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Cash transfers and mental health in Egypt*

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Abstract

The relationship between poverty and mental health is complex. Conditional cash transfers are seen as an important policy tool in reducing poverty and fostering social protection. Evidence on the impact on mental health is mixed. In this study, we assess the causal impact of the Egypt's conditional cash transfer (CCT) programme Takaful on the main beneficiaries' mental health. Using a regression discontinuity design, we find that receiving the Takaful CCT does not have a significant impact on the anxiety levels of mothers in our sample. In addition, we do not find much supporting evidence that the programme has an heterogeneous impact on anxiety levels. We discuss possible explanations behind these null results.

Keywords: conditional cash transfers, social protection, mental health, Egypt

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1 Introduction

Poverty and mental illness are part of a 'vicious cycle'. Growing evidence shows that poverty is associated with mental illness (Lund et al., 2010), and that causality runs two-ways. Poverty can increase the prevalence of mental illness, as it increases stress, social exclusion, malnutrition, and other factors that increase the risk of developing mental illness (Lund et al., 2010, 2011; Patel and Kleinman, 2003). Meanwhile, mental illness can also be a driver of poverty, due to instability or lack of employment, lower productivity and income, and social stigma, among other factors (Lund et al., 2010; Mossakowski, 2014; Patel and Kleinman, 2003). The causal impact of poverty on mental illness follows the "social causation hypothesis," which posits that experiencing hardship increases the risk of mental illness. Experiencing a disadvantaged socioeconomic status exposes individuals to sociopsychological coping mechanisms that harm mental health (Mossakowski, 2014). Financial support could help reduce economic hardship, which would be expected to improve mental illness.

Poverty alleviation interventions, and in particular cash transfers programmes, have therefore been proposed to simultaneously reduce poverty and improve mental health. However, the conditionalities associated with many programmes make the relationship theoretically ambiguous. On the one hand, an increase in income through the receipt of additional cash can increase the household's economic security and reduce the household's exposure to financial shocks. It may also reduce psychological distress resulting from anticipating shocks or financial constraints (Ridley et al., 2020; Evans-Lacko et al., 2023). The additional income can also be saved or invested in income-generating activities (Hidrobo et al., 2020; Natali et al., 2016). Such factors reduce the effective exposure to economic distress, and related personal stress and tension among household members. On the other hand, the conditionality of the cash transfer may add additional pressure to those in charge, particularly the mothers since meeting the conditionalities and receiving the cash becomes part of their responsibility and of being a 'good mother' (Baird et al., 2013; Molyneux, 2006). The cash transfer programme in Egypt is a unique opportunity to assess whether such hypotheses materialize within the context of a collectivist society in the Middle East and North Africa (MENA) region.

Egypt is an interesting case study. It is a lower middle-income country in the MENA region, with a growing population of more than 110 million people (United Nations Department of Economic and Social Affairs - Population Division, 2022). According to the country's latest estimates in 2019/2020, three in every ten individuals in Egypt lived in poverty (Genoni, 2023). It is estimated that around one in five "have been so anxious or depressed" that they could not continue with their daily activities (Gallup and Wellcome, 2021). The first conditional cash transfer programme in Egypt, called "Takaful and Karama", was introduced in 2015. The programme was designed to support poor households with children, or with elderly members and orphans. Two evaluation studies have been conducted to evaluate the programme by the

International Food Policy Research Institute (IFPRI) (Breisinger et al., 2018; ElDidi et al., 2018; El Enbavy et al., 2022). The evaluation studies touched upon the impact of the programme on many outcomes. Yet, a rigorous study on the impact of the programme on mental health has not been conducted. Following the approach used in El Enbavy et al. (2022), we exploit the eligibility criteria of the programme to implement a regression discontinuity design and assess the impact of the programme on mental health. More specifically, we assess whether Egypt's conditional cash transfer programme "Takaful" has an impact on the anxiety levels of cash recipients in the medium term. To do so, we use household data to compare beneficiaries to non-beneficiaries, around an eligibility cutoff, which is defined by a proxy-means test (PMT) score. We find that the programme has no impact on anxiety levels of the beneficiaries, who have been receiving the programme for five years. We also explore further heterogeneity by studying whether the programme affects people with specific individual-level characteristics in different ways. Our analysis reveals that receiving Takaful is correlated with lower anxiety among women who are older than 34 years of age. However, we remain cautious in interpreting this heterogeneous effect since age is correlated with other mediating factors.

We contribute to the literature on the impact of poverty reduction programmes in several ways. First, impact evaluations of cash transfers have mainly focused on assessing the impact of cash transfer programmes on household and individual well-being or on the human capital aspects (e.g. education or health) the conditionalities of the programme tend to incentivize (Pellerano and Barca, 2014). As systematically reviewed by Wollburg et al. (2023), Romero et al. (2021), Ridley et al. (2020), McGuire et al. (2022), Lund et al. (2011), Zaneva et al. (2022), and Zimmerman et al. (2021), the related literature on mental health is more recent and limited in scope.¹ The impact of anti-poverty programmes across different countries in Asia and Sub-Saharan Africa was assessed in Lund et al. (2011) and Ridley et al. (2020). The latter only selects randomized controlled trials (RCTs). Some of the included poverty alleviation programmes include cash transfer programmes. The results of both systematic reviews differ. Lund et al. (2011) conclude that poverty alleviation interventions have mixed impacts on mental health outcomes. Most studies consider mental health indicators for children. For impacts on adults, a small loans intervention led to an increase in stress levels among programme beneficiaries but had insignificant effects on depressive symptoms. The included unconditional cash transfer studies also did not show a significant impact on depression indices (Lund et al., 2011). On the other hand, results from a meta-analysis conducted by Ridley et al. (2020) concludes that anti-poverty programmes have a positive and significant impact on the mental health instruments studied.²

¹Some of these reviews such as Zaneva et al. (2022) and Zimmerman et al. (2021) focus on different subgroups of the population such as the mental health of children and youths, so will not be covered in this brief literature review.

²McGuire et al. (2022) extend Ridley et al. (2020)'s work by adding subjective well-being indicators, quasi-experimental studies and studies on Latin American countries. Through studying 100 outcome indicators, McGuire et al. (2022) conclude that on average, cash transfer programmes have a positive effect on mental health and subjective well-being among recipients. The authors also find that the estimated impact for unconditional cash transfers was substantially larger than for conditional cash transfers. Therefore, smaller impacts are found in Latin American countries where CCTs are prevalent. Additionally, the effects of cash transfers decline slowly over time. This is consistent with results from a more recent systematic review and

Second, few studies have investigated the impact of cash transfers on anxiety disorders, which are the most prevalent mental disorders globally (World Health Organization, 2023). Most studies on poverty alleviation in relation to mental health look at different outcomes, with a few exceptions. For instance, Powell-Jackson et al. (2016) assess the impact of India's Janani Suraksha Yojana (JSY) cash transfer programme on maternal depression and distress. The Indian programme provides cash to women giving birth in government health facilities. Distress is generally defined as unpleasant subjective stress responses or discomfort related to signs and symptoms of anxiety and depression (Matthews, 2016; Ridner, 2004). The authors use the 10-question Kessler Psychological Distress Scale (K10), which measures anxiety and depressive symptoms. They find that receiving the cash transfers was associated with an 8.5 percent reduction in the K10 score, a 63 percent reduction in severe depression and a 36 percent reduction in moderate depression. They do not find significant evidence of heterogeneity when comparing sub-groups based on wealth, education or the time between childbirth and the interview. Meanwhile, Heath et al. (2020) find that impacts on Mali's national cash transfer programme on intimate partner violence (IPV) were mediated by men's reduced anxiety, whereby anxiety was assessed through an index which covers 14 domains of anxiety or worry (Heath et al., 2020). Some other studies consider anxiety among younger populations, such as Pettifor et al. (2016) which measure anxiety using the Children's Manifest Anxiety Scale (CMAS) questionnaire. Baird et al. (2013) and Baird et al. (2016) also investigate the impact of a cash transfer programme provided to school-age girls in Malawi on anxiety among common mental disorders, using the General Health Questionnaire 12-items version (GHQ-12). This paper is one of the few studies focusing on generalized anxiety in the literature on poverty alleviation and mental health.

Third, despite a recent increase in studies on the impact of cash transfers, there is no systematic evidence on the topic in the Middle East and North Africa (MENA). This is the first study on a country from the MENA region, since earlier studies largely covered interventions from Latin America, Sub-Saharan Africa and Asia (Wollburg et al., 2023; Romero et al., 2021; Ridley et al., 2020; McGuire et al., 2022; Lund et al., 2011). MENA countries are socio-economically and culturally different from Latin American, Asian and Sub-Saharan African countries, which means that the impact in those countries may be different. Despite the lack of consistent data and measurements, it has been estimated that the prevalence of anxiety in the MENA region is up to three times that in East Asia, and that the prevalence among women in MENA is estimated to be the highest worldwide (Baxter et al., 2014). The burden of mental health disorders in this region is higher than global averages, particularly for women (GBD 2015 Eastern Mediterranean Region Mental Health Collaborators, 2018). The MENA region is culturally different from western countries, as it

meta-analysis conducted by Wollburg et al. (2023), which covers the same topic, looking at 17 studies on Sub-Saharan Africa, Latin America and South Asia. Wollburg et al. (2023) show that cash transfers significantly reduce the depression and anxiety of the transfer recipients, but that the results are not sustained after programme cessation of two to nine years.

generally fosters collectivism (Basurrah et al., 2022), which may have different implications on mental health in relation to receiving social protection. This study also adds to the literature on women's mental health in Egypt, which largely focus on specific sub-population groups such as pre- or postpartum or postmenopausal experiences or women's experiences in relation to sexual topics (Abdelhai and Mosleh, 2015; Arafa and Senosy, 2018; Ibrahim et al., 2012). We provide a new perspective on Egypt's conditional cash transfer programme, which is the largest poverty-targeted conditional cash transfer programme in MENA, covering about five million households (Ridao-Cano et al., 2023). While most papers in the literature focus on depressive symptoms, we show that by looking at anxiety indicators, receiving cash transfers can have a null impact on the beneficiaries' anxiety levels over the medium-term.

