal to 1 if a woman reported using telehealth services at endline and 0 otherwise. We include household level controls to measure whether the family owns the house they live in and whether the woman has more than the median level of education in the sample. Age fixed effects denote a series of indicator variables for women's age cohorts: 30-39, 40-49, 50-59, 60 and above. The base category is women between 20-29 years of age. These results are for the balanced panel.

B. *Self-reported physical and mental health status*

Table 3 shows OLS Intention to Treat (ITT) estimates on physical health (columns 1-2) and mental health (column 3). To gauge physical health, we use 2 indicator variables: (i) 'Felt sick' equal to 1 if the respondent reported feeling tired/weak, sick or extremely sick over most days over the past month and (ii) 'Illness symptoms' equal to 1 if the respondent suffered from symptoms of illness over the past month. To quantify mental health, we used the standardized 7 item Generalized Anxiety Disorder (GAD-7) scale (Spitzer et. al. 2006). GAD effectively screens for most anxiety disorders such as panic disorder, social anxiety disorder, post-traumatic stress disorder etc. Respondents are asked how frequently, over a given time period, the following problems are experienced (anxiousness, restlessness, nervousness, irritation, annoyance, fear, worry and difficulty in relaxing) making it challenging to engage in day- to-day activities. Response for each item ranges between 0 (not difficult at all) to 3 (extremely difficult). The cumulative scale varies between 0 and 21 With values greater than 5, 10 and 15 denoting mild, moderate and severe anxiety. In order to assess the relative magnitude of the treatment effect, we provide the mean of all outcomes for the control group at baseline in the last row of Table 3.

Women offered telehealth services (treated women) are around 14pp less likely to be sick and 8pp less likely to experience symptoms of illness. This represents a 47 % and 33% decrease over the baseline control mean. We also find a significant effect on mental health. At endline the GAD index is 2 points lower for treated relative to control women. This corresponds to a 52% decrease in the prevalence of symptoms associated with anxiety disorders among treated women relative to the sample mean in the control group at baseline.

Table 3: Impact of the pilot program on women's health

	(1) Felt sick	(2) Illness symptoms	(3) GAD
Treated	-0.135***	-0.0790***	-2.106***
	(0.0238)	(0.0199)	(0.407)
Constant	0.226***	0.209***	4.783***
	(0.0390)	(0.0391)	(0.645)
Observations	1218	1218	1218
Adjusted R-squared	0.037	0.011	0.074
Age fixed effects	Yes	Yes	Yes
HH controls	Yes	Yes	Yes
BL mean of Y (control group)	0.286	0.239	3.854

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors are clustered at the individual level. The table shows OLS ITT estimates on the following outcomes: 'Felt sick' is an indicator variable equal to 1 if a woman reported feeling sick or extremely sick over most days in the past month; 'Illness symptoms' is an indicator variable equal to 1 if a woman experienced symptoms of illness/disease; 'GAD' is the 7-item Generalized Anxiety Disorder scale, calculated after cumulating responses on the following questions: Over the last 2 weeks, how often have

you been bothered by the following problems: (1) feeling nervous, anxious or on edge; (2) not being able to stop or control worry; (3) worrying too much about different things; (4) trouble relaxing; (5) being so restless that it's hard to sit still; (6) becoming easily annoyed or irritable; (7) feeling afraid as if something awful might happen. For each item, women respond on a Likert scale ranging between 0 (not difficult at all) to 3 (extremely difficult). The responses on all 7 items are aggregated to get a cumulative GAD scale which ranges between 0 and 21. Values of 5, 10 and 15 on the GAD scale are considered thresholds for identifying the presence of mild, moderate and severe anxiety. We include household level controls to measure whether the family owns the house they live in and whether the woman has more than the median level of education in the sample. Age fixed effects denote a series of indicator variables for women's age cohorts: 30-39, 40-49, 50-59, 60 and above. The base category is women between 20-29 years of age. These results are for the balanced panel.

C. *Health seeking behavior for the family*

In addition to asking women about their physical and mental health, we also asked a series of questions to assess their health seeking behavior. For the most recent outpatient visit (without hospitalization) that involved the woman, her spouse, her son or daughter, we asked whether treatment was sought (columns 1-4, panel A, Table 4), the speed, measured by days, before treatment was availed (column 5, Table 4).

