**International Remittances and Women’s Reproductive Health Care: Evidence from Pakistan**

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**ABSTRACT**

This paper determines the effect of international remittances on the healthcare utilization of childbearing mothers in Pakistan using the Pakistan Social and Living Standards Measurement (PSLM) survey, 2018–19. The study reports a significant and positive effect of international remittances on the healthcare outcomes of childbearing mothers. Importantly, the remittance-receiving households have 0.615, 0.208 and 0.306 times the odds of the non-receiving households, utilizing prenatal healthcare, postnatal healthcare, and healthcare decision making, respectively, and all of them are statistically significant. Consequently, the analysis confirms that remittance-receiving households do in fact influence and increase the likelihood of utilizing prenatal healthcare, postnatal healthcare and decisions about medical treatment for women. As regression-based estimation of remittances is prone to selection bias due to the nature of the non-experimental data set, we also used propensity score matching methods, which also confirmed a significant and positive effect of international remittances on healthcare outcomes of the childbearing mothers. Thus, financial support or social development programs by the government or non-governmental organization are pivotal in enhancing the healthcare outcomes and ultimately the living standards of childbearing mothers.

**Background**

Numerous factors such as poverty, inequality, unemployment and low living standards in many developing economies tempt individuals to migrate in search of better economic opportunities, and such immigrant individuals send back capital in the form of remittances to their families. Consequently, remittances help in improving the food security situation and strengthening the healthcare system and income generation of the households. Importantly, in the last few decades, many theoretical frameworks have emerged to conceptualize and operationalize the development approaches focusing on women. Moreover, the gender gap that measures gender-based gaps in access to resources and opportunities has received a great deal of attention in international development policy and its effect on economic development.

Unfortunately, Pakistan is among the nations with one of the widest gender gap and inequality, and is ranked 153rd out of 156 countries on the Global Gender Gap Index 2021. There is a relative dearth of empirical research on the potentially transformative role of remittances on women empowerment in recipient societies. Hence, the role of remittances on women empowerment is underexplored in the recent literature, and on which the current study relies. Pakistan is one of the remittance recipient countries, and its economy largely depends on external remittances. According to the World Bank report 2019, Pakistan received approximately 21 billion USD of remittances. These remittances have had a positive impact on the long-term economic growth of the country. Therefore, migration out of country is important as among others it improves the living standards of families at the place of origin.

A plethora of research studies are available focusing on the effect of international remittances inflow on the healthcare outcomes and living standards of the individuals. For instance, a study revealed that due to remittances, the life expectancy of children increased with a decline in death rate in 69 low- and middle-income countries. Similarly, the number of children born to a woman in the remittance receiving households has declined in South Asian, Latin American and African economies. Importantly, antenatal visits of mothers and medical expenditure of immigrant households are higher compared to non-migrant households. Furthermore, through access to health...
insurance, mothers in migrant families enjoy more financial protection about delivery, prenatal and postnatal healthcare utilization.22

In these lines Kapri and Jha (2020) examined the impact of remittances on household healthcare expenditure in Nepal, using the Nepal Living Standards Survey dataset (2010–2011).12 They reported a positive role of remittances on healthcare expenditure. The study also found that a large proportion of remittances were utilized in healthcare services. Similarly, positive effects of migration on maternal and child health in Mexico were observed.17 The authors reported a positive effect of migration on reducing maternal and child mortality rates and improved women’s health through better income among the families. Another study investigated the impact of remittances on household income, household assets and human capital in Sri Lanka.21 The study reported that remittances income had positive effects on maternal and children health and education.

There is a strong correlation between remittances with educational status and healthcare outcomes. A study conducted in low-income counties found that remittances are important for improving school enrollment.15 However, remittances have a positive effect in improving primary and secondary school attainment, increasing life expectancy, and reducing mortality. Similarly, another study analyzed the dual impact of remittances and public healthcare expenditure on household health spending and women’s healthcare outcomes for 138 developing countries.14 The study unearthed that the maternal mortality in the region decreased by 50% during 1990–2010, while remittances and public health spending more than doubled. Moreover, in the same period, public health spending per capita increased by 107.7%.