2 Background

2.1 Mental health in Egypt

Data on mental health disorders in Egypt is limited. The first nationally representative survey on mental health was conducted in 2017. The survey on mental health showed that one in every four individuals suffered from mental disorders, while only 0.4 percent were receiving treatment (General Secretariat of Mental Health and Addiction Treatment, 2017). The report does not provide the prevalence of anxiety disorders, yet other studies on some population sub-groups indicate anxiety rates close to the rates found in our data. The data used in this paper shows that around 36 percent of surveyed mothers suffer from minimal anxiety, 64 percent suffer from mild or higher anxiety, 31 percent suffer from moderate or higher anxiety and 8 percent report suffering from severe anxiety. A recent study on married women in Ismailia governorate indicated that 76 percent of women suffered from anxiety, with 46 percent having mild anxiety, and 18 percent having mild to moderate anxiety (Salim et al., 2024). Another study during the COVID-19 pandemic found that about 63 percent of interviewed individuals had moderate anxiety, and 12 percent had severe anxiety (Shehata et al., 2021).

Several studies on anxiety disorders in different areas in Egypt found a correlation between mental illnesses and different characteristics, such as education (Okasha, 1999; Ghanem et al., 2009; Yount et al., 2014). Lower education and being divorced or widowed were correlated with increasing risk of mental disorders (Ghanem et al., 2009). In another study in Minya, an Upper Egypt governorate, higher school attainment, premarital economic activity, later age at first marriage and greater proximity to family were significantly correlated to lower generalized anxiety for women (Yount et al., 2014). A more recent study in Ismailia, a Lower Egypt governorate also found that anxiety among married women increases with age, living in rural area, and being exposed to domestic abuse (Salim et al., 2024).

2.2 Takaful Programme

Cash transfers constitute one common poverty alleviation strategy. They generally aim to financially support poor households or people with vulnerabilities. Within cash transfer programmes, state or non-governmental organizations transfer money to vulnerable individuals or households, as a form of social assistance or non-contributory pensions (Bastagli et al., 2019; Slater, 2011). Cash transfer programmes have become increasingly popular internationally. They increased a lot as a response to the COVID-19 crisis (Gentilini, 2022). There are two forms of cash transfers, namely, unconditional and conditional cash transfers. Unconditional cash transfers (UCTs) are provided to their eligible recipients with no requirements or attached conditions. Meanwhile, recipients are required to perform specific actions or abide by specific conditions to carry on receiving conditional cash transfers (CCTs). Conditionalities are generally established to improve human capital accumulation, by conditioning transfers on the adoption of ‘desirable’ behaviors such as activities related to health and education (Pellerano and Barca, 2014).

Takaful is the largest part of Egypt’s flagship cash transfer programme, “Takaful and Karama.” Takaful and Karama is implemented by the Ministry of Social Solidarity in Egypt (MOSS). Takaful (an Arabic word meaning solidarity) is a conditional cash transfer given to mothers and caregivers of children within households living in poverty. The cash is received by the mothers, from local MOSS offices, post offices, or automated teller machines (ATM) located throughout the country (World Bank, 2015, 2022). Receiving cash is conditional on attendance to school and monitoring growth of children. To continue receiving Takaful, children between the ages of 6 and 18 are expected to attend at least 80% of school days. Meanwhile, mothers and children under 6 years of age are expected to visit local health centers three times a year, for growth monitoring, prenatal checks, attending awareness sessions, and ensuring the full immunization of children (Egypt’s Ministry of Social Solidarity, 2023). The cash that each household receives is a function of the number of children within the household, their age and school year.

The programme offers cash if there are children from kindergarten to high school grades (secondary schooling). Takaful offers a base monthly payment of EGP325 per household,³ in addition to an allowance per child based on their educational level. As of the latest payment update, the programme grants households EGP60 per child under six years of age, EGP80 for every child in primary education stage, EGP100 for children in preparatory stage and EGP140 for those in secondary stage (El Enbaby et al., 2022; Egypt’s State Information Service, 2022). The maximum monthly amount that a household can receive under Takaful is EGP625, while the average amount reported by beneficiaries is EGP432 (El Enbaby et al., 2022).⁴

³At the time of the survey, this was equivalent to about USD20.70. The average exchange rate in February 2022 was EGP1=USD0.0636

⁴The maximum amount is equivalent to USD39.8 and the average is equivalent to USD27.5 based on the USD/EGP exchange rate at the time of the survey, which took place in January and February 2022. The national poverty line was estimated to be EGP736 per capita per month (World Bank, 2020). Hence, average Takaful transfers account for about 12 percent of the income

Targeting Takaful is based on a proxy-means test (PMT) methodology, which has often been used in similar cash transfer programmes (World Bank, 2015). The PMT methodology utilizes statistical methods to generate an estimate for household well-being, or most commonly consumption (Stoeffler et al., 2016). The PMT for Takaful includes demographics, assets, housing conditions, and other individual and household characteristics (World Bank, 2015). Targeting and eligibility are based on a PMT threshold/cutoff that the authorities select, along with some additional exclusion criteria that MOSS applies. The eligibility cutoff has changed several times throughout the life of the programme. For the sample of households included in this study, which are households who have registered into the programme between May and December 2016, the PMT cutoff is 4,500 (El Enbaby et al., 2022).

The PMT score is the main, but not the only, predictor of programme participation. At the beginning of the programme, targeting was primarily geographic in conjunction with the PMT score. The programme was rolled out in the poorest districts in the poorest governorates in Egypt, then to the whole country. Based on the PMT methodology, households with a score lower than the threshold received the transfers, while households with a score above it are excluded from the programme. In addition to the PMT score, MOSS applies some exclusion criteria such as land ownership, having social insurance, or having a formal job with a salary above a certain level. For instance, a household that owns land, larger than half a feddan (equivalent to 0.21 hectare) would be excluded from the programme (Egypt's Ministry of Social Solidarity, 2023). The PMT score is calculated at the central level within the ministry (MOSS), based on a function that includes more than 80 variables (Kurdi et al., 2018). Neither household members nor ministry employees at the local offices know how the score is calculated, or which variables have more weight. Hence, manipulation in the PMT score is unexpected. While corruption and clientelism have generally been of concern in similar cash transfer programmes (Alcázar, 2010; Frey, 2019), given that the PMT score and eligibility criteria are determined at the central level, and not in local offices, we believe that such concerns are minimal within the context of Takaful.⁵

Two evaluation studies have been conducted to evaluate the impact of the Takaful programme by the International Food Policy Research Institute (IFPRI). The first study was conducted in 2017, concluding that the programme increased household consumption per adult equivalent ⁶ by 8.4 percent and reduced the probability that a beneficiary household is poor (< USD1.90 per capita per day) by 11.4 percentage points, which is comparable to similar CCT programmes in Latin America (Breisinger et al., 2018). The second study was conducted in 2022, showing that Takaful beneficiary households are investing in productive

of an average household of five members living on an income equivalent to the poverty line.

⁵An earlier qualitative study indicated that households have mixed views on whether the programme's targeting is fair or not within their communities (ElDidi et al., 2018). However, concerns are related to possible manipulation of the exclusion criteria, not the PMT score, used as the key indicator for our identification strategy (ElDidi et al., 2018).

⁶The adult equivalent units are defined as giving a weight of 1 to the first adult, 0.7 to additional adults and, 0.3 to children under age 18 (El Enbaby et al., 2022; Commission et al., 1994)

assets, have lower debt burdens, and borrowed less to cope with shocks, compared to non-beneficiaries. In addition, results showed improved school enrollment and attendance for children among Takaful beneficiary households (El Enbaby et al., 2022). This paper uses the data collected for the second evaluation. El Enbaby et al. (2022) estimate the impact of receiving Takaful on GAD-7 for a different sample of household members, using a non-parametric methodology and find no impact on anxiety, worry or self-esteem. While we also find null effects of Takaful on anxiety, the point estimates differ due to differences in sample and estimation strategy.

3 Data

We use data collected by IFPRI for the second evaluation study, for the purpose of assessing the medium-term impact of the Takaful programme. IFPRI has implemented a household survey in February 2022 for Takaful's follow-up impact evaluation. The sample of beneficiaries and non-beneficiaries needed for the evaluation has been selected using the Ministry of Social Solidarity (MOSS)'s inventory of all Takaful applicants, referred to as "MOSS administrative data".

MOSS Administrative Data. MOSS stores the information on all Takaful and Karama applicants in its administrative database. The database includes individual-level characteristics on both the applicant and her/his household members, as well as household-level characteristics. Individual-level information include applicant's name, ID number, age, education, health issues, among other variables. The same information is also collected for the household members. Additionally, household-level characteristics that are used in the PMT score calculation are included, such as households assets and infrastructure.

The PMT score is calculated using both individual-level and household-level characteristics. It is calculated based on a regression that includes about 80 variables. The regression has been developed using the significant variables from the Egyptian Household Income, Expenditure and Consumption Survey (HIECS) that define household income. A separate regression is run for the different geographic regions of Egypt. Given the way the PMT score is calculated, it is a continuous variable. MOSS only saves discrete values for the PMT score, without decimal points.

