RESEARCH ARTICLE

Effect of Cash Transfer on School Dropout Rates using Longitudinal Data Modelling: A Randomized Trial of Research Initiative to Support the Empowerment of girls (RISE) in Zambia

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Abstract:

Background:

School dropout rates, as well as early marriages and pregnancies, are high among adolescent girls in rural Zambia. In the quest to fight this, the Research Initiative to Support the Empowerment of girls (RISE) trial has been providing cash transfers and community dialogues to adolescent girls in rural Zambia. The overall goal of the study was to establish the effects of cash transfers on adolescent girls' school dropout rates in selected provinces of Zambia.

Methods:

The study was nested in the RISE trial which is a cluster randomized trial conducted in Central and Southern provinces of Zambia. A total of 3500 adolescent girls were included in the study. Random intercepts model was used to model the individual effects estimates, taking account of the dependency that was likely to occur due to the repeated measurements and clustering in the study.

Results:

Girls who were married or cohabiting and girls who had given birth, were significantly less likely to be in school (OR=0.004, 95% CI {0.001-0.02}, *p*-value=<0.0001) and (OR=0.003, 95% CI {0.02-0.04}, *p*-value=<0.0001) respectively. Consistently receiving cash transfers increased the chance of a girl being in school (OR=8.51, 95% CI {4.50-16.08}, *p*-value=<0.0001). There was an indication that the combined intervention arm had a reduced chance of girls being in school, however, we could not rule out chance finding (OR=0.89, 95% CI {0.59-1.36}, p=0.606).

Conclusion:

The study found that marriage or cohabiting and giving birth whilst in school reduced the chances of the girl continuing schooling. No significant association could be attributed to the type of intervention, However, consistent receipt of cash transfers was shown to be a protective factor of school dropout rates in the study.

Keywords: Cash transfer, Cluster Randomized Controlled Trial, Longitudinal, Adolescent girls, RISE, Zambia.

1. INTRODUCTION

Early pregnancy is often associated with early marriage and school dropout, and poverty contributes to all three. Observational studies from low-income countries indicate that young women who quit school early are more likely to marry and become pregnant earlier than those who stay in school [1, 2]. Increased schooling has also been associated

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with the better health of women and their children [2, 3]. In the last decades, primary school enrolment has increased significantly in many poor countries. However, in Low Middle-Income Countries (LMICs) enrolment at the secondary level is much lower than at the primary level in most, particularly for girls. This may be due to limited availability of school places and longer distances to school, higher fees, or to early marriage or pregnancy. Moreover, there may be a preference to support boys' education rather than girls' [4].

Dropping out of school is related to a variety of factors that can be classified in four categories, namely: individual, family, school, and community factors. Some of these factors belong to the individual, such as poor health or malnutrition and motivation. Others emerge from children's household situations such as child labour and poverty. Poverty appears to influence the demand for schooling, not only because it affects the inability of households to pay school fees and other costs associated with education, but also because it is associated with a high opportunity cost of schooling for children. As children grow older, the opportunity cost of education is even larger, hence increasing the pressure for children to work and earn income for the household as opposed to spending time in education [5].

In the sexual reproductive health perspective, early pregnancy is often closely interlinked with early marriage and school dropout, and poverty is an important factor contributing to all three. Marrying off a girl may be regarded as a better way to secure her future than schooling, and the bride-price paid to the girl's family may be an important source of income. Once a girl is married, she is expected to start childbearing. Where access to cash is limited, unmarried girls report the possibility of receiving gifts and cash as a motivation to get involved in sexual relationships with boys or men [2].

To a large extent, school is a protective environment for young people. Schooling defers girls' age at marriage, especially if they attend secondary education [6]. Once they are no longer in school, however, girls are more likely to be viewed as marriageable [7], which leads to a heightened vulnerability to early marriage. Across sub-Saharan Africa, young people who are enrolled in school are significantly less likely to have started having sex than adolescents who are no longer enrolled in school, and those students who have begun sexual activity are significantly more likely to use a condom than non-students. However, there is also strong evidence that young women who begin sexual activity while they are enrolled in school are significantly more likely to subsequently drop out of school than young women who have never had sex [8].