Similarly, another study analyzes the impact of remittances on the nutritional status of children aged under 5 years using anthropometric indicators based on the World Health Organization guidelines for Ecuador.16 The study reveals that remittances have positive effects on the weight-for-height percentile (WHZ) and weight-for-age z-score (WAZ). Moreover, this study also confirms a positive and significant effect of remittances income on the nutritional status of children aged between 5 and 14 years old. Furthermore, another study investigated the effect of workers’ remittances on human capital and labor supply as well as on health expenditure, life expectancy at birth, nutrition status and maternal mortality rates in developing countries.24

This study reported that the remittance inflow has a stronger influence than aid on the women’s reproductive healthcare outcomes. So much so that remittances are more effective than foreign aid inflows to improve child health.2 The analysis found that remittances have effectively enhanced the maternal and infant healthcare outcomes. Another study from Mexico highlighted a statistically significant effect of remittances on the proportion of health expenditures among households that do not have access to medical insurance.25

Nevertheless, very few studies so far have unpacked the impact of remittances on healthcare outcomes and living standards in Pakistan. One study on the impact of remittances on fertility rate shows that a 1% increase in remittances causes a 0.082% decrease in fertility rate both in the short term and in the long term.13 This study also confirms that remittances are used mostly to access education and health services. People with higher education are more aware of healthcare and birth control, therefore their fertility rate is low. In the same lines, another study examined the socio-economic impact of overseas workers’ remittances in districts Swabi, Pakistan.26 The study finds a positive impact of remittances on health and education as well as a significant improvement of their houses. Moreover, women who received remittances were less likely to accept domestic violence than those who did not receive remittances.5

These studies show limited research on the effects of remittances on woman’s healthcare outcomes in Pakistan. Hence, we examine women’s health responses to international remittances using Pakistan Social and Living Standards Measurement (PSLM) 2018–19 survey. The current study tests the following hypotheses in investigating the impact of remittances and healthcare outcomes:

HI—Households receiving international remittances will have a significant positive association on increasing the number of prenatal healthcare utilization visits with a healthcare professional.

H2—Households receiving international remittances will have a significant positive association on increasing the number of postnatal healthcare utilization visits with a healthcare professional.

H3—Households receiving international remittances will have a significant positive association on the decision making about the medical expenditure of childbearing mothers.

H4—Individual and household characteristics will have a significant influence on healthcare service utilization.
Materials and Methods

Data and Variables

The current study utilized Pakistan Living Standards and Measurement Survey dataset 2018–19, focusing on all married women aged 15–45 years, who gave birth during the last three years. The total sample size consisted of 10,360 children bearing mothers after cleaning the dataset for missing values and outliers. The population for the survey consisted of all urban and rural domains and four provinces of Pakistan, namely, Punjab, Sindh, Khyber Pakhtunkhwa (KP), and Baluchistan. A stratified two-stage sampling design has been adopted for the survey. Each enumeration block is comprised of 200–250 households on average. Whereas each enumeration block is treated as Primary Sampling Units (PSU) which are selected with probability proportional to size (PPS) method of the sampling scheme, while 12 and 16 households have been selected as Secondary Sampling Units (SSUs) from urban and rural domains, respectively, by using a systematic sampling technique.

The outcome variables are: (a) prenatal healthcare utilization, which is medical care that pregnant women receive, including advice on diet, appropriate weight gain, and lifestyle choices to protect their lives and their babies; and (b) postnatal healthcare utilization, which is the necessary care including proper nutrition and rest of the mother and child for the first six weeks after delivery. The prenatal healthcare questions are only applicable to women who had a live birth of their last child and postnatal healthcare utilization is confined to checkups within 6 weeks of delivery; and (c) decision-making power, which is the decision about the purchase of medical treatment by women. International remittances are used as a treatment variable which is financial resources or money which come from other countries by the migrant people of the country during the last year.

Importantly, the explanatory variables consist of individual, household and regional-level characteristics. For instance, the individual characteristics of the childbearing mothers are whether the respondent herself is the head of the household, her age as well as age at her marriage, number of children, education and employment level, and possession of personal mobile as a proxy for information and communication technology awareness. The household characteristics are residential status and the number of rooms, and the regional variables are urban/rural domain and provinces. The definition and explanation of these variables are given in Table 1.