Household Survey. The survey used for this study has been collected for Takaful's follow-up evaluation, to measure the medium-term impact of the programme. IFPRI restricted the sample to households who have been registered to the programme for about five years, i.e. who have joined the programme between May 2016 and December 2016 (El Enbaby et al., 2022). These compose the "treatment" arm. Meanwhile, the "control" arm is composed of households who were not eligible in 2016, i.e. had a PMT score above the

4,500 cutoff.

IFPRI used the administrative data for all Takaful registrants between May and December 2016, and selected all villages where there are more than 16 Takaful registering households, targeting 12 households per village.⁷ Within those villages, the households with PMT scores closest to the cutoff have been selected, identifying 540 villages (El Enbaby et al., 2022). The sample ended up with a PMT score window ranging from 4,448 to 4,562. IFPRI also added two villages from Egypt's frontier governorates, for geographic representativeness (with scores ranging from 4,444 to 4,564). The initial sample consisted of 6,480 households, but the response rate was 94.6 percent due to difficulties in locating some of the households (El Enbaby et al., 2022).

Data have been collected from 6,475 households in all Egypt's governorates during the month of February 2022. The households were interviewed in their homes through home visits conducted by a data collection firm. Data have been collected through Computer-Assisted Personal Interviews (CAPI), based on face-to-face interviews whereby enumerators collected the data on tablets. The survey collected data about several individual and household-level characteristics and outcomes of interest for the purpose of the impact evaluation. For our analysis, IFPRI's household survey is merged with MOSS's administrative data set, following the approach used in El Enbaby et al. (2022). MOSS administrative data include the proxy-means test (PMT) score that each household received, and the household's beneficiary status (i.e., whether the household was accepted into the programme or not).

Generalized Anxiety Disorder (GAD). Generalized anxiety disorder refers to having excessive anxiety and worry about various domains, in more days than not, for at least six months (American Psychiatric Association, 2016). Having GAD also includes having some physical symptoms such as restlessness, being easily fatigued, and muscle tensions, among others (American Psychiatric Association, 2016). GAD is likely to be the type of anxiety mostly linked with poverty given that it covers different forms of anxiety. It can be reliably assessed through a short diagnostic tool called the generalized anxiety disorder 7-item scale (GAD-7). GAD-7 proved to be a good tool in identifying probable cases of GAD, in measuring GAD severity, as well as distinctively identifying GAD from depression (Spitzer et al., 2006). It has been estimated that GAD-7 can diagnose GAD with a sensitivity of 89 percent and a specificity of 82 percent (Spitzer et al., 2006).⁸

Arabic versions of the GAD-7 have been validated for Arabic-speaking people in the MENA region (AlHadi et al., 2017; Sawaya et al., 2016). It has also been used in multiple studies on Egypt (Gewaifel et al.,

⁷IFPRI chose this sampling method to maximize statistical power (El Enbaby et al., 2022)

⁸Sensitivity and specificity are measures of a test's diagnostic accuracy. Sensitivity refers to a test's ability to identify those with the disease correctly. More specifically, it is the proportion of true positive patients with the disease from the total group of patients diagnosed with the disease. Meanwhile, specificity refers to a test's ability to determine those without the disease correctly, or the proportion of those without the disease with a negative test result from the total number of subjects that do not have the disease (Simundic, 2012)

2023; Rabei and El Fatah, 2021; Sayed Ahmed et al., 2022; Elfar et al., 2023). The household questionnaire includes the generalized anxiety disorder 7-item scale (GAD-7). GAD-7 assesses the anxiety level of the main beneficiary from the programme and is the main outcome variable of interest for this study. GAD-7 lists seven questions and asks the individual “Over the last two weeks, how often have you been bothered by the following problems?” The following list of problems are surveyed: 1) feeling nervous, anxious, or on edge; 2) not being able to stop or control worrying; 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; and 7) feeling afraid as if something awful might happen. Responses for each question take the value of 0 for “not at all,” 1 for “several days,” 2 for “more than half the days,” and 3 for “nearly every day,” over the last two weeks. A total score is then calculated for the responses of each respondent, producing a score than ranges from 0 to 21. Individuals with scores between zero and four are rated as having “minimal anxiety,” between five and nine having “mild anxiety,” between 10 and 14 having “moderate anxiety” and between 15 and 21 having “severe anxiety” (Spitzer et al., 2006). The GAD-7 is the main variable of interest in this study, estimating the impact of the intervention on anxiety. In addition, we will estimate the programme’s impact on whether the mother falls within a specific level of anxiety, by generating binary variables that indicates whether the respondent has at least mild anxiety (GAD-7 score higher than five), at least moderate anxiety (GAD-7 score higher than 10), and severe anxiety (GAD-7 score higher than or equal to 15).

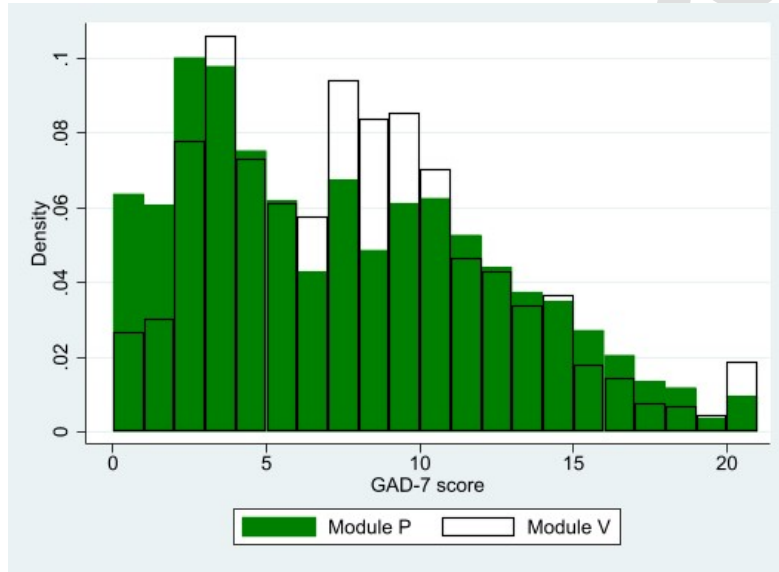
GAD-7 was administered in two sections of the household questionnaires. It was administered in the second half and towards the end of the survey (in module P, 14th module out of 19 modules) to the survey’s main respondent, which in most cases was the household head or spouse. In the case where the main respondent was not the female caregiver or mother of the children benefiting from Takaful, GAD-7 was surveyed at the end of the questionnaire to the main female in the households (in module V, 17th module). That female respondent is also the mother of the Takaful children and the spouse of the household head. The full sample of mothers interviewed amounts to 6,421 mothers, out of which 3,447 were interviewed in module P, and 2,974 in module V. We merge both modules to create one variable for the GAD-7 score for analysis purposes. GAD-7 non-response accounts for 0.83 percent, which is equivalent to 54 households, distributed among treatment and control households.⁹

Comparing the results of both modules P and V indicates that GAD scores recorded in module V are significantly higher than those recorded in module P. A Kolmogorov-Smirnov test is conducted in order to check whether the GAD-7 distribution from both modules follow the same normal distribution, and Overlapping histograms and kernel density plots for both modules are presented in Figure 1. The test results fail to accept the hypothesis that the distributions are normally distributed. The approximate asymptotic

⁹T-test results indicate that there is no significant difference in non-response rates between treatment and control groups (p=0.856)

p-value for the combined two-sample Kolmogorov–Smirnov test is 0, indicating that there is a significant difference between the distributions of GAD-7 scores in modules P and V, whereby GAD-7 scores in Module P are smaller. The different administration times between the modules may explain that discrepancy. Module V was conducted at the end of the survey, following other modules that included some stress-inducing questions. Hence, respondents might have been subject to more stress and survey fatigue. For this reason, we add module fixed effects to the regressions to control for possible omitted variable bias.

Figure 1: Distribution of GAD-7 scores: Modules P and V



Note: Produced by authors based on household data.

4 Empirical Framework

4.1 Identification Strategy

Takaful’s evaluation study was designed and implemented after the Takaful programme had been rolled out to all governorates in Egypt. Following the approach used in El Enbaby et al. (2022), we use a regression discontinuity design (RDD) to identify the medium-term impact of the programme on the mental health of the recipient. The main idea behind applying RDD is that treatment is defined by the value of an observable predictor or a running variable (pre-intervention screening measure) and a fixed cutoff, either totally or partially. In addition, outcomes of interest are assumed to have a smooth distribution. Hence, any “step-like” discontinuity in the distribution would be attributed to the treatment, and would be interpreted as a causal effect of the treatment (Imbens and Lemieux, 2008; Thistlewaite and Campbell, 2017; Lee and Lemieux, 2014).

In the case of Takaful, the identification strategy exploits the programme design, which utilizes a PMT score to determine eligibility. Households with scores lower than the PMT cut-off of 4,500 receive Takaful transfers and hence, compose the treatment arm. Meanwhile, those with scores higher than 4,500 do not receive Takaful, and compose the control arm. So, if there is a discontinuity at the cutoff in any outcome variable that should be smooth or gradually evolving, then we can infer that Takaful is causing this abrupt change or discontinuity (Angrist and Krueger, 1999).

Within the Takaful programme, the PMT score (the running variable) determines eligibility, but not perfectly. In other words, the probability of being treated changes significantly at the cutoff rather than being perfectly determined by the cutoff since other factors determine eligibility. As such, there are crossovers, since some households with scores below 4,500 are not eligible and cannot benefit from Takaful due to the exclusion criteria (Breisinger et al., 2018; Imbens and Lemieux, 2008). In addition, a few households with scores above the PMT cutoff may be benefiting from Takaful, because the programme's cutoff was changed a few times since the inception of the programme, and re-certification has not been done for all households by the time of the evaluation.