Programmes in which cash is provided by the government to poor households for poverty alleviation have been found to be effective in increasing school attendance rates, particularly for girls. When conditioned on school attendance, cash transfers have shown promise in keeping girls in education [9].

In 2007 the rate of teenage pregnancy was 28% and school dropout rate of adolescent girls due to pregnancy or child marriage was 46% [10]. An early start to childbearing greatly reduces women's educational and employment opportunities and is associated with higher levels of fertility. Teenage pregnancy is much higher in rural areas than urban areas 36% and 20% respectively, girls aged 15-19 who have had a live birth in the rural area was 30%, while in the urban areas 16% have had a live birth, girls aged 15-19 who were pregnant with their first child was higher in the rural areas than in the urban areas 8% and 4% respectively [11].

Sometimes sending a child to school means that the family loses the income from child labour or has less help with housework. In such cases, cash transfers can considerably help to ease these opportunity costs [5].

The government of Zambia implemented the re-entry policy for school girls who fall pregnant in 1997 and introduced free education at primary school level in 2002. These policies were implemented in an effort to reduce school dropout rates. Despite these efforts to keep adolescent girls in school, there are still disparities between boys' education and girls' education in Zambia in that school dropout rates are high both at primary and secondary schools. Girls fail to continue their education due to domestic chores, early marriages or them becoming pregnant.

The RISE trial has been providing material support such as books pens and pencils to all adolescent girls in the study. The trial also provides monthly cash transfer to some adolescent girls in the study, payment of school fees, and gives money to parents/guardians. In addition, other adolescent girls and their communities have community meetings for the parents/guardians, were adolescent girls and boys are invited to attend. This study aimed to determine the effect of cash transfers in the RISE trial on school dropout rates.

2. METHODS AND MATERIALS

2.1. Study Area

The areas under study were 12 districts of Central and Southern Provinces of Zambia namely: Kalomo, Choma, Pemba, Monze, Mazabuka, Chikankata, Chisamba, Chibombo, Kabwe, Kapiri Mposhi, Mkushi, and Luano.

2.2. Study Design

The study design for this study was a nested Cluster Randomised Controlled Trial (RCT) of the Research Initiative to Support the Empowerment of girls (RISE) trial. The original RISE study has a control arm and two intervention arms namely; material support, economic support and combined intervention arm respectively. The randomization units (clusters) were basic schools and their surrounding communities, and the randomized schools were at least 8 km apart from each other [2] to avoid contamination.

The protocol for the Research Initiative to support the empowerment of girls study was submitted and approved by the University of Zambia Biomedical Research Ethics Committee (ref 021-06-15) and the Regional Ethics Committee of Western Norway. The protocol for this study was also submitted to the University of Zambia Biomedical Research Ethics Committee (UNZABREC) and approval was granted (ref 065-06-17).

No physical harm was inflicted on the participants as the data used for the study was secondary data. The data extracted was in a de-identified state, therefore, confidentiality was highly ensured.

2.3. Sample Size Estimation

Research Initiative to Support the Empowerment of girls (RISE) trial used PASS 14 (NCSS Statistical Software, Kaysville, UT, USA) to calculate sample size required for a cluster randomized trial [2]. The sample extracted for the study was about 3500 adolescent girls corresponding to the two sample size in the cash transfer arm, the combined cash and community dialogue arm. The period under consideration for the study was September 2016 to about December 2017.

2.4. Inclusion/Exclusion Criteria

The study included adolescent girls who were enrolled in the RISE trial and were randomized to the economic arm or the combined intervention arms. Girls in the control arm were excluded from the current study.

2.5. Study Variables

The primary outcome variable in this study was school dropouts which was binary. Independent variables included; cash transfer, girls' age in years, girl married/cohabiting, girl ever given birth, girl ever been pregnant, girl sharing the cash transfer, living with her biological parents, and intervention arm. Cash transfer and intervention arm were priori independent variables, they were kept in the model regardless of their significance.

3. STATISTICAL ANALYSIS

Data was analysed using Stata software, version 14.0 (Stata Corporation, college station, TX, USA). The Continuous variable was checked for normality using the Shapiro-Wilk W-test, and the assumption of symmetry was satisfied, and therefore, the mean and standard deviation for age were reported. A chi-square test was used to check for an association between the treatment arms and covariates. Percentages and frequencies were also reported. School dropout rate was compared between the two intervention arms using random intercept logistic model in both unadjusted and adjusted estimates.