| Table 1. Definition and explanation of variables (outcome and explanatory variables). |
|-----------------------------------------------|
| Outcome variables (Women healthcare variables) |
| Pre-natal healthcare utilization | While you were pregnant with your last child, did you have any pre-natal consultations? Pre-natal care = 1, Otherwise = 0 |
| Post-natal healthcare utilization | After the birth, did you receive a post-natal check-up within 6 weeks of delivery from a healthcare facility or at home? Post-natal care = 1, otherwise = 0 |
| Healthcare decision making | Who in your household usually makes decisions about purchase of Medical treatment? We constructed binary category such as women take decision herself = 1 and don’t take decision herself = 0 using the given combination: Woman herself, Head/Father in consultation with the woman Concerned, Head/Father and spouse of the head in consultation with the woman concerned = 1 |
| Treatment variable | Remittances received in cash from outside Pakistan, which will not be repaid (Yes = 1 No = 0) |
| Explanatory variables | Household head | Who is the head of the household woman or man? Head of the household female = 1 other = 0 |
| | Age | Age of the respondent as a continuous variable |
| | Age at marriage | At what age did you first marry? Generated three categories group1 (13–17); group2 (18–23); group3 (24–40) |
| | Number of children | How many children have you given birth |
| | Employment | Employment level (employed = 1 No = 0) |
| | Education | Education as a binary variable (educated = 1, illiterate = 0) |
| | Residence | What is your present occupancy status (owned = 1, rent = 0) |
| | Number of rooms | How many rooms are there is this residential building? As a continuous variable |
| | Mobile | Do you have your personal mobile (Yes = 1 No = 0) |
| | Region | Rural = 0 Urban = 1 |
| | Province | Four provinces: KP, Punjab, Sindh, Baluchistan |

Methods

The study uses Logistic Regression Analysis (LRA) owing to the binary nature of the outcome variables, and for robustness check Propensity Score Matching (PSM) methods because of the non-experimental nature of the data set, which results in possible selection bias. The LRA model is considered suitable when the outcome variable is dichotomized or (0/1).27–30

Formally, the logit regression model for the outcome variables is given by:

\[
\Pr(\text{service utilization} = 0|X) = \Pr(\text{service utilization}^* \leq \tau) = \Pi
\]

\[
\Pr(\text{service utilization} = 1|X) = \Pr(\text{service utilization}^* > \tau) = 1 - \Pi
\]

where \(\tau\) is the threshold value, below the threshold value lies the mothers who do not receive healthcare service utilization and no decision-making power and above the threshold value lies the mothers who receive the
healthcare service utilization and make their own decision about medical treatment. Whereas X stands for explanatory variables used in the analysis.

Similarly, the PSM method is a quasi-experimental method in which an artificial control group is generated by matching each treated group (remittance-receiving households) with a non-treated group (no remittance-receiving households) of similar characteristics.\textsuperscript{31–33} To this end, we match each treated group to one or more non-treated groups on the propensity score, using one of these methods which is 1) nearest neighbor matching method, 2) radius matching method, 3) kernel matching method, and 4) stratification matching. Specifically, through the nearest neighbor matching method, the closest neighbor variable is selected in terms of propensity score.\textsuperscript{34,35} With radius matching, each treated group is matched only with a non-treated group whose propensity score falls in a predefined neighborhood of the propensity score of the treated group.\textsuperscript{36} Whereas, kernel matching are non-parametric matching estimators that use the weighted average of all individuals in the non-treated group to produce counterfactual results.\textsuperscript{35} Finally, the concept of stratification matching is to arrange propensity score into a collection of intervals and to calculate the impact inside every interval by taking the mean difference in outcomes between the treated group and non-treated group.\textsuperscript{33}

**Results**

Table 2 describes the demographic characteristics of the childbearing mothers and socio-economic characteristics of the households. About 80\% of the childbearing mothers use prenatal healthcare services, while only 31\% use postnatal healthcare services, whereas, 9.8\% of mothers make the decision about their medical treatment expenses\textsuperscript{1}. Moreover, about 4\% of females are the head of households while the average age is 29 years and the average age at marriage is 20 years. The average number of children per mother is approximately 3. The employment level is 20\% and the higher education level is almost 39\%. About 86\% of respondents have their own houses while the number of rooms per household are almost 3. About 68\% live in rural regions and 31\% have mobile access and utilization and almost 8\% of households receive remittances. The distribution of childbearing mothers is 40\%, 24\%, 24\%, and 12\% for Punjab, Sindh, KP, and Baluchistan, respectively.

Table 3 presents the result of the logistic regression. The main findings delineate that for the households that receive international remittance, the likelihood of utilizing the prenatal and postnatal healthcare utilization as well as healthcare decision making of the childbearing mothers increase, significantly. For instance, in households who receive remittances, their coefficients are 0.615, 0.208 and 0.306 for prenatal, postnatal, and healthcare decision making, respectively, and all of them are statistically significant at a 1\% level of significance.