We find that on average, treated women are around 4-7pp more likely to seek treatment for themselves (column 1), their spouse (column 2) or their children (columns 3-4) relative to control women. Is this because treated women and their family members need and therefore seek healthcare services more frequently? A descriptive analysis of the data shows that this is not the case. At endline, twice as many women report feeling sick or extremely sick in the control group (30%) relative to the treated group (16%). This resonates with the results shown earlier in Table 3, according to which treated women report an improvement in the self-reported physical and mental health status at endline (columns 1 to 3, Table 3). It seems that by endline, treated women seek healthcare more proactively for themselves and their family members. This is also supported by descriptive statistics; when asked, on average how many times do you seek outpatient medical assistance for your family in a month, 80% of treated women reported at least once a month versus 50% of those in the control group.

Treated women not only seek healthcare more frequently but also more quickly as shown by the significant and negative coefficient on the treated variable (column 5, Table 4). Descriptive statistics show that in the sub-sample of women who report seeking treatment, treated women seek healthcare within a day after symptoms first appear in contrast to control women who report seeking healthcare approximately 3 days after symptoms first appeared. Taken together these findings suggest that by endline, there is an

improvement in the self-reported physical and mental health of treated women (columns 1-3, Table 3), they are more likely to seek medical assistance (and they do so faster) for themselves and their family members (columns 1-5, Table 4).

Table 4: Impact of the pilot program on health-seeking behavior

	Panel A					Panel B		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Self	Spouse	Son	Daughter	Days	Health cost	Transport cost	Wait time
Treated	0.0694***	0.0550***	0.0539***	0.0382***	-0.265***	379.1	32.49***	8.164***
	(0.0250)	(0.0130)	(0.0143)	(0.0118)	(0.0729)	(235.7)	(3.955)	(1.637)
Constant	0.111**	0.0193	0.0437***	0.0208*	0.420***	1371.0***	30.59***	13.75***
	(0.0441)	(0.0206)	(0.0154)	(0.0123)	(0.0994)	(344.0)	(4.890)	(2.169)
Observations	1218	1218	1218	1218	1218	1218	1218	1218
Adj. R-sqr.	0.019	0.012	0.010	0.007	0.011	0.001	0.052	0.033
Age FE	Yes	Yes	Yes	Yes	Yes	No	No	No
HH controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BL Mean of Y (control)	0.496	0.0912	0.0803	0.0712	0.670	1974.8	70.62	33.56

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors are clustered at the individual level. The table shows OLS ITT estimates on a series of indicator variables showing for the most recent outpatient visit involving the respondent, her spouse or children, whether treatment was sought for herself (column 1), for the spouse (column 2), for her son (column 3), for her daughter (column 4). Days (column 5) measures number of days after the symptoms appeared when the respondent first visited a healthcare provider. In columns 5 and 6, panel B we look at the pecuniary cost of seeking treatment during the most recent illness episode. 'Health cost' has been winsorized cost and refers to the total incurred for seeking treatment for the sick family member during the most recent illness episode; this includes the doctor's consulting fee as well as expenses for other items including drugs and tests. 'Transport cost' measures the cost of conveyance to and from the preferred health facility. Both costs are in PKR. 'Wait time' is the number of minutes the patient had to wait at the health facility before being attended by a doctor. We include household level controls to measure whether the family owns the house they live in and whether the woman has more than the median level of education in the sample. Age fixed effects denote a series of indicator variables for age cohorts. These results are for the balanced panel.

D. *Pecuniary and non-pecuniary health treatment costs*

In panel B of Table 4 we show ITT estimates for total pecuniary and non-pecuniary cost incurred during the most recent outpatient visit in the household. This includes health cost (total expenditure incurred on treatment including doctor's consultation fee, medicines, diagnostic tests in column 6), transportation (for travel to and from the health facility in column 7) and waiting time at the facility before the doctor sees the patient (in column 8) during the most recent outpatient visit in the household. We don't observe a significant effect on the overall health cost (column 5). Lastly, we observe that treated women incur a $0.2 higher

transport cost per visit (column 7) and on average 8 minutes longer wait time (column 8) relative to control women. In part, this may be because we observe a large proportion of control women seek healthcare in public facilities at endline (38 percent) relative to baseline (23 percent).

E. *Status in the Household*

In Table 5, we present ITT estimates on women's status within the household using two indicator variables; 'Go alone' equal to 1 if she is allowed to visit her friends/relatives house on her own and 'Health decisions' equal to 1 if health related decisions in the household are either made solely by the woman herself or after joint consultation with her spouse. We don't observe a significant treatment effect on whether the woman can go out alone. In contrast, we find that treated women are 8pp more likely to be consulted in health-related decisions relative to those in the control group. This corresponds to 12% greater inclusion of women in household decision making on health matters.