The random intercepts model was used to model the individual effect estimates taking account of the dependency that was likely to occur due to the repeated measurements and clustering in the study. Diagnostics for the best fit model were performed using both Akaike Information Criteria (AIC) and Bayesian Information Criteria statistics (BIC).

4. RESULTS

Fig. (**1**) illustrates the population of girls enrolled at baseline and interviewed at first and second follow up. At the first follow up, the number of girls interviewed reduced from 100% (1,854 and 1,668) to 85% (1,584) and 81% (1,359) in the economic arm and combined intervention arm respectively. The study team were concerned with attrition rates in

the first follow up, hence in the second follow up, the study team redoubled its efforts in following up participants, hence the number of participant who were followed up increased at second follow up to 95% (1755) and 97% (1610) in the economic arm and combined intervention arm respectively.
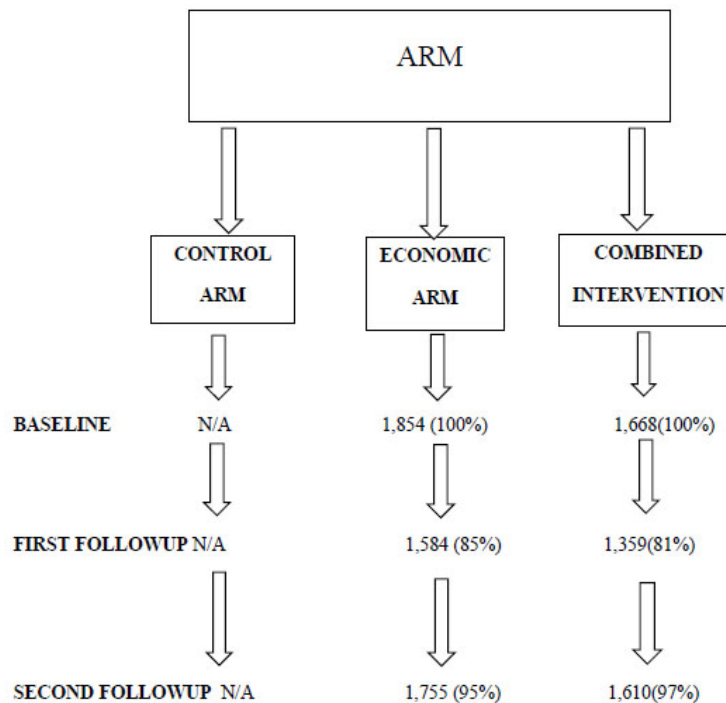
Fig. (1). The numbers in the intervention arms at the three time points.

Table **1** shows the basic characteristics of adolescent girls in the study. The results were from the Pearsons chi-squared test and Fisher's exact test for categorical variable, while for the continuous variable of age, a student's t- test was used.

Table 1. Basic characteristics of the population.

Factors	In School n (%) N=3,162	Not in School n (%) N=203	*P*-value
Girl Received cash Transfer No Sometimes Every time	93 (3%) 171 (5%) 2,898 (92%)	35 (17%) 50 (25%) 118 (58%)	<0.0001[a]
Arm Cash only Cash/community dialog	1,644 (52%) 1,518 (48%)	111 (55%) 92 (45%)	0.457[a]
Girl living with parents Yes No	2,318 (75%) 757 (25%)	126 (65%) 68 (35%)	0.001[a]
Girl ever been Pregnant Yes No	14 (0.5%) 3,103 (99.5%)	59 (50%) 59% (50%)	<0.0001[a]
Girl currently pregnant Yes No	11 (22%) 38 (78%)	55 (41%) 80 (59)	0.022[a]
Girl ever given birth Yes No	47 (1%) 3,115 (99%)	85 (42%) 118 (58%)	<0.0001[a]

Factors	In School n (%) N=3,162	Not in School n (%) N=203	*P*-value
Girl Married/living with a man Yes No	3 (0.1%) 3,159 (99.9%)	49 (24%) 154 (76%)	<0.0001[b]
Shared cash transfer Yes No	1,073 (35%) 1,999 (65%)	51 (30%) 117 (70%)	0.225[a]
Age in years	15.1	16.4	< 0.00001[c]

Values are Mean (Standard deviation), number (percent). A students [c] t-test. [a] Chi-square test, [b] Fishers exact test.