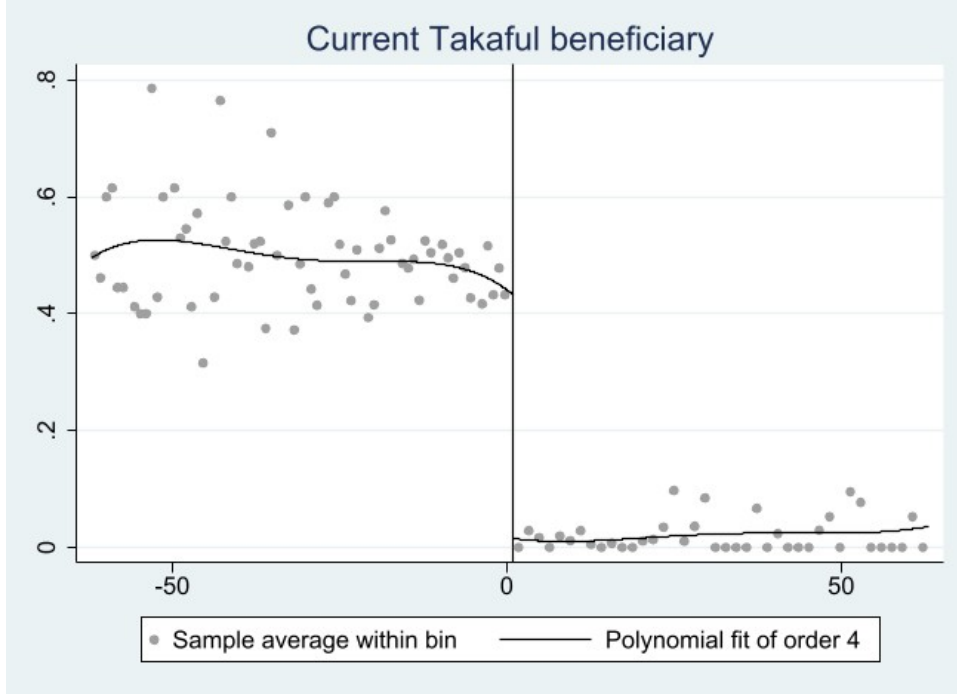
With this design and programme implementation, a fuzzy regression discontinuity design (FRD) should be considered since treatment is not a deterministic function of an observable variable. Benefiting from Takaful results in a discontinuity in the probability of treatment or the expected value of treatment, conditional on the PMT score, since there are other variables that determine assignment to treatment (Hahn et al., 2001). Hence, discontinuity becomes an instrumental variable for treatment status (Angrist and Pischke, 2009).

We can define the treatment in two ways. First, from the household survey, we can observe whether the household reports having received Takaful transfers in the two months preceding the survey. Second, from the administrative data, we can observe whether the household has a valid Takaful card, compared to having a stopped card, a frozen one, or a rejected application. Both variables can be used to define treatment, but with some drawbacks. Some people may be registered as beneficiaries while not receiving any transfers. Meanwhile, more households above the cutoff self-report receiving Takaful, compared to administrative data, which could indicate that they are mistaking Takaful for other cash transfers. Hence, any causal estimation based on this variable could suffer from measurement error. To limit these issues, we generate a new treatment variable that combines both definitions. In other words, a "treated" individual or household will be defined as one that self-reported having received Takaful, while officially benefiting from Takaful based on MOSS records.

Figure 2 presents the discontinuity in receiving Takaful based on our treatment definition, where we plot the proportion of households that receive treatment in each bin against the distance of the household from the PMT cutoff. Figure 2 shows a clear discontinuity in receiving Takaful - a jump in probability of

approximately 47 percentage points at the threshold.

Figure 2: Discontinuity in Takaful receipts



Note: The figure shows the discontinuity in receiving Takaful transfers for households with PMT scores below and above the cutoff score of 4,500, centered around zero.

4.2 Fuzzy Regression Discontinuity Design

We estimate the fuzzy RDD model both parametrically and non-parametrically. We give a stronger interpretative weight to the parametric specifications as the running variable is not continuous. We re-center the running variable at 0, by subtracting 4,500 from all PMT scores.

Parametric RDD. To run a fuzzy regression discontinuity design, we estimate the following flexible linear parametric specification:

$$GAD_i = \delta_0 + \delta_1.VT_i + \delta_2.PMT_i + \delta_3.PMT_i.VT_i + \sum_j \delta_j X_i + \tau_g + \gamma_m + \mu_i \quad (1)$$

Where the corresponding first-stage regression is:

$$VT_i = \alpha_0 + \alpha_1.E_i + \alpha_2.PMT_i + \alpha_3.PMT_i.E_i + \sum_j \alpha_j X_i + \tau_g + \gamma_m + \varepsilon_i \quad (2)$$

Where GAD_i is the outcome of interest. VT_i indicates whether the individual is a Takaful beneficiary based on our treatment definition, taking the value of 1 for beneficiaries and 0 for non-beneficiaries. The running variable PMT_i is centred around 0, as it is computed by calculating the difference between the PMT score and the eligibility cutoff (4,500). We also include an interaction of the running variable and the Takaful indicator ($PMT_i * VT_i$) to allow the slopes of the linear functions to differ on either side of the threshold. Administrative units and module fixed effects are included as τ_g , and γ_m , respectively, while X includes a vector of pretreatment individual characteristics. The predetermined characteristics that we include are age, education and marital status.¹⁰ fixed effects indicate whether the household is located in urban Lower Egypt, rural Lower Egypt, urban Upper Egypt, rural Upper Egypt or Frontier areas. For the predetermined characteristics, age refers to the individual's age in completed years; education is included as a dummy variable, indicating whether the respondent received any education or not at all; and marital status is included as a dummy variable, indicating whether the respondent is married or not.

Since VT_i and $PMT_i * VT_i$ are plausibly endogenous, we instrument them with E_i and $E_i * PMT_i$, where E_i is a dummy variable that takes value 1 if $PMT_i \leq 0$. Equation 2 shows the first stage regression for VT_i . The first stage regression for $PMT_i * VT_i$ is similar. The coefficient δ_2 in equation 1 captures the local average treatment effect (LATE). Finally, the standard errors (μ_i) are clustered at the village level (primary sampling unit).

As a robustness check we also estimate a flexible quadratic parametric fuzzy RDD model. We only consider linear and quadratic forms, since higher-order polynomials can lead to over-fitting and introduce bias (Cunningham, 2021). For the quadratic model, the first-stage regression for VT_i is:

$$VT_i = \alpha_0 + \alpha_1.E_i + \alpha_2.PMT_i + \alpha_3.PMT_i^2 + \alpha_4.PMT_i.E_i + \alpha_5.PMT_i^2.E_i + \sum_j \alpha_j X_i + \tau_g + \varepsilon_i \quad (3)$$

And the second-stage regression is:

$$GAD_i = \delta_0 + \delta_1.VT_i + \delta_2.PMT_i + \delta_3.PMT_i^2 + \delta_4.PMT_i.VT_i + \delta_5.PMT_i^2.VT_i + \sum_j \delta_j X_i + \tau_g + \mu_i \quad (4)$$

Non-parametric RDD. Following Hahn et al. (2001), the non-parametric analog of the local average treatment effect can be estimated as the ratio of the difference in the expected value of the outcome conditional on the PMT score on either side of the threshold relative to the change in the probability of participation at the cutoff:

$$\tau_{GAD} = \frac{\lim_{c \uparrow 0} E(GAD_i | PMT_i = c) - \lim_{c \downarrow 0} E(GAD_i | PMT_i = c)}{\lim_{c \uparrow 0} E(Pr_i | PMT_i = c) - \lim_{c \downarrow 0} E(Pr_i | PMT_i = c)} \quad (5)$$

¹⁰The administrative units

where Pr is the probability of receiving treatment and τ_{GAD} denotes the LATE. We use local linear regressions (including strata and survey module fixed effects) to estimate the left and right limits of the discontinuity at the cutoff PMT score of 4,500. We use a triangular kernel in order to give higher weights to points nearer to the threshold and continue to cluster the standard errors at the village level.

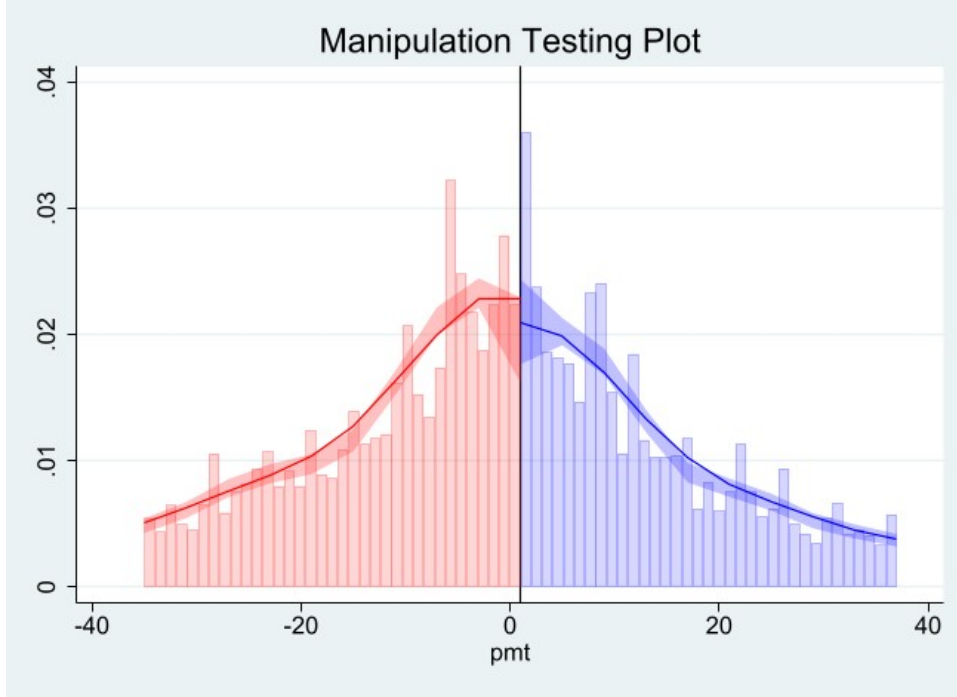
The choice of the bandwidth can play an important role in RDD based analysis. We use the Mean Squared Error (MSE)-optimal bandwidth approach for bandwidth selection (Calonico et al., 2017; Cattaneo and Vazquez-Bare, 2017). The Mean Squared Error (MSE)-optimal bandwidth for our main outcome variable - the GAD score - is 12.423 and the corresponding bandwidths for the other indicator variables of anxiety lie between 11-12. Since PMT scores are recorded as discrete values and to standardize the estimation sample size, we use 12 as the bandwidth for all outcome variables in both parametric and non-parametric estimations. Robustness checks with alternative bandwidths are also discussed in Section 5.