Table 5: Impact of the pilot program on empowerment

	(1)	(2)
	Go alone	Household decisions
Treated	0.0008	0.0731***
	(0.0267)	(0.0164)
Constant	0.380***	0.784***
	(0.0502)	(0.0394)
Observations	1218	1218
Adjusted R-sqr.	0.047	0.026
Age fixed effects	Yes	Yes
Household controls	Yes	Yes
BL Mean of Y (control group)	0.797	0.905

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors are clustered at the individual level. The table shows OLS ITT estimates on variables to gauge a woman's status in her household. These include 'Go alone', an indicator variable equal to 1 if the woman is allowed by her spouse to go outside the house and visit her relative alone, 0 otherwise and 'Household decisions', another indicator variable equal to 1 if the woman perceives that her husband consults and listens to her while making various decisions in the household. We include household level controls to measure whether the family owns the house they live in and whether the woman has more than the median level of education in the sample. Age fixed effects denote a series of indicator variables for age cohorts: 30-39, 40-49, 50-59, 60 and above. The base category is women between 20-29 years of age. We show results for the balanced panel.

4.2 Robustness Check

The descriptive statistics in Table 1 show that on average, treated women are more likely to own a house and are older as compared to control women. We control for these characteristics in the main regressions reported in Tables 2-5. However, as a further robustness check, we use propensity score matching[3] to match treated and control women on baseline characteristics (age, education, house and vehicle ownership) to ensure that both groups are comparable on observable characteristics and then run a difference-in-differences (DiD) analysis on the matched sample using specification (2) below:

$$\Delta y_{ijt} = \alpha . treared_{ijt} + \varepsilon_{ijt} \qquad (2)$$

Where Δy_{ijt} denotes the change in key outcomes of interest over time (endline minus baseline): self-reported physical health, mental health and empowerment measured for female borrower (i) at branch (j). $treared_{ijt}$ is an indicator variable equal to 1 if the client *i* belongs to the treated branch and zero otherwise. Our parameter of interest is (α) which measures the ITT impact of offering telehealth services on the change in outcomes of interest over time. ε_{ijt} is the standard idiosyncratic error term.

The results of the DiD analysis on the matched sample are shown in Tables 6-8. On comparison with earlier results on self-reported health (Table 3), heath seeking behavior (Table 4) and bargaining power (Table 5), we find that our results of offering telehealth services on client's self-reported physical and mental health (Table 6), the speed of seeking treatment (Table 7) and inclusion in household decisions (Table 8) are robust to this alternative estimation strategy.

Table 6: Impact of the pilot program on women's health (DiD estimates)

	(1)	(2)	(3)
	Delta_Felt sick	Delta_Illness symptoms	Delta_GAD
Treated	-0.149***	-0.0881***	-2.178***
	(0.0458)	(0.0392)	(0.644)
Observations	1218	1218	1218
BL mean of Y (control group)	0.286	0.239	3.854

[3] We use the nearest neighbor matching based on the propensity score. The propensity score was computed by regressing the treatment dummy on the set of covariates using a probit regression model.

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. 'Delta' refers to the change in outcome variable over time (endline minus baseline). 'Felt sick' is an indicator variable equal to 1 if a woman reported feeling sick or extremely sick over most days in the past month; 'Illness symptoms' is an indicator variable equal to 1 if a woman experienced symptoms of illness/disease; 'GAD' is the 7-item Generalized Anxiety Disorder scale, calculated after cumulating responses on the following questions: Over the last 2 weeks, how often have you been bothered by the following problems: (1) feeling nervous, anxious or on edge; (2) not being able to stop or control worry; (3) worrying too much about different things; (4) trouble relaxing; (5) being so restless that it's hard to sit still; (6) becoming easily annoyed or irritable; (7) feeling afraid as if something awful might happen. For each item, women respond on a Likert scale ranging between 0 (not difficult at all) to 3 (extremely difficult). The responses on all 7 items are aggregated to get a cumulative GAD scale which ranges between 0 and 21. Values of 5, 10 and 15 on the GAD scale are considered thresholds for identifying the presence of mild, moderate and severe anxiety. These results are for the matched sample using nearest neighbor matching.