Besides, with an increase in the age of the mothers, the chance of taking up postnatal and health expenditure also increases. However, the study also reveals that the age at marriage of the young childbearing mothers are more likely to get prenatal healthcare services. As the household size increases in terms of the number of children, the likelihood of prenatal and postnatal care services utilization also declines. The education coefficients for prenatal, postnatal, and decision-making about medical expenditure are positive and statistically significant as indicated by 0.742, 0.553 and 0.324, respectively. Regarding occupational status, the results show that working mothers are less likely to utilize prenatal healthcare services. The household residential status also imparts a significant influence on mothers’ decision-making about their health expenditure. Similarly, mothers in rural regions pay less attention to their prenatal and postnatal healthcare services. This is also obvious from the fact that rural women are likely to be poor and possess less decision-making and economic power compared to urban women. Moreover, compared to the KP province, women in Punjab and Sindh provinces have more chance of utilizing the healthcare services as compared to Baluchistan province. Finally, the diagnostic test findings confirm that all three models are well specified.

The two-sample test of proportion-based mean difference findings is shown in Table 4. This test is used to determine whether the two samples differ significantly

| Table 2. Socio-demographic characteristics of women and households. |
|---------------------------------------------------------------|
| Variables (outcome & explanatory var.) | Mean (SD) |
| Prenatal healthcare utilization | 0.802 (0.398) |
| Postnatal healthcare Utilization | 0.312 (0.463) |
| Healthcare decision making | 0.098 (0.297) |
| Remittances | 0.080 (0.272) |
| Household head | 0.037 (0.190) |
| Age | 28.829 (6.263) |
| Marriage age | 19.944 (3.409) |
| Number of children | 3.421 (2.208) |
| Employment | 0.207 (0.405) |
| Education | 0.387 (0.487) |
| Residence | 0.858 (0.348) |
| Number of rooms | 2.608 (1.671) |
| Mobile | 0.318 (0.465) |
| Region | 0.687 (0.463) |
| Punjab | 0.396 (0.489) |
| Khyber Pakhtunkhwa | 0.238 (0.352) |
| Sindh | 0.238 (0.426) |
| Baluchistan | 0.125 (0.331) |
### Table 3. Findings of Multivariate Regression Analysis.

| Variables                                      | Prenatal utilization | Postnatal utilization | Decision making |
|------------------------------------------------|----------------------|-----------------------|-----------------|
| Remittances (HH not receiving remittance as reference category) Yes | 0.615***(0.133)      | 0.208***(0.086)       | 0.306***(0.109) |
| HH head herself (reference category, other members) Herself          | 0.066(0.177)         | –0.176(0.124)         | 1.287***(0.122) |
| Age of the respondent as continuous variable Age                    | –0.005(0.007)        | 0.018****(0.006)      | 0.036****(0.009) |
| Age at marriage (reference category 13–17) 18–23                  | –0.173****(0.067)    | –0.113* (0.059)       | 0.009(0.096)    |
| 24–40                                                           | –0.276****(0.113)    | –0.073(0.091)         | –0.088(0.140)   |
| Number of children as continuous variable Children                 | –0.110****(0.019)    | –0.122****(0.018)     | 0.015(0.025)    |
| Education of the respondent (Reference category Illiterate) Educated| 0.742****(0.074)     | 0.553****(0.052)      | 0.324****(0.086) |
| Employed of the respondent (Reference category unemployed) Employed | –0.285****(0.066)    | –0.081(0.059)         | –0.088(0.093)   |
| Owned house (Reference category No) Yes                            | –0.019(0.085)        | 0.107(0.066)          | 0.073(0.103)    |
| Number of rooms in the house as continuous variable Rooms          | –0.009(0.017)        | –0.0004(0.014)        | 0.050***(0.024) |
| Personal mobile (Reference category No) Yes                        | 0.677****(0.0743)    | 0.418****(0.0513)     | 0.620****(0.079) |
| Region (Reference category Urban) Rural                            | –0.665****(0.071)    | –0.385***(0.051)      | 0.016(0.082)    |
| Provinces (Reference category KP) Punjab                           | 1.628****(0.080)     | 0.335****(0.062)      | 0.938****(0.091) |
| Sind                                                             | 0.550****(0.080)     | 0.827****(0.070)      | 0.019(0.124)    |
| Baluchistan                                                      | –0.330****(0.079)    | 0.002(0.090)          | –2.385****(0.390) |
| Constant                                                         | 1.731****(0.192)     | –1.460****(0.137)     | –4.424***(0.250) |
| Diagnostic Test                                                  |                      |                       |                 |
| Pseudo R-sq                                                      | 0.168                | 0.070                 | 0.124           |
| Log likelihood                                                   | –4293.6              | –5981.3               | –2912.5         |
| Chi2                                                             | 1208.2               | 796.6                 | 649.4           |
| P value                                                          | 0.00                 | 0.00                  | 0.00            |
| N                                                                | 10360                | 10360                 | 10360           |

Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01
on specific characteristics. The two-sample test of proportion reveals a significant difference between the treated group and the controlled group. In another way, the two-sample test of proportion results establishes a significant mean difference between the treated group (household receiving remittances) and the controlled group (household not receiving remittances). Consequently, the difference in mean manifests the use of propensity score matching.