Heterogeneity analysis. For the heterogeneity analysis, we run the parametric model, which controls for predetermined individual characteristics, while adding an interaction term between the specific heterogeneity variable and being treated by Takaful. This interaction term is instrumented by another interaction term; interacting eligibility into the programme with the predetermined heterogeneity variable.

Identification Threat. The most important identification threat to running a RDD is the possibility of manipulating the running variable around the cutoff. Manipulation of the PMT score may allow households who should have a score above the cutoff to influence the score and end up with a score below the cutoff, in order to qualify for the programme. Nevertheless, the PMT score is unlikely to get manipulated. As explained above, the PMT score is calculated at the central level based on more than 80 variables that are not known by potential beneficiaries.

Despite the low likelihood of PMT score manipulation by households, the sampling strategy that IFPRI employed results in clustering around the cutoff which can appear as manipulation. Since IFPRI decided to interview households with scores closest to the cutoff in the sampled villages, then by design, the area above and below the cutoff would have more households compared to the remainder of the PMT distribution. This is reflected in the manipulation testing plot (Figure 3) that presents the density of the PMT scores around the cutoff within the chosen bandwidth of 12 points above and below the cutoff. More formally, the manipulation test suggested by Cattaneo et al. (2018) fails to reject the null hypothesis of no systematic manipulation of the running variable ($p\text{-value} = 0.542$), providing evidence of the validity of the RD design in our context.

Figure 3: RD density plot



Note: The figure shows the density plots for PMT scores below and above the cutoff score of 4500, within the optimal bandwidth and centered around zero.

Validity Threat. Continuity is the main identifying assumption for RDD. It implies that without the treatment, the distribution of potential outcomes is continuous at the cutoff. Hence, as the probability of treatment assignment changes discontinuously at the cutoff, then any discontinuity in outcome variables would be attributed to the treatment (i.e. to benefiting from Takaful in this case).

The continuity assumption rules out omitted variable bias by excluding the presence of other simultaneous treatments at the cutoff (Cunningham, 2021). In other words, it implies that observed predetermined characteristics or other potential outcomes should be smooth at the cutoff. Hence, the described treatment is the only factor responsible for the jump in the outcome variable of interest.

We check if the probability of benefiting from Takaful is discontinuous at the cutoff by estimating the first-stage regression of the parametric model, looking at the relationship between the probability of being a Takaful beneficiary and eligibility. As Table 1 shows, we find that the eligibility dummy is positive and highly significant for all four specifications, suggesting the validity of the instrument.

To test the validity of the RD design, we also check for discontinuities in predetermined individual characteristics, such as age of beneficiaries, education and marital status, which we use in the analysis in the

Table 1: First-stage regressions

	Linear regressions		Quadratic regressions	
	Without covariates	With covariates	Without covariates	With covariates
Eligibility dummy	0.299*** (0.0313)	0.296*** (0.309)	0.329*** (0.0437)	0.328*** (0.0429)

Note: The bandwidth for all regression is 12, which yields a sample size of 3,213 observations. Controls include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt) and module fixed effects, along with the following covariates: age, marital status (1 is married), and education (1 for having received any education). Standard errors are clustered at the village level (primary sampling unit). Interaction terms are included in the regressions. *p < 0.10, **p < 0.05, ***p < 0.01

following section. We estimate the following reduced-form regression:

$$X_i = \gamma_0 + \gamma_1.E_i + \gamma_2.PMT_i + \gamma_3.PMT_i.E_i + \tau_g + \xi_i \quad (6)$$

where X_i are predetermined individual characteristics, and the right-hand side are defined as in equations 1 and 2. Table A1 in the appendix shows that the impact of benefiting from Takaful on those predetermined variables is mostly close to zero and statistically insignificant. Those results confirm the validity of the RD design.

5 Results

Descriptive Statistics. In general, beneficiary and non-beneficiary mothers seem to be similar in terms of observed individual and household characteristics. Table 2 provides summary statistics for individual-level and household-level characteristics for both treatment and control samples. The full sample of households comprises 6,421 households, with 1,735 beneficiary households and 4,686 non-beneficiary households. Table 2 shows that non-beneficiary mothers are on average older than beneficiary mothers by about 1.5 years. Non-beneficiary households also have a lower number of members in total, and a lower number of children. In addition, non-beneficiary households have on average less ration supply cards. Out of the full sample, 6,178 women were married and living with their spouses, 222 were widowed or divorced and 21 were single mothers who are married but living separately from their spouses. At first sight, there is no difference between treated and control mothers in terms of mental health. If anything, a lower proportion of women reported moderate anxiety level among beneficiaries. But that might be entirely driven by selection into the programme.

Table 2: Summary statistics

	Full Sample	Control	Treated	Diff.	SE Diff.	Obs. Control	Obs. Treated
Urban household (0=rural)	0.12	0.120	0.115	0.006	0.0091	4686	1735
Age in completed years	35.93	36.324	34.856	1.467***	0.2375	4686	1735
Married	0.96	0.962	0.970	-0.008	0.0052	4686	1735
Has any school education or higher	0.60	0.609	0.590	0.019	0.0137	4686	1735
At what age did (name) get married	19.21	19.222	19.188	0.033	0.0936	4686	1735
Total children 0-18 in household	2.63	2.583	2.750	-0.167***	0.0368	4686	1735
Total number of household members	4.88	4.854	4.956	-0.102***	0.0340	4686	1735
At what age did (name) get married	19.21	19.222	19.188	0.033	0.0936	4686	1735
Do any unpaid labour in the household	0.01	0.007	0.006	0.001	0.0023	4686	1735
Do any agricultural activities	0.12	0.127	0.119	0.008	0.0093	4686	1735
You or member of HH is government official	0.01	0.006	0.006	-0.001	0.0022	4686	1735
You or member of HH know any political leader	0.01	0.008	0.008	0.000	0.0025	4686	1735
You or member of HH know someone works in local office	0.05	0.047	0.051	-0.004	0.0060	4686	1735
Owing a debt to relatives, friends or traders (past year)	0.28	0.285	0.275	0.010	0.0127	4686	1735
Any household member having a ration supply card	0.97	0.966	0.976	-0.010**	0.0049	4686	1735
Number of shocks experiences by household last year	0.76	0.759	0.776	-0.017	0.0206	4686	1735
GAD-7 score	7.23	7.290	7.084	0.206	0.1351	4686	1735
Minimal anxiety (score 0-4)	0.36	0.354	0.374	-0.020	0.0135	4686	1735
Mild anxiety or higher (5 or more)	0.64	0.646	0.626	0.020	0.0135	4686	1735
Moderate anxiety or higher (10 or more)	0.31	0.318	0.292	0.027**	0.0130	4686	1735
Severe anxiety (15-21)	0.08	0.080	0.077	0.003	0.0076	4686	1735

Note: *p < 0.10, **p < 0.05, ***p < 0.01

Main Results. We start by estimating the parametric and non-parametric RDD without any controls. As shown in Panels A and C of Table 3, we do not find Takaful to have had any long-term impact on the generalized anxiety of beneficiary mothers, as measured by GAD-7 (Col 1). Coefficients from parametric and non-parametric estimations show opposite signs, with coefficients close to zero. Results for the dummy variables indicating whether the person has mild or higher anxiety, moderate or higher anxiety or severe anxiety, also show insignificant results (Col 2-4). The lack of impact can also be witnessed graphically through Figure 4 that plots the reduced-form relationship between the GAD-7 scores and the running variable.¹¹

These results are also consistent across a series of robustness checks. First, we find that adding covariates discussed earlier in Section 4.2, does not change the results. These are presented in Panels B and D of Table 3. In Table 4, we undertake additional checks, which are described below.

