PRE-ANALYSIS PLAN FOR

MENTAL HEALTH, TEACHER STRESS AND STUDENT ACHIEVEMENT: EXPERIMENTAL EVIDENCE FROM PAKISTAN

Introduction.— Is teacher stress holding back student achievement? Does stress transmit from teacher to students? How does psychological and pharmacological aid to teachers influence their mental health and students? We hope to answer these questions, by conducting a field experiment with one of the largest charter school networks in the world, the PEN Education Network of Pakistan. Using detailed data on teachers' self-reported stress, life satisfaction, teachers stress hormonal concentrations in blood plasma, we explore if stress reducing treatments to teachers impact them and their students.

*Study Design.—*We randomize teachers into 6 treatment arms. In the first treatment group, we assign teachers in 4 weekly sessions with a psychologist practicing cognitive behavioral therapy. The second, third and fourth group is assigned a session with the psychiatrist with possibility to prescribe medicines where we subsidize the prescription medicines to varying degrees (0% vs 50% vs 100% subsidies of prescriptions). Finally, we randomly assign the teachers into 4 weekly sessions of mindfulness meditation of same length of time as the psychologist treatment. The teachers are further cross randomized into social signaling treatment using color-coded bracelets that aims to reduce stigma associated with mental health.

Empirical Specification.— The impact of the four treatments will be evaluated by comparing outcomes across groups in a simple regression framework. For each teacher and student-level outcome, the estimation equations are:

$$Y_i = \alpha + \beta\, CBT_i + \gamma Pharmacology_i + \lambda\, Mindfullness +$$
$$\delta\, Pharmacology\, \&\, with\, Half\, Subsidy_i + \omega\, Pharmacology\, \&\, with\, Full\, Subsidy_i +$$
$$\boldsymbol{X}_i\, \mu + \epsilon_i \qquad (1)$$

$$Y_i = \alpha + \beta\, Wrist\, Band\, X\, CBT_i + \gamma\, Wrist\, Band\, X\, Pharmacology_i +$$
$$\lambda\, Wrist\, Band\, X\, Mindfullness +$$

$$\delta \; Wrist \; Band \; \text{X} \;\; Pharmacology \; \& \; with \; Half \; Subsidy_i \; + $$

$$\omega \; Wrist \; Band \; \text{X} \;\; Pharmacology \; \& \; with \; Full \; Subsidy_i + \rho \; Wrist \; Band + \Omega \; Treatments + $$

$$\boldsymbol{X_i} \; \mu \; + \; \epsilon_i \qquad\qquad\qquad\qquad (2)$$

We will compute treatment effects via OLS with robust standard errors. We will provide results with and without all available controls on teacher and student characteristics.

Outcomes Variables. —The first set of outcome variables concern teacher stress measured on a 5-point Likert Scale, Cohen Perceived Stress Scale (PSS), cortisol concentration in blood plasma that we will standardize to mean zero and standard deviation one. The second set of outcomes concern hours of teaching, attendance of teachers, whether medication was prescribed by the psychiatrist and self-reported use of prescribed medicine by the teacher. The third set of outcomes concern student outcomes that include students' self-reported stress, Cohen Perceived Stress Scale (PSS), test scores in mathematics and Urdu language and self-reported corporal punishment by the teacher. Marlowe–Crowne framework will be used to rigorously speak to social desirability and misreporting concerns.

Heterogeneity Analysis.— We will also assess heterogeneity of our treatment effects by (1) wrist bands public signaling the teacher goes to see a psychiatrist and (2) treatment impact on those that have higher pre-treatment self-reported stigma see a psychiatrist.

Hypotheses.— We will test the following hypotheses:

H1: Treatments are balanced across treated and control groups.

H2: Treatments impact stress of teachers (all three prespecified measures)

H3: Treatments impacts teacher attendance

H4: Treatments impacts hours of teaching

H5: Treatments with psychiatrist impact use of medications

H6: Treatments impact stress of students (all two prespecified measures)

H7: Treatments impact student test scores in mathematics

H8: Treatments impact student test scores in Urdu