The result of the propensity scores matching method is given in Table 5. First, the probit model is used to estimate the propensity score. The explanatory variables, which are included in the probit model, are utilized to predict the propensity score. The propensity score represents the estimated propensity of being treated. Its magnitude ranges between zero and one. The larger the propensity score, the more likely individual is to be treated. All the results are significant. For instance, the value of average treatment effect for prenatal are 0.048, 0.074, 0.060, and 0.058 using the nearest neighbor matching, radius matching, kernel matching and stratification method, respectively, and statistically significant.

| Outcome variables         | Treated (Mean) | Untreated (Mean) | Diff. | t-value | Treated (N) | Untreated (N) |
|---------------------------|---------------|-----------------|-------|---------|-------------|---------------|
| Prenatal healthcare utilization | 0.896         | 0.793           | −0.102*** | −7.199 | 842         | 9584          |
| Postnatal healthcare utilization | 0.359         | 0.307           | −0.052*** | −3.126 | 842         | 9584          |
| healthcare decision making | 0.182         | 0.091           | −0.091*** | −8.056 | 842         | 9584          |

**Discussion**

The findings reveal that remittances play a significant role in improving women’s prenatal healthcare utilization, postnatal healthcare utilization and decision-making power about medical treatment in Pakistan. It is well established that prenatal and postnatal healthcare utilizations are necessary for the diagnosis and treatment of complicated problems such as anemia and pregnancy complications before and after childbirth. Nevertheless, it is discouraging as few mothers use postnatal services in Pakistan. In this dismal situation, it looks difficult to achieve sustainable development goals (SDG 3). Nearly 75% of remittances are used to cover the routine living expenses and medical costs, school fees or housing expenses in the developing world. The role of remittances is well-known effects on poverty alleviation, improve the small businesses, invest in education, obtain better health, and contribute to growth of the country. Moreover, primary healthcare (PHC) spending ranges from 33–88 percentage of health spending by both the public and private health expenditure in Pakistan. As per capita spending is often low in developing economies, therefore, PHC takes a greater share of health spending in low- and middle-income countries. In the case of Pakistan, only 8% of mothers decide about the utilization of medical treatment. This low representation of mothers in decision-making power for medical expenditure could be due to the patriarchal nature of the society where almost all financial decisions are taken by males. Specifically, according to the World Economic Forum report 2021, Pakistan is ranked 153 out of 156 countries on the Global Gender Gap Index, with huge gender disparities in education, employment, healthcare services utilization and political participation. These gender inequalities, particularly their say in the use of medical expenditure, tend to deprive women of their rights and autonomy, which ultimately affects their healthcare and reproductive behaviors.

Our results are in line with previous studies. For instance, if the head of the household is the mother herself, the likelihood of decision-making power about the utilization of medical treatment increases. This manifests that a mother who is also the head of the household has more autonomy and say on spending with regard to medical treatment. Besides, with an increase in the age of the mothers, the chance of taking up
postnatal and health expenditure also increases. However, the study also reveals that the age at marriage of the young childbearing mothers is more likely to get prenatal healthcare services utilization. One reason for the greater prenatal healthcare utilization among younger women could be their increased outreach to health-related information through media openness and information communication technologies. Another possible explanation for this finding could be those women expecting their first child may perceive themselves as more likely to experience complications during pregnancy. As the household size increases in terms of the number of children, the likelihood of prenatal and postnatal care services utilization also declines. A possible explanation for this finding could be that the cost-of-service utilization increases as the family size increases as well as the accumulation of health-related information.

Similarly, educated childbearing mothers are more likely to utilize all the healthcare services. Moreover, our findings are in line with previous studies. Furthermore, these results are consistent with several previous studies, where educational attainment was closely associated with increases in maternal healthcare services. As education has a positive impact on health awareness, educated mothers are more likely to learn from the health information available to them and are more open to accepting new information.

The results showed that working mothers are less likely to utilize prenatal healthcare utilization. One possible explanation could be that in Pakistan, women are mostly employed in informal sectors and earn less compared to their male counterparts. Our study is also in line with the studies conducted in India and Nepal where working women are less likely to use maternal healthcare services utilization.