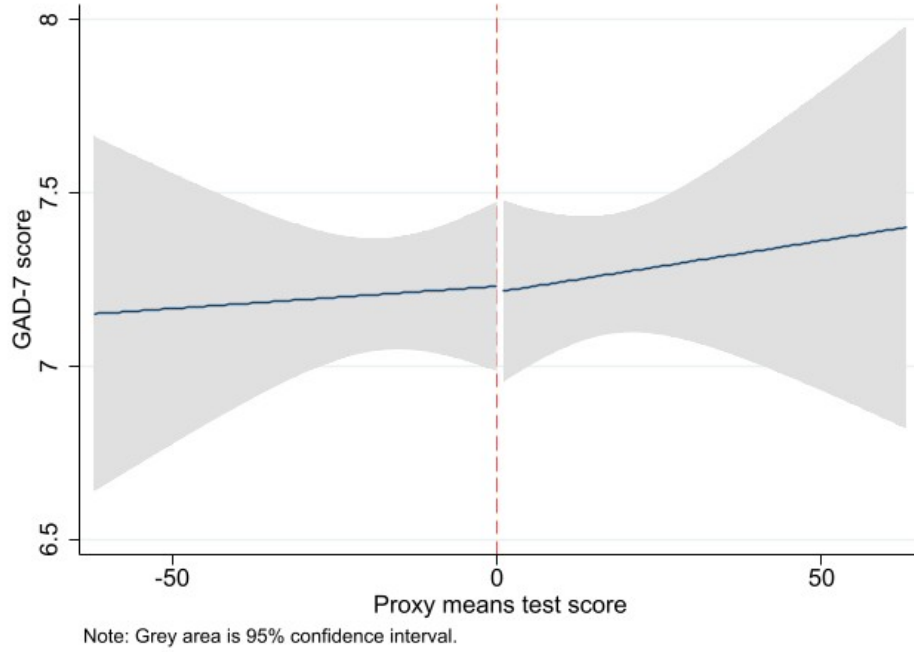
¹¹The confidence intervals are wide so economically meaningful effects cannot be completely ruled out.

Table 3: Main results

	(1)	(2)	(3)	(4)
	GAD-7	Mild or higher anxiety	Moderate or higher anxiety	Severe anxiety
Panel A - Parametric approach without covariates				
RD	-0.343 (1.113)	-0.113 (0.118)	-0.0272 (0.109)	0.0191 (0.0668)
Panel B - Parametric approach with covariates				
RD	-0.345 (1.126)	-0.101 (0.117)	-0.0279 (0.110)	0.0172 (0.0676)
Panel C - Non-parametric approach without covariates				
RD Robust	0.505 (1.335)	0.174 (0.140)	0.0214 (0.128)	0.0304 (0.0764)
Panel D - Non-parametric approach with covariates				
RD Robust	0.306 (1.356)	0.153 (0.142)	0.011 (0.130)	0.0258 (0.0774)

Note: The bandwidth for all regression is 12, which yields a sample size of 3,213 observations. Panels A and C include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt) and module fixed effects. Panels B and D include strata fixed effects and module fixed effects, along with the following covariates: age, marital status (1 is married), and education (1 for having received any education). Standard errors are clustered at the village level (primary sampling unit). Cluster-robust standard errors are shown in parentheses. Interaction terms are included in the parametric regressions. *p < 0.10, **p < 0.05, ***p < 0.01

Figure 4: RD Plot for GAD-7 Scores - Linear fitted line



Note: The figure shows the fitted line for GAD-7 scores below and above the cutoff score of 4500, centered around zero for the full sample. The difference in slopes above and below the line indicates a significant difference in the change in the anxiety of treated individuals, relative to changes in the PMT score, as reflected by a negative and significant interaction term (interacting receiving Takaful and eligibility).

Robustness. We assess whether the results are sensitive to alternative specifications, such as using different bandwidths and different regression functions. In the main estimation, we use the optimal bandwidth provided by *rdbwselect*. In Table 4, we estimate the results parametrically using a quadratic rather than a linear model (Panel A), then using the linear regression but with the full sample (Panel B). We also estimate the results non-parametrically using half of the optimal bandwidth (Panel C), double the optimal bandwidth (Panel D), and using the full sample (Panel E). The estimates change, but having statistically insignificant results is robust to changes in the bandwidth and the estimation model.¹²

¹²We also run the parametric and non-parametric regressions for module P and module V separately, to check if results may be biased depending on whether GAD-7 is administered at different points of the survey. Similar to the results using the full sample, the resulting coefficients are not statistically significant. These results are presented in Table A2 of the appendix.

Table 4: Robustness checks

	(1)	(2)	(3)	(4)
	GAD-7	Mild or higher anxiety	Moderate or higher anxiety	Severe anxiety
Panel A - Parametric approach - Quadratic function (N=3,213)				
RD	-0.308 (1.341)	-0.042 (0.136)	-0.0403 (0.133)	0.0922 (0.0816)
Panel B - Parametric approach - Full sample (N=6,421)				
RD	-0.0517 (0.468)	-0.0236 (0.0471)	-0.0045 (0.0455)	0.00717 (0.0267)
Panel C - Non-parametric approach - Bandwidth: 6 (N=1,503)				
RD Robust	2.233 (2.281)	0.309 (0.242)	0.32 (0.230)	0.0282 (0.126)
Panel D - Non-parametric approach - Bandwidth: 24 (N=4,603)				
RD Robust	0.192 (0.975)	0.0424 (0.0996)	0.0254 (0.0935)	0.0337 (0.0548)
Panel E - Non-parametric approach - Full sample (N=6,421)				
RD Robust	0.0953 (0.671)	-0.00971 (0.0657)	0.0113 (0.0635)	0.0485 (0.0368)

Note: All regressions include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt) and GAD-module fixed effects, along to the following covariates: age, marital status (1 is married), and education (1 for having received any education). Standard errors are clustered at the village level (primary sampling unit). Cluster-robust standard errors are shown in parentheses for non-parametric regressions. Interaction terms are included in the parametric regressions. *p < 0.10, **p < 0.05, ***p < 0.01

6 Discussion

Null results are perhaps not surprising as the impact of similar cash transfer programmes on mental health indicators were mixed. Similar studies in the literature focus on depressive symptoms, rather than anxiety. Hence, we discuss here some of the results on depressive symptoms. For instance, studies on the impact of Ecuador's unconditional cash transfer programme Bono de Desarrollo Humano (BDH) on mother's mental health found no significant impact on depressive symptoms, as measured by the Center of Epidemiologic Studies Depression Scale (CES-D) (Fernald and Hidrobo, 2011; Paxson and Schady, 2010). Meanwhile, Ozer et al. (2011) studied the impact of Mexico's CCT Oportunidades on beneficiary women's depressive symptoms (using CES-D), and found that benefiting from Oportunidades was linked to having significant clinically lower levels of depressive symptoms compared to those in the control group. The study also found that this impact was mediated by mothers' levels of perceived stress and their perceived control. Ozer et al. (2011) controlled for maternal age, education and household demographics, ethnicity and socio-economic status. In our study, we control for age and education but not household demographics because earlier results showed that the Takaful might have increased fertility among beneficiary households (El Enbaby et al., 2022).

Within the context of Egypt, the null impact could have several possible explanations. First, the amount of the cash transfer is not large, particularly with the increasing inflation facing Egypt. At the time of the survey, the maximum monthly amount that household can receive under Takaful is EGP625 (equivalent to USD39.8). The average amount reported by beneficiaries is EGP432 (equivalent to USD27.5). In 2019, the international poverty line for lower middle income countries was equivalent to EGP22.6 per day per capita, based on 2017 PPP (Genoni, 2023). Assuming that all Takaful beneficiary households fall below or around the poverty line, with an average household size of five individuals, the average household income can be calculated as EGP3,390 per month. This means that the Takaful transfer of EGP432 is about 12.7 percent of household income living under the poverty line. Transfer size in similar programmes can range from 1.5 percent to 100 percent of average household income (Baird et al., 2013). Given that Takaful is conditional, an increase in the transfer size can have two plausible impacts; either a positive impact since it better cushions the household from income shocks, or a negative impact from the burden of meeting the conditionalities to continue receiving the transfer. A study on Malawi's conditional cash transfer for female adolescents found that increasing the transfer size given to the parents, led to a reduction in the positive effects of the programme on the girls' mental health (Baird et al., 2013). However, a recent a systematic review and meta-analyses of cash transfers (conditional and unconditional) finds a positive relationship between the size of the transfers and positive affect size on mental health indicator (McGuire et al., 2022).

Second, the null impact can be due to rising inflation. In March 2022, the Egyptian government devalued

the Egyptian pound by 14 percent. Yet, inflation had been soaring earlier, reaching 8 percent in January 2022, compared to 4.8 percent a year earlier, and 6 percent in December 2021. Inflation was mainly driven by higher prices of core food items, which constitutes a large share of poor household's spending. Inflation was also supported by large increases in non-food prices (Daily News Egypt, 2022), and was expected to continue. Due to the high inflation, the size of the transfers would have been declining in real terms, by the time of the study period. Hence, the transfers' contribution to reducing anxiety resulting from economic distress might be minimal. So, even beneficiary households may have been anxious about rising prices and anticipated financial difficulties. Although imperfect, we investigate heterogeneous effects distinguishing between high and low inflation areas based on monthly data over the year prior to the survey from the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). We do not find any significant heterogeneous effects.¹³

Third, the null results might be due to the fact that other social protection programmes compensate for the effect of the conditional cash transfer on mental health either if benefiting from Takaful is correlated with these other programmes or if non-beneficiaries tend to benefit more from these other programmes. However, this explanation does not seem plausible. From a qualitative point of view, current major social protection programmes such as Forsa and Haya Karima programmes were introduced several years after Takaful.¹⁴ While there are other transfer programmes in Egypt as well, we should also note that none of them use the same eligibility criteria as the Takaful programme. In our survey the households were asked if they benefited from eight different types of social protection programmes. To confirm that participation in these programmes is not linked to Takaful, we run a reduced form regression testing whether the fact household benefits from any of these programmes correlates with eligibility for Takaful. The outcome is a dummy variable that takes value 1 if the household benefits from one of the programmes and 0 otherwise. The coefficient of interest for both parametric and non-parametric specifications is insignificant and close to zero, confirming that enrolment in these programmes is not correlated with eligibility for Takaful.¹⁵

Fourth, programme conditions and conditionalities might have muted positive impacts on anxiety. The reasons behind acceptance into the programme or suspension from it were unclear, as an earlier qualitative study on the programme indicated (ElDidi et al., 2018). Both beneficiary households and households who were previously benefiting from Takaful but had suspended cards expressed having no clear information about

¹³Results are available in Table A3 of the appendix.

