

**LONGITUDINAL DATA MODELLING OF THE EFFECT OF CASH
TRANSFER ON SCHOOL DROPOUT RATES IN THE RESEARCH
INITIATIVE TO SUPPORT THE EMPOWERMENT OF GIRLS (RISE)
TRIAL 2016 TO 2017**

By

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*A dissertation submitted in partial fulfilment of the requirements for the Degree
of Master of Science Medical Statistics*

THE UNIVERSITY OF ZAMBIA

LUSAKA

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DECLARATION

I, Mutale Sampa hereby declare that this dissertation is my original work and it has not previously been submitted for a degree, diploma or other qualification at this or any other University. This work has however, been published in the open public health journal as a requirement for my graduation.

Signature:..... Date:

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APPROVAL

This dissertation of Mutale Sampa has been approved as partial fulfilment of the requirements for the award of Master of Science in Medical Statistics at the University of Zambia.

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ABSTRACT

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.

The study was nested in the RISE trial which is an ongoing cluster randomized trial being conducted in Central and Southern provinces of Zambia. A total of 3,500 adolescent girls were included in the study. Random intercepts model for binary data 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.

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 an increased 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).

The findings suggest that there is no difference between the two arms (the cash arm and the combined intervention arm) on school dropouts. 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.

Key terms: Cash transfer, Cluster Randomised Controlled Trial, Longitudinal

DEDICATION

This work is dedicated to my late father Major John Mutale Sampa, who first taught me the value of education and critical thought

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ACRONYMS AND ABBREVIATIONS

CAPRISA Centre for the AIDS Programme of Research in South Africa

CCT Conditional cash transfers

CISMAC Centre for Intervention Science in Maternal And Child Health.

HIV Human Immunodeficiency Virus

HSV-2 Herpes simplex virus type 2

MOE Ministry of Education

PTA Parent Teacher Association

RCT Randomized Controlled Trial

RISE Research Initiative to Support the Empowerment

UCT Unconditional Cash Transfers

UNESCO United Nations Education Scientific and Cultural Organisation

DEFINITION OF TERMS

Adolescent girls: girls between 10 years and 19 years of age.

Cash transfer: Cash transfers are direct transfer payments of money to eligible people.

Randomized Control trial: A study in which people are allocated at random to receive one of several clinical interventions.

CHAPTER 1: INTRODUCTION

Education is viewed as being so fundamental to the development of individuals and as such, the right to primary education is legally guaranteed in most countries of the world. School dropout and child marriage/early marriage are interrelated outcomes that have an enormous impact on adolescent girls, curtailing full realisation of their rights, limiting their livelihood options, and harming their health and wellbeing as well as that of their children. There are also broader social implications related to economic development and gender equality. Education is a fundamental human right for all children (Sekine and Hodgkin, 2017). Adolescent girls are girls between the ages of 10 years to 19 years (WHO, 2011).

According to United Nations Education Scientific and Cultural Organisation (UNESCO) 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 (UNESCO, 2011). Some of which 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 (EFA, 2011).

Initial primary school enrolment is high in most countries, and often similar for boys and girls, but increasing dropout of girls in adolescence is a major and wide-spread problem. Since schooling often starts late and grades are repeated, dropout in adolescence frequently means dropout before the end of primary school, as well as the loss of opportunities for secondary schooling and tertiary education (Glynn *et al.*, 2018). Being out of school can lead to risky sexual behaviour, pregnancy and marriage, but unintended pregnancies and early marriage can lead to school dropout (Clark *et al.*, 2009). Compared to out-of-school adolescents, those in school are less likely to have sex, have multiple life partners or have frequent sex (Zuilkowski and Jukes, 2012). Adolescents in school and performing better at school may have a higher perception of risk associated with early sexual debut, and higher aspirations for their future than their non-school going peers (Clark *et al.*, 2009). For those in school, sexual activity poses a high opportunity cost, with unintended pregnancies and marriage as a deterrent to achieving educational goals. Those out of school may consider

sexual activity desirable, potentially bringing marriage and financial security for the future (Glynn *et al.*, 2018).

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 (EFA, 2011). Age-specific dropout rates for older children increase drastically after the age of 10 years this result reinforces the well know finding that the older the child is, the greater the chances of not completing the basic cycle of primary school This is due to the fact that for older children the opportunity cost of schooling increases significantly and with this a pressure to work or to get married.

Cash transfers have increased enrolment and attendance rates in both primary and secondary schools. Moreover, even in contexts where education is free, families can still face direct out-of-pocket expenses, for instance on travel, books, food, uniforms and shoes, and this may constitute a serious barrier for poorer families. 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 (EFA, 2011).

In low income countries young women who quit school early are more likely to marry and become pregnant at an early age and engage in risky sexual activities than those who stay in school longer and achieve a higher educational attainment (Lloyd and Mensch, 2008).

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 (Sandøy *et al.*, 2016).

Girls with no education are three times more likely to marry or enter into union before age 18 years than those with a secondary or higher education. Schooling defers girls' age at marriage, especially if they attend secondary education (Raj *et al.*, 2014). Once they are no longer in school, however, girls are more likely to be viewed as marriageable (Lee-Rife *et al.*, 2012), which leads to a heightened vulnerability to early marriage.