Regional and provincial differences were also observed in the use of healthcare services. The province of Baluchistan is at the lowest rank in healthcare services utilization, followed by the KP province. In Baluchistan, a scantly population, far-flung areas, weak security situation and nonexistent health facilities are some of the important barriers to the provision of health services. Furthermore, socio-cultural barriers, poverty and lack of female staff at primary healthcare facilities make it difficult for women to utilize maternal healthcare services. Recently in Pakistan, Ehsaas programs were launched as poverty reduction programs that impact healthcare spending to prevent low-income households from facing financial catastrophe and also offered preventive services for universal health coverage through providing health cards and cash benefits. Moreover, Sehat Sahulat Programme (SSP) offered a comprehensive benefits package including emergency care, hospitalization, OPD consultation, diagnostic tests and transportation, which is the most preferred among low-income beneficiaries.

Thus, the study deems it necessary to examine the impact of any public program on healthcare services utilization in Pakistan. International remittances are one of the prominent steps forward, as they contributed 8% in GDP in the year 2019, which is well above the global average of about 4% and it has a significant impact on the economy in general and on health services in particular. The study also encourages future researchers to investigate the impact of the new government’s health cards and Ehsaas programs (both are new poverty reduction strategy programs) on overall healthcare services utilization.

Finally, the question asked from childbearing mothers about prenatal healthcare utilization and postnatal healthcare utilization is binary along with the main independent variable which is remittances. There are a number of visits by childbearing mothers as a continuous variable, however, the collected data do not allow us to use the continuous data due to the large percentage of missing data. Nevertheless, it is a minor issue and does not make any difference in using the outcome variables as continuous or binary. The current study does not mention any supply-side factors that might affect utilization (such as service quality, provider availability, or cost at these facilities where women are accessing prenatal and postnatal healthcare utilization) due to limited data for these variables and missing values.

**Conclusion and Implications**

Our results show that remittance plays a pivotal role in improving women’s prenatal, postnatal healthcare utilization and healthcare decision-making. Numerous individuals and household characteristics are responsible for the proper utilization of healthcare services. Moreover, the proportion of women using healthcare services is quite different among the different regions of Pakistan. It is recommended that an increased outreach and effective implementation of social welfare programs, such as the Benazir Income support program, Ehsaas program, and particularly healthcare...
insurance, can be helpful in the utilization of healthcare services, which ultimately results in the improvement of the women’s health. Besides, enough spending on public healthcare by the federal or local government ensures a robust functioning of healthcare services in the country. Globally, remittances are considered as one of major international financial resources, which sometimes exceed the flows of foreign direct investment (FDI) and contribute in the national economy of the country. Hence, it is encouraged for the national policymakers to implement such policies that result in improving the governance of migration particularly by providing information on employment prospects, subsidizing the cost of travel and making it safer, providing migrants with legal and other means of institutional support, and reducing the cost of sending remittances may have a significant positive influence on maternal healthcare utilization. In addition, remittances make direct contributions to the economy by reducing the gap of current account deficit.

Note

1. The major part of the remittance comes from the spouse which is approximately 60%, and then from the son which is approximately 30%.

Acknowledgments

We acknowledge Ratchadapisek Somphot Fund for Postdoctoral Fellowship, Chulalongkorn University Thailand.

Author Contributions

T.M design the manuscript, data analyses plan and variable selection. R.K performed the literature search and drafted paper for this study. Data analysis and interpretation was done by A.U.R with input from S.P. All the authors were involved in revision and editing of the draft. All authors critically reviewed the final manuscript and approved the draft for final submission.

Availability of data and material

PSLM data set is publically available online on the following link: https://www.pbs.gov.pk/content/pakistan-social-and-living-standards-measurement

Disclosure of Potential Conflicts of Interest

No potential conflict of interest was reported by the author(s).

Funding

The author(s) reported there is no funding associated with the work featured in this article.

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Research Ethics And Patient Consent

This study is based on an analysis of cross sectional data available freely and publicly with all identifier information removed, no ethics approvals were required.