Table 7: Impact of the pilot program on health-seeking behavior (DiD estimates)

	Panel A						Pan
	(1)	(2)	(3)	(4)	(5)	(6)	(
	Delta_Self	Delta_Spouse	Delta_Son	Delta_Daughter	Delta_Days	Delta_Health cost	Delta_Tra
Treated	0.0328	0.0373	0.0209	0.0433*	-0.569***	-14.86	29.1
	(0.0494)	(0.0249)	(0.0277)	(0.0256)	(0.187)	(477.4)	(7.
Observations	1218	1218	1218	1218	1218	1218	12
BL Mean of Y (control)	0.496	0.0912	0.0803	0.0712	0.670	1974.8	70

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. 'Delta' refers to the change in outcome variable overime (endline minus vaseline). The table shows ITT estimates on a series of indicator variables showing for the most recent outpatient visit involving the respondent, her spouse or children, whether treatment was sought for herself (column 1), for the spouse (column 2), for her son (column 3), for her daughter (column 4). Days (column 5) measures number of days after the symptoms appeared when the respondent first visited a healthcare provider. In columns 5 and 6, panel B we look at the pecuniary cost of seeking treatment during the most recent illness episode. 'Health cost' has been winsorized and refers to the total cost incurred for seeking treatment for the sick family member during the most recent illness episode; this includes the doctor's consulting fee as well as expenses for other items including drugs and tests. 'Transport cost' measures the cost of conveyance to and from the preferred health facility. Both costs are in PKR. 'Wait time' is the number of minutes the patient had to wait at the health facility before being attended by a doctor. These results are for the matched sample using nearest neighbor matching.

Table 8: Impact of the pilot program on empowerment (DiD estimates)

	(1)	(2)
	Delta_Go alone	Delta_Household decisions
Treated	0.00896	0.130***
	(0.0442)	(0.0332)
Observations	1218	1218
BL Mean of Y (control group)	0.797	0.905

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. 'Delta' refers to the change in outcome variable overtime (endline minus baseline). 'Go alone', an indicator variable equal to 1 if the woman is allowed by her spouse to go outside the house and visit her relative alone, 0 otherwise and 'Household decisions', another indicator variable equal to 1 if the woman perceives that her husband consults and listens to her while making various decisions in the household. These results are for the matched sample using nearest neighbor matching.

4.3 Attrition

We observe an overall attrition rate of 40 percent between the baseline and endline period. At endline, treated women are 17 percent more likely to respond to the survey than the comparison group. These differences are statistically significant at 1 percent level of significance. Given treated women are less likely to attrite, we recognize that the ITT estimates presented in sections 4.1 and 4.2 could be biased upwards. In part, the drop in sample size can be attributed to the timing of the endline survey. We hired a small team of enumerators to conduct endline interviews in a sequential manner – starting from the treated branch and then moving to the control branch. By the time the lockdown due to the COVID-19 pandemic was imposed in March, we had only interviewed 40 percent of the baseline sample. Most of these pre-lockdown interviews were conducted from the treated branch. Once we resumed endline interviews (after the government started easing the lockdown and transitioned towards a 'smart' lockdown approach to be imposed only in areas with high/rising infection rates), we experienced a large drop in the response rate; i.e. the proportion of women who responded to phone calls dropped from 82 percent before the lockdown to 44 percent after the lockdown. Note that the main reason for nonresponse was that the phone numbers were switched off (which was the case for around 50 percent of all phone call attempts), and not a result of refusal to participate in the survey.

Figure A1-3 shows the kernel density distributional plots across mental and physical health and empowerment measures at baseline for the two groups: (i). Attritors (ii). Non-attritors. We observe no significant differences in distributions of our outcomes of interests between women who respond versus those who don't at endline.

Table 9 shows the correlates of attrition. The dependent variable is a dummy equal to one if the woman attrited and 0 otherwise. Column 1 shows that belonging to the treatment branch predicts attrition by 17 percent. Column 2 shows that results are not conditional upon individual characteristics at baseline; other than education. Moreover, none of these characteristics: age cohorts, education and income differentially

relate to attrition between the treatment and the control branch as reflected in the insignificant coefficients of the interaction terms.

Table 9: Correlates of Attrition

	(1)	(2)
Treated	-0.170***	-0.224***
	(0.0213)	(0.0826)
Age30 (=1)		-0.0784
		(0.0542)
Treatedxage30		0.0495
		(0.0833)
Age40 (=1)		-0.109**
		(0.0531)
Treatedxage40		0.0358
		(0.0807)
Age50 (=1)		-0.0623
		(0.0556)
Treatedxage50		-0.0427
		(0.0836)
Age60(=1)		0.0914
		(0.0765)
Treatedxage60		-0.107
		(0.109)
Income (=1)		-0.0602
		(0.05178)
Treatedxincome		0.0382
		(0.0673)
Education(=1)		-0.0884***
		(0.0327)
Treated*education		0.0689
		(0.0475)
Observations	2067	2067

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The table shows the OLS ITT estimates at baseline for those who appear and do not appear at endline. In column 1, "Treated" is a dummy variable equal to 1 if the respondent belongs to the treated branch, 0 otherwise. Age cohorts is a categorical variable equal to 1 if the respondent belongs to age30, age40, age50 and age60 category. Income is a dummy variable equal to 1 if the household's monthly income exceeds PKR. 50,000. Education is a dummy variable equal to 1 if the respondent reports any form of formal schooling, 0 otherwise. All interaction terms are represented by "x".