¹⁴Forsa was piloted in 2020 and was designed as a graduation programme for Takaful beneficiaries and for unsuccessful Takaful applicants within 1000 points of the eligibility cutoff and with young household heads who met Forsa's eligibility criteria (ElShabrawy et al., 2022; World Bank and Government of Egypt, 2024). Meanwhile, Haya Karima provides different types of development initiatives, such as housing, medical services and funding for small and medium enterprises (Raouf et al., 2023). IFPRI's sample does not include Forsa and Haya Karima beneficiaries but as these programmes do not follow the same eligibility criteria as Takaful, excluding them from the sample should not bias the results.

¹⁵Results are available in Table A4 of the appendix. Our main results are also robust to controlling for whether the household benefits from other social protection programmes (Table A5 of the appendix).

reasons behind suspension of Takaful cards (ElDidi et al., 2018). This might be reducing the beneficiaries' sense of financial security that Takaful should be inducing. Beneficiaries are likely to be aware that the cash transfers can stop at any point. In addition, the program's first evaluation indicated that most beneficiaries did not know about the program's conditionalities (Breisinger et al., 2018). The conditionalities were not implemented back in 2017. By the time of the second evaluation, conditionalities were enforced (Ridao-Cano et al., 2023), and results from the evaluation study showed higher school enrollment and attendance among Takaful households (El Enbaby et al., 2022). Thus, complying with the conditionalities can be offsetting any reduced stress experienced by the mothers from the additional income, since the transfers are linked to their children's school attendance and health care visits.

Fifth, the null impact might result from being in the programme for a long time, since the sample includes only households who have been into the programme for about five years. We cannot estimate whether the programme had an initial impact on mental health, since data does not exist. Yet, Wollburg et al. (2023) concluded that mental health benefits from cash transfer programmes were not sustained after programmes have ended by two to nine years. Our result might suggest that the "social causation theory" does not apply, because the cash transfer ceases to exist as an "income shock," but rather becomes part of the household income that gets absorbed into households expenditures.

Finally, our main results report the local average treatment effect. It does not mean that the programme may not have been more salient in terms of mental health for some mothers with specific characteristics across the PMT distribution. There is no reason to expect the conditional cash transfer to have homogeneous effects on the studied population. We therefore investigate the heterogeneity in the treatment effects of Takaful, on different population sub-groups. Studying heterogeneity gives insights on impacts that can be concealed by the average impact on the whole sample. Heterogeneity analysis is conducted on predetermined variables, which should not have been affected by the programme. The choice of those predetermined variables is based on the literature having identified factors that can affect anxiety levels. Estimations are conducted using the linear parametric model exploring the mitigating or exacerbating effect of the programme with respect to age (below and above the median age of 34 years), education (educated vs. uneducated), and marital status (married vs. unmarried).¹⁶ The results suggest that there is no heterogeneity by marital status or education level (Tables A6 and A7). Meanwhile, as Table A8 shows, the local average treatment effect of receiving Takaful among those above 34 years old indicates significantly lower generalized anxiety scores, compared to younger groups. This result holds only for GAD-7 score, but not for the different levels of anxiety.

Our results are in line with the literature, as research has shown that the incidence of generalized anxiety disorder (GAD) increases later in life (Wittchen and Hoyer, 2001; Wittchen, 2002; Mkhwanazi and Gibbs,

¹⁶In heterogeneity analysis, age is included as a dummy variable, indicating whether the mother is above or below the median age of 34 years old.

2021). However, we remain cautious in interpreting this result. Table A9 shows that there are significant differences among younger and older mothers. As younger mothers are more likely to be educated, more likely to be married, have more children, got married younger, and are more likely to be living in rural areas. Hence, perceived heterogeneity by age may be concealing other dimensions that affect anxiety levels. Conclusions cannot be drawn on which factor might have mediated the other. This result implies that programmes such as cash transfers can play a role in producing some mental health changes among beneficiaries, but not necessarily through a causal pathway.

7 Conclusion

We find little effect of Egypt's conditional cash transfer programme "Takaful" on anxiety levels in our sample of mothers, who are the main programme recipients. This may be for several reasons, including the size of the monthly transfers, rising inflation, the implementation of the conditionalities, or the fact that our sample includes households who have been benefiting from Takaful for five years, and hence, have become accustomed mentally and financially to receiving the transfers. Additionally, we do not see heterogeneous impacts when looking at predetermined variables, such as marital status and education. We only see a negative correlation between generalized anxiety score and age, which is in line with the literature on anxiety. This may be mediated by other factors, so that we cannot infer causation.

Knowing that a conditional cash transfer programme like "Takaful" had no impact on mothers' anxiety is key for poverty alleviation strategy in Egypt. However, further investigation is certainly needed on the topic. In relation to Takaful's impact, data on mental health need to be collected prior to the enrollment of beneficiaries, and potentially right after they start receiving Takaful. In that way, we may better assess whether receiving the cash transfer has an impact on anxiety or not, at least in the short-run. Furthermore, more mental health indicators are needed to broaden the coverage of mental health disorders. Further analysis can be done on the relationship between community-level characteristics and the impact of receiving Takaful on mental health. Meanwhile, global evidence is still needed on whether the conditionalities tied to CCT programmes do indeed offset any mental health benefits that may arise from the cash transfers.

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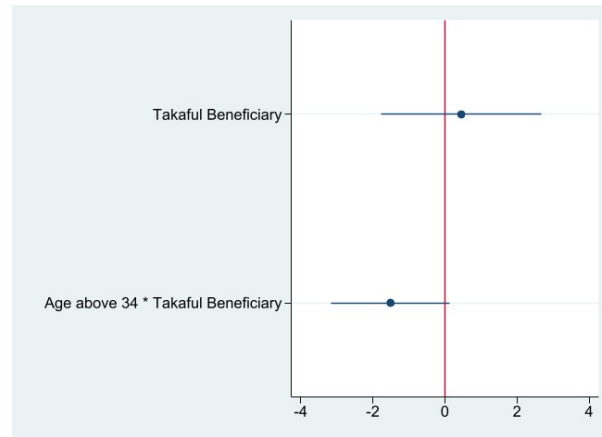
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A Appendix

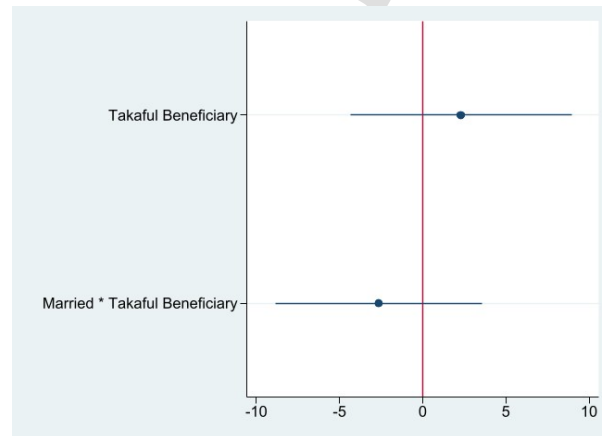
A.1 Figures

Figure A1: Heterogeneity by age



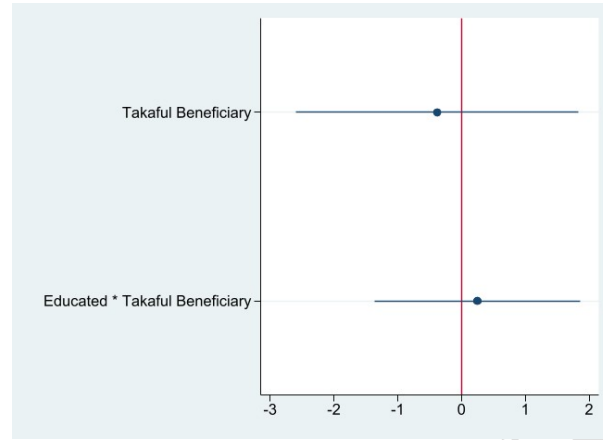
Note: The figure shows the coefficient plot for the regression assessing heterogeneity in impact by age (whether the respondent is above or below the median age of 34 years at the time of the survey).

Figure A2: Heterogeneity by marital status



Note: The figure shows the coefficient plot for the regression assessing heterogeneity in impact by marital status (whether the respondent is married or not).

Figure A3: Heterogeneity by education



Note: The figure shows the coefficient plot for the regression assessing heterogeneity in impact by education (whether the respondent received any education or none at all).

A.2 Tables

Table A1: RD design validity

VARIABLES	(1)	(2)	(3)
	Age in completed years	Married	Has any school education or higher
Eligibility dummy	-0.492 (0.604)	0.00699 (0.0130)	-0.0363 (0.0314)
Observations	3,213	3,213	3,213
R-squared	0.013	0.037	0.015

Note: The table presents estimates from the reduced form regression of the linear model. The bandwidth for all regressions is 12. Controls include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt), and GAD-module fixed effects. Standard errors are clustered at the village level (primary sampling unit). Interaction terms are included in the regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Module P and V separately

	(1) GAD-7	(2) GAD-7	(3) GAD-7
	Full sample	Module P respondents	Module V respondents
Panel A - Parametric approach			
RD	-0.345 (1.126)	-1.693 (1.539)	1.573 (1.572)
Panel B - Non-parametric approach			
RD Robust	0.306 (1.356)	1.574 (2.166)	-0.801 (1.534)
Observations	3,213	1,751	1,462

Note: The table includes female beneficiary respondents, who are the mothers of children benefiting from Takaful. The bandwidth for all regressions is 12. The first regression includes module fixed effects. All three regressions include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt), age, marital status (1 is married), and education (1 for having received any education). Standard errors are clustered at the village level (primary sampling unit). Cluster-robust standard errors are shown in parentheses for non-parametric regressions. Interaction terms are included in the parametric regressions.