Receiving cash transfers, a girl living with biological parents, ever given birth, being married/cohabiting and age of the adolescents were found to be associated with school drop outs while there was no evidence of an association with school drop outs for those girls who were sharing the cash transfers and for being in either of the two intervention arms.

Results from the random effects model found that Girls who had given birth before were 97% less likely to be in school compared to girls who had never given birth before taking into account of other explanatory variables in the model (OR=0.003, 95% CI{ 0.02-0.04}, *p*-value=<0.0001). Girls who were married/cohabiting were approximately 96% less likely to be in school than girls who were not married/cohabiting (OR=0.004, 95% CI {0.001-0.02}, *p*-value=<0.0001).

A year increase in age significantly reduced the chances of a girl being in school by 37% (OR=0.63, 95% CI {0.54-0.75}, *p*-value=<0.0001, adjusting for other explanatory variables in the analysis. Girls living with their biological parents were 46% more likely to be in school than girls not living with biological parents, however, we could not rule out chance finding (OR=1.46, 95% CI {0.94-2.28}, *p*-value=0.094). Girls who consistently received cash transfers and those who sometimes received the cash transfers had an increased chance of being in school than girls who never received (OR=8.51, 95%CI{4.50-16.08}, *p*-value=<0.0001 and OR=1.38, 95% CI {0.65-2.92}, *p*-value=0.397 respectively), there was however, insufficient evidence to rule out chance finding for those who sometimes received cash transfers.

There was an indication of a reduced chance of being in school for girls belonging to the combined intervention arm compared to the girls in the economic arm. This study however, found that there was no evidence to reject the null hypothesis that there was no difference between the economic arm and the combined intervention arm in the RISE study (*p*-value=0.606) (Table **2**).

Table 2. Factors associated with school dropout rates from the best model that fit the data well (Model assuming Dependency).

Variables	COR (95% confidence interval)	*p*-value	AOR (95% confidence interval)	*p*-value
Cash transfer Yes sometimes Yes every time No	1.29(0.78-2.14) 9.27(6.03-14.26) 1	0.397 <0.0001	1.38 (0.65-2.92) 8.51 (4.50-16.08) 1	0.397 <0.0001
Arm Cash/community Cash	1.00(0.74-1.34) 1	0.981	0.89 (0.59-1.36) 1	0.606
Age	0.49(0.33-0.73)	<0.0001	0.63 (0.54-0.75)	<0.0001
Living with biological parents Yes No	1.47(1.07-2.02) 1	0.019	1.46 (0.94-2.28) 1	0.094
Ever given birth Yes No	0.02(0.002-0.133) 1	<0.0001	0.03 (0.02-0.04) 1	<0.0001
Married/living with a boyfriend Yes No	0.003(0.001-0.012) 1	<0.0001	0.004 (0.001-0.02) 1	<0.0001

Values are: 1= refence category, COR=crude odds ratio, AOR=Adjusted odds ratio.

5. DISCUSSION

Dropping out of primary school can lead to adolescent girls indulging in risky sexual behaviour, which could lead to early pregnancies and early marriages [12]. Unintended pregnancies and early marriage can lead to school dropout. Compared to out-of-school adolescents, those in school are less likely to have sex, have multiple life partners or have frequent sex.

It is argued that education is a powerful positive predictor of female age at marriage. Schooling defers girls' age at marriage, especially if they attend secondary education. Once they are no longer in school, however, girls are more likely to be viewed as marriageable which leads to a heightened vulnerability to early marriage. Further, married girls are drastically less likely to attend school than their unmarried peers [13].

The findings on the significant effect of early marriages on adolescent girls school dropout rates is consistent with other studies [13, 14], suggesting that marriage limits girls' schooling. A study in Nepal [13] found that early marriages is the most common reason given for leaving school. Married girls were 10 times more likely to drop out of school than their unmarried peers. Girls with no education are three times more likely to marry or enter into the union before age 18 than those with a secondary or higher education.