5. Conclusion

In this paper, we study the impact of a pilot program, introduced as an add-on to an existing health micro insurance scheme, provided by a MFI to its borrowers. The add-on involved the presence of a trained health

care professional at the MFI branch who would record the patient's history, take vitals, and then virtually connect the patient with a doctor. This add-on facility could be availed by microfinance borrowers (all women in this case) as well as their family members at a nominal fee. Before the program was rolled out, we conducted a baseline survey of all borrowers in both the treated and the control branch. The baseline survey focused on collecting information about the woman's physical health, mental health and her status in the household, about the health of her family members, as well as the family's health seeking behavior. We followed up with these borrowers after 6 months to collect endline data. We use information collected as part of the baseline and endline survey to study the average treatment effect of the pilot program on women's well-being.

Two key insights emerge from our work. First, we find that treated women report an improvement in their self-reported physical health (where physical health is measured by how women felt on most days in a month and whether they experienced any symptoms of illness or disease). Relatedly, we also observe a lower prevalence of anxiety among treated women. We use the Generalized Anxiety Disorder scale (GAD) to identify the existence of anxiety and its associated symptoms. Second, for the most recent illness episode in the household which affected the woman's spouse or children, family members of treated women are more likely to consult a doctor relative to control women

In order to understand the potential mechanisms driving our main results, we study the effects of the pilot program on women' health seeking behavior, pecuniary and non-pecuniary health costs and women's status in the household. We find that on average, treated women, relative to those in the control group, consult a doctor sooner from when they first start experiencing symptoms. Treated women also report a greater likelihood of their spouse consulting them for household decisions. Overall then, we conclude that the improvement in the self-reported physical and mental health status of women is perhaps driven by a more pro-active approach in seeking consultation and their perception of greater inclusion in household decision-making.

References

Akotey JO, Adjasi CK. 2016. Does microcredit increase household welfare in the absence of microinsurance? *World Development* **77**: 380-94.

Baicker K, Taubman SL, Allen HL *et al.* 2013. The Oregon experiment - effects of medicaid on clinical outcomes. *New England Journal of Medicine* **368**: 1713–22.

Banerjee A, Duflo E, Hornbeck R. 2014. Bundling health insurance and microfinance in India: there cannot be adverse selection if there is no demand. *American Economic Review* **104**: 291– 97.

Burgstahler S. 2003. The role of technology in preparing youth with disabilities for postsecondary education and employment. *Journal of Special Education Technology* **18**: 7-19.

Cole S. 2015. Overcoming barriers to microinsurance adoption: evidence from the field. *The Geneva Papers on Risk and Insurance-Issues and Practice* **40**: 720-40.

Digiacomo M, Davidson PM, Taylor KP *et al*. 2010. Health information system linkage and coordination are critical for increasing access to secondary prevention in Aboriginal health: a qualitative study. *Quality in Primary Care* **18**: 17–26.

Dorsey ER, Deuel LM, Voss TS *et al*. 2010. Increasing access to specialty care: a pilot, randomized controlled trial of telemedicine for Parkinson's disease. *Movement Disorders* **25**: 1652–59.

Erlangga D, Suhrcke M, Ali S *et al.* 2019. The impact of public health insurance on health care utilisation, financial protection and health status in low- and middle-income countries: a systematic review. *PloS one* **14**: e0219731.

Finkelstein A, Taubman S, Wright B *et al.* 2012. The Oregon health insurance experiment: evidence from the first year. *The Quarterly journal of economics* **127**: 1057-106.

Free C, Phillips G, Watson L *et al*. 2013. The effectiveness of mobile-health technologies to improve health care service delivery processes: a systematic review and meta-analysis. *PLoS Med* **10**: e1001363.

Graetz IP, Reed M, Huang J *et al*. 2008. Care coordination and health information technology: information availability and timeliness across care transitions. *Clinical Medicine & Research* **6**: 149.

Grecu AM, Sharma G. 2019. The effect of telehealth insurance mandates on health-care utilization and outcomes. *Applied Economics* **51**: 5972-85.