References

1. Adams RH Jr. Evaluating the economic impact of international remittances on developing countries using household surveys: a literature review. J Dev Stud. 2011;47 (6):809–8281. doi:10.1080/00220388.2011.563299.
2. Chauvet L, Gubert F, Mesplé-Somps S. Are remittances more effective than aid to improve child health? An empirical assessment using inter and intra-country data. In Annual Bank Conference on Development Economics. Paris; 2008. p. 9–11.
3. World Economic Forum. Global gender gap report 2021: insight report; 2020
4. King EM, Mason AD. Engendering development through gender equality in rights, resources, and voice. Washington (DC): The World Bank; 2000.
5. Mitra A, Bang JT, Abbas F. Do remittances reduce women’s acceptance of domestic violence? Evidence from Pakistan. World Dev. 2021;138:105149. doi:10.1016/j.worlddev.2020.105149.
6. Cavaliere LPL, Tautiva JAD, Barragán C, Khan SU. Analyzing the pattern and relative importance of remittance sources of Pakistan. Int J Manage. 2021;12 (1):879–88.
7. Muhammad T, Khan A. Exploring the impact of remittances on economic growth in Pakistan. J Managerial Sci. 2021;15:1–20.
8. Adams RH Jr, Cuecuecha A. The impact of remittances on investment and poverty in Ghana. World Dev. 2013;50:24–40. doi:10.1016/j.worlddev.2013.04.009.
9. Córdova JEL. Globalization, migration and development: the role of Mexican migrant remittances (Working Paper ITD= Documento de Trabajo ITD; n. 20) (Vol. 20); 2006. BID-INTAL.
10. Page J, Plaza S. Migration remittances and development: a review of global evidence. J Afr Econ. 2006;15 (suppl_2):245–336. doi:10.1093/jae/ejl035.
11. Gilani I, Khan MF, Iqbal M (1981). Labour migration from Pakistan to the middle east and its impact on the domestic economy: part II (cost-benefit analysis).
12. Kapri K, Jha S. Impact of remittances on household health care expenditure: evidence from the Nepal living standards survey. Rev Dev Econ. 2020;24:991–1008.

13. Paul FH, Soomro R, Arif M. The impact of remittances on fertility rate in Pakistan: new evidence from ARDL cointegration. RADS J Bus Manage. 2019;1:114–24.

14. Terrelonge SC. For health, strength, and daily food: the dual impact of remittances and public health expenditure on household health spending and child health outcomes. J Dev Stud. 2014;50(10):1397–410. doi:10.1080/00220388.2014.940911.

15. Zhunio MC, Vishwasrao S, Chiang EP. The influence of remittances on education and health outcomes: a cross-country study. Appl Econ. 2012;44(35):4605–16. doi:10.1080/00220388.2012.719348.

16. Antén JI. The impact of remittances on nutritional status of children in Ecuador. Int Migration Rev. 2010;44(2):269–99. doi:10.1111/j.1747-7379.2010.00806.x.

17. Hildebrandt N, McKenzie DJ, Esquivel G, Schargrodsky E. The effects of migration on child health in Mexico [with comments]. Economia. 2005;6:257–89.

18. Anwar AI, Mughal MY. Migrant remittances and fertility. Appl Econ. 2016;48(36):3399–415. doi:10.1080/00220388.2016.1139676.

19. Naufal GS, Vargas-Silva C. Changing fertility preferences one migrant at a time: the impact of remittances on the fertility rate (No. 4066). IZA Discussion Papers; 2009.

20. Atake EH. The impacts of migration on maternal and child health services utilisation in Sub-Saharan Africa: evidence from Togo. Public Health. 2018;162:16–24. doi:10.1016/j.puhe.2018.05.010.

21. West HS, Robbins ME, Moucheraud C, Razzazque A, Kuhn R. Effects of spousal migration on access to healthcare for women left behind: a cross-sectional follow-up study. Plos one. 2021;16(12):e0260219. doi:10.1371/journal.pone.0260219.

22. Kan S. Is an ounce of remittance worth a pound of health? The case of Tajikistan. Int Migration Rev. 2021;55(2):347–81. doi:10.1177/0197918320926891.

23. De PK, Rath A. Impact of remittances on household income, asset and human capital: evidence from Sri Lanka. Migration Dev. 2012;1(1):163–79. doi:10.1080/21632324.2012.719348.

24. Azizi S. The impacts of workers’ remittances on human capital and labor supply in developing countries. Econ Model. 2018;75:377–96. doi:10.1016/j.econmod.2018.07.011.

25. Valero Gil JN. Remittances and the household’s expenditures on health. J Bus Strategics. 2009;26(1):119–40. doi:10.54155/jbs.26.1.119-140.

26. Khan M. Socio-Economic impact of overseas workers remittances on the recipient households in district Swabi, Pakistan [Doctoral dissertation]. Pakistan: NWFP Agricultural University Peshawar; 2010.

27. Dayton CM. Logistic regression analysis. Stat. 1992;474–574.

28. Peng CYJ, Lee KL, Ingersoll GM. An introduction to logistic regression analysis and reporting. J Educ Res. 2002;96(1):3–14. doi:10.1080/00220267020958786.