*p < 0.10, **p < 0.05, ***p < 0.01

Table A3: Heterogeneity by governorate-level inflation

VARIABLES	(1) GAD-7 score	(2) Mild anxiety (5 or more)	(3) Moderate anxiety (10 or more)	(4) Severe anxiety (15-21)
Takaful Beneficiary	-0.921 (1.098)	-0.120 (0.115)	-0.0618 (0.106)	-0.0190 (0.0654)
Takaful Beneficiary * PMT Score	-0.220** (0.100)	-0.0199** (0.0100)	-0.0187* (0.0102)	0.00253 (0.00558)
Takaful Beneficiary * High Inflation	1.439 (1.089)	-4.08e-05 (0.104)	0.134 (0.104)	0.0919 (0.0718)
PMT Score	0.0383 (0.0450)	0.00219 (0.00472)	0.00393 (0.00476)	-0.00155 (0.00264)
Observations	3,149	3,149	3,149	3,149
R-squared	0.023	0.023	0.012	0.023

Notes: This table shows heterogeneity analysis by inflation using the parametric specification. High inflation is a dummy variable that takes value 1 if average inflation in the year preceding the survey was higher than the median, by urban/rural areas within the governorates. Data on inflation were obtained from Central Agency for Public Mobilization and Statistics' Monthly Bulletin of Consumer Price Index (CPI) (CAPMAS, 2022, 2021). The bandwidth for all regressions is 12. Controls include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt), GAD-module fixed effects, age (being older than 34), marital status (1 is married), education (1 for having received any education) and inflation. Standard errors are clustered at the village level (primary sampling unit). *p < 0.10, **p < 0.05, ***p < 0.01

Table A4: Benefiting from other social protection programmes

	(1)
	HH benefits from any other programme
Panel A - Parametric approach	
RD	-0.00535 (0.0222)
Panel B - Non-parametric approach	
RD Robust	0.0323 (0.0206)
Observations	3,213

Note: The bandwidth for the regression is 12. In this model, we include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt). Standard errors are clustered at the village level (primary sampling unit). Cluster-robust standard errors are shown in parentheses for non-parametric regressions. Interaction terms are included in the parametric regressions. *p < 0.10, **p < 0.05, ***p < 0.01

Table A5: Controlling for other social protection programmes

VARIABLES	(1) GAD-7 score	(2) Mild anxiety or higher (5 or more)	(3) Moderate anxiety or higher (10 or more)	(4) Severe anxiety (15-21)
Panel A – Parametric approach				
RD	-0.361 (1.122)	-0.102 (0.118)	-0.0289 (0.110)	0.0163 (0.0671)
Panel B – Non-parametric approach				
RD Robust	0.453 (1.351)	0.163 (0.142)	0.0204 (0.130)	0.0331 (0.0771)
Observations	3,213	3,213	3,213	3,213

Note: The bandwidth for all regressions is 12. In this model, we control for whether the households benefit from any other social protection programme (dummy variable taking the value of 1 if true). The regressions also include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt), GAD-module fixed effects, age, marital status (1 is married), and education (1 for having received any education). Standard errors are clustered at the village level (primary sampling unit). Cluster-robust standard errors are shown in parentheses. Interaction terms are included in the parametric regressions. *p < 0.10, **p < 0.05, ***p < 0.01

Table A6: Heterogeneity by marital status

VARIABLES	(1) GAD-7 score	(2) Mild anxiety (5 or more)	(3) Moderate anxiety (10 or more)	(4) Severe anxiety (15-21)
Takaful Beneficiary	2.206 (3.393)	-0.0753 (0.330)	-0.0706 (0.328)	0.0589 (0.216)
Takaful Beneficiary * PMT Score	-0.235** (0.104)	-0.0221** (0.0103)	-0.0213** (0.0105)	0.00142 (0.00584)
Married * Takaful Beneficiary	-2.630 (3.172)	-0.0243 (0.302)	0.0473 (0.312)	-0.0423 (0.202)
PMT Score	0.0535 (0.0450)	0.00377 (0.00470)	0.00508 (0.00480)	-0.000576 (0.00264)
Observations	3,213	3,213	3,213	3,213
R-squared	0.003	0.011	-0.004	0.015

Notes: The bandwidth for all regressions is 12. Controls include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt), GAD-module fixed effects, age (being older than 34), marital status (1 is married), and education (1 for having received any education). Standard errors are clustered at the village level (primary sampling unit). *p < 0.10, **p < 0.05, ***p < 0.01

Table A7: Heterogeneity by education

VARIABLES	(1) GAD-7 score	(2) Mild anxiety (5 or more)	(3) Moderate anxiety (10 or more)	(4) Severe anxiety (15-21)
Takaful Beneficiary	-0.437 (1.124)	-0.129 (0.117)	-0.0318 (0.112)	0.0198 (0.0670)
Takaful Beneficiary * PMT Score		-0.0221** (0.0101)	-0.0211** (0.0102)	0.00124 (0.00565)
Educated * Takaful Beneficiary	0.220 (0.822)	0.0598 (0.0791)	0.0130 (0.0805)	-0.00301 (0.0470)
PMT Score		0.00393 (0.00472)	0.00504 (0.00479)	-0.000518 (0.00265)
Observations	3,213	3,213	3,213	3,213
R-squared	-0.000	0.009	-0.003	0.015

Notes: The bandwidth for all regressions is 12. Controls include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt), GAD-module fixed effects, age (being older than 34), marital status (1 is married), and education (1 for having received any education). Standard errors are clustered at the village level (primary sampling unit). *p < 0.10, **p < 0.05, ***p < 0.01

Table A8: Heterogeneity by age

VARIABLES	(1) GAD-7 score	(2) Mild anxiety (5 or more)	(3) Moderate anxiety (10 or more)	(4) Severe anxiety (15-21)
Takaful Beneficiary	0.388 (1.133)	-0.0479 (0.116)	0.0347 (0.109)	0.0494 (0.0661)
Takaful Beneficiary * PMT Score	-0.256** (0.102)	-0.0229** (0.0100)	-0.0219** (0.0101)	0.000834 (0.00564)
Age above 34 * Takaful Beneficiary	-1.546* (0.846)	-0.110 (0.0827)	-0.130 (0.0852)	-0.0677 (0.0433)
PMT Score	0.0619 (0.0446)	0.00412 (0.00465)	0.00538 (0.00469)	-0.000320 (0.00260)
Observations	3,213	3,213	3,213	3,213
R-squared	-0.006	0.009	-0.008	0.011

Notes: The bandwidth for all regressions is 12. Controls include strata fixed effects (representing administrative units which are Metropolitan, Rural Lower Egypt, Urban Lower Egypt, Rural Upper Egypt and Urban Upper Egypt), GAD-module fixed effects, age (being older than 34), marital status (1 is married), and education (1 for having received any education). Standard errors are clustered at the village level (primary sampling unit). *p < 0.10, **p < 0.05, ***p < 0.01

Table A9: Student t-test by age of mother

	34 years or younger	Older than 34 years	Diff.	SE Diff.	Obs. 0	Obs. 1
Urban household (0=rural)	0.105	0.135	-0.030***	0.0081	3375	3046
Married	0.978	0.949	0.029***	0.0046	3375	3046
Has any school education or higher	0.756	0.436	0.320***	0.0116	3375	3046
At what age did (name) get married	18.729	19.748	-1.019***	0.0823	3375	3046
Total children 0-18 in household	3.002	2.215	0.787***	0.0313	3375	3046
Total number of household members	4.992	4.759	0.233***	0.0301	3375	3046
At what age did (name) get married	18.729	19.748	-1.019***	0.0823	3375	3046
Do any unpaid labour in the household	0.006	0.007	-0.001	0.002	3375	3046
Do any agricultural activities	0.101	0.151	-0.050***	0.0082	3375	3046
You/ member of HH is government official	0.004	0.008	-0.004*	0.0019	3375	3046
You/ member of HH know any political leader	0.008	0.009	-0.001	0.0023	3375	3046
You/ member of HH know someone works in local office	0.044	0.052	-0.008	0.0053	3375	3046
Owing a debt to relatives or friends or traders (past year)	0.28	0.285	-0.005	0.0113	3375	3046
Any household member having a ration supply card	0.958	0.981	-0.022***	0.0043	3375	3046
Number of shocks experiences by household last year	0.747	0.783	-0.037**	0.0183	3375	3046
GAD-7 score	7.32	7.139	0.182	0.1201	3375	3046
Mild anxiety or higher (5 or more)	0.65	0.629	0.021*	0.012	3375	3046
Moderate anxiety or higher (10 or more)	0.312	0.31	0.001	0.0116	3375	3046
Severe anxiety (15-21)	0.085	0.074	0.011*	0.0068	3375	3046

Note: *p < 0.10, **p < 0.05, ***p < 0.01

Highlights

- The impact of a conditional cash transfer programme on beneficiaries' mental health in Egypt is reviewed.
- A quasi-experiment is used to establish causality between receiving Takaful transfers and the generalized anxiety levels of mothers, who are the main recipients.
- The generalized anxiety disorder 7-item scale (GAD-7) is used to assess generalized anxiety.
- No significant impact from receiving the transfers on GAD-7 is found, over the medium-term.
- No heterogeneous impacts are found when looking at predetermined variables, such as marital status and education, or sub-national inflation.

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