Hamid, S.A., Roberts, J., Mosley, P. 2011. Can Micro Health Insurance Reduce Poverty? Evidence From Bangladesh. *Journal of Risk and Insurance*, **78**: 57-82.

Hansen RJ, Talmage CA, Thaxton SP *et al*. 2020. Enhancing older adult access to lifelong learning institutes through technology-based instruction: a brief report. *Gerontology & geriatrics education* **41**: 342-51.

Haushofer J, Chemin M, Jang C *et al.* 2020. Economic and psychological effects of health insurance and cash transfers: evidence from a randomized experiment in Kenya. *Journal of Development Economics* **144**: 102416.

Hersh WR, Hickam DH, Severance SM *et al*. 2006. Diagnosis, access and outcomes: update of a systematic review of telemedicine services. *Journal of telemedicine and telecare* **12**: 3-31.

Hussain S, Nazif MA, Ahmad H. 2019. Utilization of Health Microinsurance: Evidence from Focus Group Discussions. *CREB Policy Paper*: No. 02-19.

Jamal A. 2020. Can Telehealth Affect Medical Spending and Health Outcomes? Evidence from Telehealth Private Parity Laws. Working Paper https://ayesha-jamal.weebly.com/uploads/1/3/3/8/133894310/jmp1.pdf

Janzen, SA, Carter, MR, Ikegami, M. 2021. Can insurance alter poverty dynamics and reduce the cost of social protection in developing countries? *Journal of Risk and Insurance*. **88**: 293– 324.

Jowett M, Brunal MP, Flores G, Cylus, J. 2016. Spending targets for health: no magic number. *World Health Organization*: No. WHO/HIS/HGF/HFWorkingPaper/16.1.

Khairat S, Haithcoat T, Liu S *et al*. 2019. Advancing health equity and access using telemedicine: a geospatial assessment. *Journal of the American Medical Informatics Association* **26**: 796-805.

Liu GG, Chen Y, Qin X. 2014. Transforming rural health care through information technology: an interventional study in China. *Health policy and planning* **29**: 975-85.

Mathur S. 2012. Micro Insurance-A Powerful Tool to Empower Poor. *Management Insight* **6**.

McFarland S, Coufopolous A, Lycett D. 2019. The effect of telehealth versus usual care for home-care patients with long-term conditions: a systematic review, meta-analysis and qualitative synthesis. *Journal of Telemedicine and Telecare*: 1357633X19862956.

McKenna R. 2010. Using information and communications technology to enable the exchange of information between New Zealand clinicians and health providers. *The New Zealand Medical Journal* **123**: 92–104.

Mehrotra A, Paone S, Martich GD *et al*. 2013. A comparison of care at e-visits and physician office visits for sinusitis and urinary tract infection. *JAMA internal medicine* **173**: 72-4.

Ministry of Finance. Pakistan economic survey 2018-19: chapter 11 Health and Nutrition. http://www.finance.gov.pk/survey/chapters_19/11-Health%20and%20Nutrition.pdf

Pakistan Bureau of Statistics. 2017. Population Census. https://www.pbs.gov.pk/sites/default/files//DISTRICT_WISE_CENSUS_RESULTS_CENSUS_2017.pdf

Pan E, Cusack C, Hook J *et al*. 2008. The value of provider-to-provider telehealth. *Telemedicine and e-Health* **14**: 446-53.

Resneck JS, Abrouk M, Steuer M *et al*. 2016. Choice, transparency, coordination, and quality among direct-to-consumer telemedicine websites and apps treating skin disease. *JAMA dermatology* **152**: 768-75.

Sommers BD, Gawande AA, Baicker K. 2017. Health insurance coverage and health—what the recent evidence tells us. *N Engl J Med* **377**: 586-93.

Spitzer RL, Kroenke K, Williams JB *et al*. 2006. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine* **166**: 1092-97.

Sudan R, Salter M, Lynch T *et al*. 2011. Bariatric surgery using a network and teleconferencing to serve remote patients in the veterans administration health care system: feasibility and results. *The American journal of surgery* **202**: 71-6.

Wade VA, Karnon J, Elshaug AG *et al*. 2010. A systematic review of economic analyses of telehealth services using real time video communication. *BMC health services research* **10**: 233.

Wang CD, Rajaratnam T, Stall B *et al*. 2019. Exploring the effects of telemedicine on bariatric surgery follow-up: A matched case control study. *Obesity surgery* **29**: 2704-6.