Contrary to what was found in this study that adolescent pregnancies and early marriages are significantly associated with school dropouts, a study in Malawi found no significant changes in early marriages and adolescent pregnancies among school girls who were receiving cash transfers and girls who were not [15].

Findings from a study in Kenya indicate cash transfers had significantly reduced the likelihood of pregnancy, but had no significant impact on the likelihood of early marriage [16]. Studies in Kenya and Zimbabwe found that School support significantly reduced early marriages among orphan adolescents [17, 18]. A study in Malawi [14] found that there was a desire to delay childbearing as a result of the cash transfer. Cash transfers also led to a significant decrease in marriages. A cluster-randomized trial [17] in Zimbabwe found that offering payment of school fees, free uniform and a school-based assistant who dealt with problems of absenteeism, led to a reduction in school dropout, increased school attendance, and reduction in marriage rates in the next 2 years.

This study found that girls who have been receiving cash transfers since the inception of the RISE trial were less likely to drop out of school compared to those who received in intervals and those who had never received at all. A study in Nepal [13] found that despite relatively low costs of schooling in the form of fees, books, and transport, as well as fairly good access to schools in much of the country, early marriage puts an end to girls' education.

A Randomised Controlled Trial in Rural China's Junior High Schools found that the dropout rate of the students receiving cash transfers was lower than those who were not receiving. The cash transfers may motivate students to study harder and thus improve their academic performance. In turn, increased academic performance encourages students to stay in school [19]. In a trial in Kenya [17], girls who were provided with free school uniforms were less likely to drop out before completing primary school [20].The cash helps poor children to attend school by alleviating the financial burden of schooling for the household.

The study found that the older the girl gets the more likely they are to drop out of school, this could be because female children are considered as a source of wealth mostly in rural areas of Zambia. Through the bride price paid by a man's family, parents/guardians benefit and hence, marrying off their children rather than keeping them in school. The findings of this study were in agreement with what other studies found in Nepal, and two studies in Zimbabwe [13, 18, 21], as the age increased, girls were more likely to have dropped out of school due to marriage. A study in Nepal [13] found that families are motivated to marry off their daughters at a young age because dowry requirements often increase with the age of the bride.

CONCLUSION

The findings in this study suggest that there is no sufficient evidence of a difference in school dropouts among adolescent girls in the economic arm and the combined intervention arm. However, consistently receiving cash transfers was shown to be a protective factor of school dropout rates. The findings also indicate that early marriages and adolescent pregnancies are some of the factors negatively affecting schooling.

The time that girls spend in school curtails girls from indulging in illicit behaviour which could lead to early marriages and early pregnancies and could lead them to dropping out of school. Communities should be empowered or supported in all means possible to help keep adolescent girls in school.

LIMITATION

The mother study is ongoing and is expected to go beyond 2020. Therefore, further effects of the interventions will not be captured in this study.

RECOMMENDATIONS

Based on the findings of this study, it appears like supporting girls in the way it was done in this study has some beneficial outcomes. It follows that policymakers should find ways of helping adolescent girls in this way. Cash transfers seem to help keep adolescent girls in school, the government of Zambia should adopt one of the interventions and scale up to rural areas in other provinces. The ministry of general education should intensify teachings on sexual and reproductive health so that both school girls and boys can be made aware of the ways to prevent early pregnancies. It is undoubtedly that adolescents are having sex and knowledge on contraceptive use should also be emphasized rather than abstinence only.

AVAILABILITY OF DATA AND MATERIAL

Data used for this study can be requested from (Centre for Intervention Science in Maternal and Child Health (CISMAC).

AUTHORS CONTRIBUTIONS

All authors contributed extensively to the work presented in this paper. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The protocol for the Research Initiative to support the empowerment of girls study was submitted and approved by the University of Zambia Biomedical Research Ethics Committee (ref 021-06-15) and the Regional Ethics Committee of Western Norway. The protocol for this study was also submitted to the University of Zambia Biomedical Research Ethics Committee (UNZABREC) and approval was granted (ref 065-06-17).

HUMAN AND ANIMAL RIGHTS

No humans/ animals were used for the studies that are basis of this research.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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