29. Bewick V, Cheek L, Ball J. Statistics review 14: logistic regression. Crit Care. 2005;9(1):1–7. doi:10.1186/cc3045.

30. Abadie A, Imbens GW. Matching on the estimated propensity score. Econometrica. 2016;84(2):781–807. doi:10.3982/ECTA11293.

31. Rosenbaum PR, Rubin DB. The central role of the propensity score in observational studies for causal effects. Biometrika. 1983;70(1):41–55. doi:10.1093/biomet/70.1.41.

32. Baser O. Too much ado about propensity score models? Comparing methods of propensity score matching. Value Health. 2006;9(6):377–85. doi:10.1111/j.1524-4733.2006.00130.x.

33. Caliendo M, Kopeinig S. Some practical guidance for the implementation of propensity score matching. J Econ Surv. 2008;22(1):31–72. doi:10.1111/j.1467-6419.2007.00527.x.

34. LaLonde RJ. Evaluating the econometric evaluations of training programs with experimental data. Am Econ Rev 1986;76(4):604–20.

35. Smith JA, Todd PE. Does matching overcome LaLonde’s critique of nonexperimental estimators? J Econom. 2005;125(1–2):305–53. doi:10.1016/j.jeconom.2004.04.011.

36. Dehejia RH, Wahba S. Causal effects in nonexperimental studies: reevaluating the evaluation of training programs. J Am Stat Assoc. 1999;94:1053–62.

37. Farooq A, Kayani AK. Social dynamics in rural Punjab: changes in gender roles, spatial mobility and decision making. Int J Sociol Social Policy. 2014;34(5/6):317–33. doi:10.1108/IJSPP-06-2013-0067.

38. Nigatu D, Gebremariam A, Abera M, Setegn T, Deribe K. Factors associated with women’s autonomy regarding maternal and child health care utilization in Bale Zone: a community based cross-sectional study. BMC Women’s Health. 2014;14(1):1–9. doi:10.1186/1472-6874-14-79.

39. Rizvi N, Khan KS, Shaikh BT. Gender: shaping personality, lives and health of women in Pakistan. BMC Women’s Health. 2014;14(1):1–8. doi:10.1186/1472-6874-14-53.

40. Karlens S, Say L, Souza JP, Hogue CJ, Calles DL, Gülmezoglu AM, Raine T. The relationship between maternal education and mortality among women giving birth in health care institutions: analysis of the cross sectional WHO global survey on maternal and perinatal health. BMC Public Health. 2011;11(1):1–10. doi:10.1186/1471-2458-11-606.

41. Mekonnen Y, Mekonnen A. Factors influencing the use of maternal healthcare services in Ethiopia. J Health Popul Nutr. 2003;21(4):374–82.

42. Davies NM, Dickson M, Smith GD, Van Den Berg GJ, Windmeijer F. The causal effects of education on health outcomes in the UK biobank. Nat Hum Behav. 2018;2(2):117–25. doi:10.1038/s41562-017-0279-y.

43. Matsumura M, Gubhaju B. Women’s status, household structure and the utilization of maternal health services in Nepal. Asia-Pac Popul J. 2001;16(1):23–44. doi:10.18356/e8ad49ed-en.
44. Muchabaiwa L, Mazambani D, Chigusiwa L, Bindu S, Mudavanhu V. Determinants of maternal healthcare utilization in Zimbabwe. Int J Econ Sci Appl Res. 2012;5:145–62.

45. Celik Y, Hotchkiss DR. The socio-economic determinants of maternal health care utilization in Turkey. Soc Sci Med. 2000;50(12):1797–806. doi:10.1016/S0277-9536(99)00418-9.

46. Gage AJ. Barriers to the utilization of maternal health care in rural Mali. Soc Sci Med. 2007;65(8):1666–82. doi:10.1016/j.socscimed.2007.06.001.

47. Sadaquat MB. Employment situation of women in Pakistan. Int J Soc Econ. 2011; 28(2): 98–113.

48. UNDP. Pakistan National Development Report 2020; 2021. https://www.pk.undp.org/content/dam/pakistan/docs/NHDR2020/NHDR%20Inequality%202020%20low%20res.pdf.

49. Government of Pakistan. Ehsaas governance and integrity policy. Ehsaas strategy; 2019.

50. Habib SS, Zaidi S. Exploring willingness to pay for health insurance and preferences for a benefits package from the perspective of women from low-income households of Karachi, Pakistan. BMC Health Serv Res. 2021;21(1):380. doi:10.1186/s12913-021-06403-6.