Webb CL, Waugh CL, Grigsby J *et al*. (2013). Impact of telemedicine on hospital transport, length of stay, and medical outcomes in infants with suspected heart disease: a multicenter study. *Journal of the American Society of Echocardiography* **26**: 1090-98.

World Bank. World Development Indicators 2019: mortality rate, under-5 (per 1,000 live births) – Pakistan https://data.worldbank.org/indicator/SH.DYN.MORT?locations=PK

World Bank. World Development Indicators 2017: Out-of-pocket expenditure (% of current health expenditure) – Pakistan https://data.worldbank.org/indicator/SH.XPD.OOPC.CH.ZS?locations=PK

World Health Organization. 2017. UHC service coverage index

https://data.worldbank.org/indicator/SH.UHC.SRVS.CV.XD?locations=PK-1W

Yao, Y., Schmit, J.T., Sydnor, J.R. 2017. The Role of Pregnancy in micro health insurance: Evidence of adverse selection from Pakistan. *Journal Risk and Insurance*, **84**: 1073-1102.

Young JD, Badowski ME. 2017. Telehealth: Increasing access to high quality care by expanding the role of technology in correctional medicine. *Journal of clinical medicine* **6**: 20.

Zaidi S, Idrees N, Riaz A. 2016. Primary care systems profiles & performance (PRIMASYS): Pakistan case study. *Alliance for Health Policy and Systems Research*.

Appendix

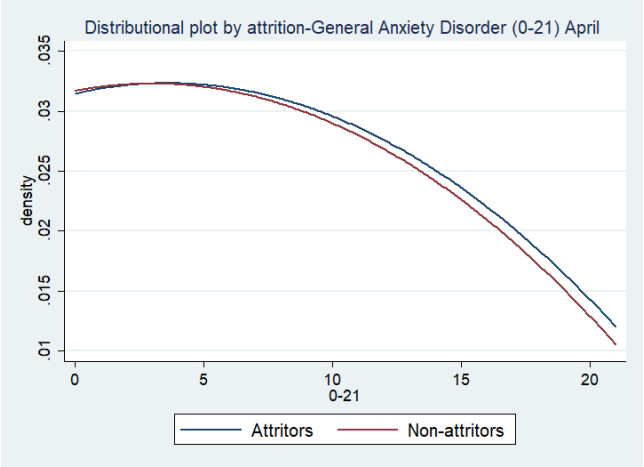
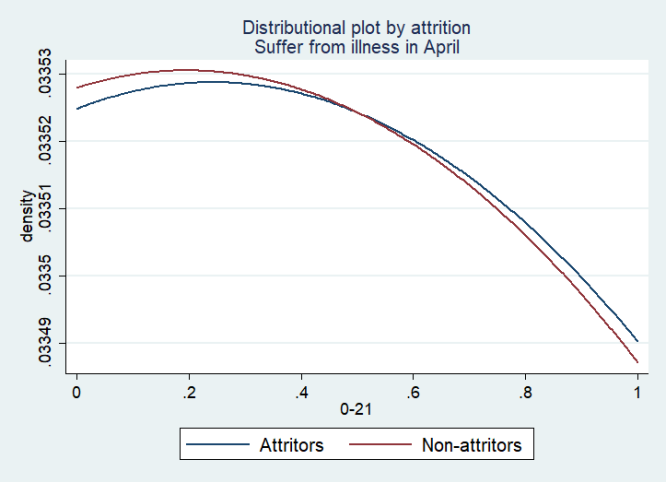


Figure A1: Mental Health using General Anxiety Disorder

Note: This Figure shows the distributional plots of respondents across General Anxiety Disorder (GAD). The horizontal axis shows the GAD scale from 0 to 21. The red line denotes the distribution of tracked individuals while the blue line shows the distribution of attritors. We observe no significant difference in the respective distributions across two groups.



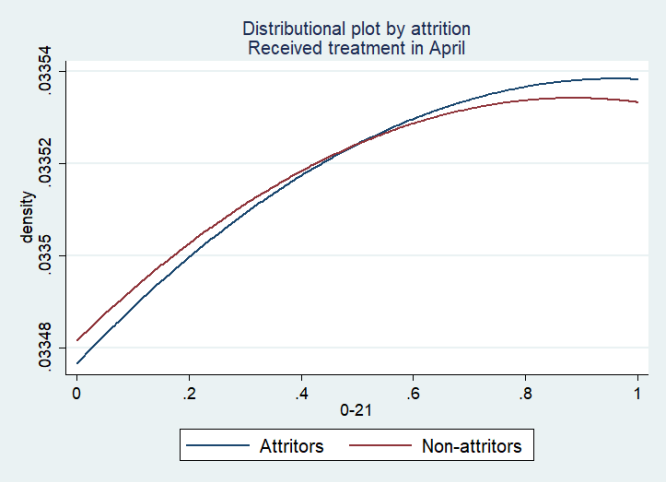
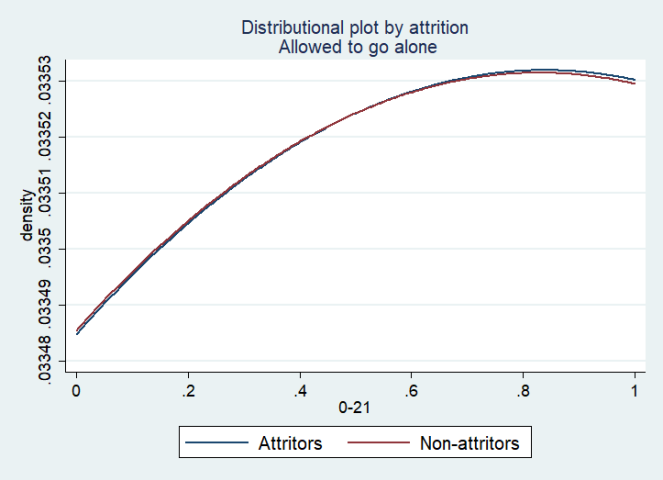
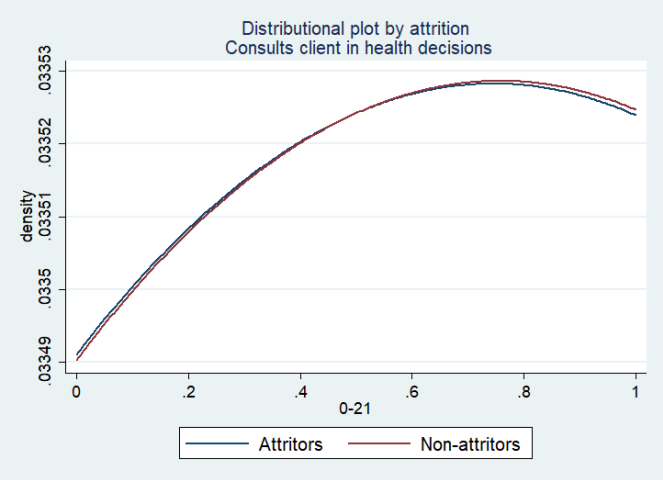


Figure A2: Physical health measures

Note: This Figure shows the distribution of respondents across Physical health measures namely whether the respondent (i). suffer from any illness in April at baseline (ii). seek treatment in April for the aforementioned illness. The horizontal axis is a dummy variable ranging from 0 to 1 where 0 corresponds to "No" and 1 corresponds to " Yes". The red line denotes the distribution of tracked individuals while the blue line shows the distribution of attritors. From this figure, we can conclude that attritors are similar to non-attritors across physical health measures at baseline.





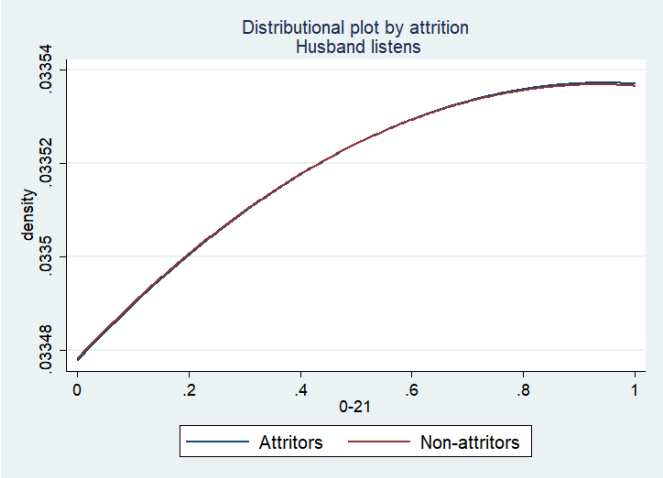


Figure A3: Empowerment measures

Note: This Figure shows the distribution of respondents across Empowerment measures namely whether the respondent (i). allowed to go outside unaccompanied at baseline (ii). consulted in making health decisions for herself and her family (iii). Listened to by the husband. The horizontal axis is a dummy variable ranging from 0 to 1 where 0 corresponds to “No” and 1 corresponds to “Yes”. The red line denotes the distribution of tracked individuals while the blue line shows the distribution of attritors. From this figure, we can conclude that attritors are no different than non-attritors across empowerment measures