Nearly 58 million children of primary school age (typically between 6 and 11 years) around the world were not enrolled in school in 2012. Of that number, 38 million children were in Africa (UNESCO, 2014). A disproportionate number of these out of school children of primary school age were girls; 10% and 8% (58 million) of all girls and boys respectively were denied the right to education (UNESCO, 2015). In addition, 63 million children of lower-secondary school age (typically between 12–15 years) were out of school worldwide in 2012 (UNESCO, 2014)

Children's access and completion of primary education was named a top goal by the United Nations' (UN) Millennium Development Goals (MDGs), introduced in 2000 as a blueprint for the world's development agenda. Since the establishment of the MDGs, there has been considerable progress made in school enrolment rates across the developing world. Most children in low and middle-income countries now complete primary school and many also go on to obtain at least some secondary-level education (Glewwe and Muralidharan, 2015). Nevertheless, sub-Saharan Africa (SSA), still lags behind other developing regions of the world. Indeed, the majority of the world's 124 million children that are not in school live in SSA. In 2013, half of the nearly 30 million primary school-age children out of school in the region had never been enrolled, and of these children, girls make up the disproportionate share (Kilburn *et al.*, 2017).

Reducing child marriage (marriage before age 18 years) and adolescent pregnancy is essential for improving the sexual and reproductive health as well as the social and economic wellbeing of adolescent girls. There is increasing evidence that conditional school support programmes can increase educational attainment and reduce school dropout, early marriage and early pregnancy for a large majority of adolescent females, including orphans (Baird *et al.*, 2012).

UNESCO in 2012 found that in Ethiopia, female drop-outs was high especially in the transition from primary to secondary education. In 2009, only 41% of girls survived to the last grade of primary education and there were only 30% enrolled in secondary education. Over 1.8 million adolescent girls were out of school in 2009.

In 2007 the rate of teenage pregnancy was at 28% and school dropout rate of adolescent girls due to pregnancy or child marriage was at 46% (Central Statistical *et al.*, 2009). An early start to childbearing greatly reduces women's educational and employment opportunities and is associated with higher levels of fertility. Teenage pregnancy was much higher in rural areas 36% than urban areas 20%, girls age 15-19 years who have had a live birth in the rural

area was 30% and while in the urban areas 16%, girls aged 15-19 years who were pregnant with their first child was higher in the rural area 8% and 4% in the urban (Central Statistical *et al.*, 2015). The central statistics office in 2015 indicated that girls who had a live birth were more among girls with no education 43% compared to those with education 10%, the percentage of girls pregnant with their first child were higher among girls with no education 30% compared to those with no education 6%. These percentages of girls were higher at primary level compared to secondary level 18%, and 5% respectively.

The evidence from (Mwanza,2010) research findings revealed that in Zambia there are disparities between boys' education and girls' education in that there are high drop-out rates among girls at both primary and secondary school level. It was found that some girls fail to continue their education due to domestic chores, early marriages or them becoming pregnant. Therefore, there is need to address negative attitudes and cultural beliefs that hinder the education of a girl child in order to encourage the full participation of girls in schools. Researchers are suggesting that educating girls is one of the ways of achieving gender equality in education thereby helping in achieving Education for All in primary and secondary schooling.

Bordering on the circumstances in which adolescent girls find themselves, this study aimed at assessing the effect that empowerment programmes of adolescent girls through the provision of cash transfers had on school dropout.

The study was embedded in the RISE study which is a Cluster randomized controlled clinical trial on the effectiveness of girls' empowerment programme on early childbearing, marriage and school dropout among adolescent girls in rural Zambia.

The RISE study is an ongoing study being implemented by the University of Zambia in 150 schools and their surrounding communities in Central and Southern provinces, in Kalomo, Choma, Pemba, Monze, Mazabuka, Chikankata, Chisamba, Chibombo, Kabwe, Kapiri Mposhi, Luano and Mkushi districts. To find out how this goal can be best achieved, the University of Zambia are collaborating closely with the Ministry of Education, the Ministry of Chiefs and Traditional Affairs, the Ministry of Gender and Ministry of Health who are also involved in the programme's advisory board. The programme has received support from all key stakeholders, including District Commissioners, the Chiefs in all study districts, head teachers, headmen, religious leaders, and parent-teacher association (PTA) members (Sandøy *et al.*, 2016).

The RISE programme enhances opportunities for communities to support adolescent girls to continue going to school and increases girls' possibilities to postpone pregnancy and marriage through material support, economic support and community dialogues on empowerment of adolescent girls. There are three arms in the RISE study namely; the material support group where girls are provided with books, pens, and pencils only. The second arm is the economic support group, in this group girls are provided with material support and in addition, they are provided with payment of schools fees for girls who continue schooling into grade 8 and 9 in 2017 and 2018. In addition payment of a grant to the girls' parents/guardians at the beginning of each year to cover expenses related to the girls' education such as uniforms, shoes, PTA fees and reading books. To help parents/guardians support their adolescent girl in other ways (Sandøy *et al*, 2016).

This study focussed on assessing the effects of cash transfers on school dropout rates. The study also compared the economic intervention arm and the combined intervention arm to determine whether school dropout rates were different.

1.1 Problem Statement

Early pregnancy is often closely interlinked with early marriage and school dropout, and poverty is an important factor contributing to all three. Numerous observational studies from low-income countries indicate that young women who quit school early are more likely to marry and become pregnant at an early age and engage in risky sexual activities than those who stay in school longer and achieve a higher educational attainment. Increased levels of schooling have also been found to be associated with better health of women themselves and their children (Gakidou *et al.*, 2010).

The adolescent childbearing rates are much higher in rural than urban areas, and higher among girls who are out of school compared to those who are still attending (36% vs. 5% at age of 17 years in rural areas, 8- 11% of girls in Choma, Monze, Mazabuka, Chibombo, Kapiri Mposhi and Mkushi districts had given birth at age of 16 years and 33% - 38% at age of 18 years (Sandøy *et al*, 2016). According to the 2010 Annual Global Report on education by UNESCO (2010), Zambia in 2007 had 11.80% primary school dropouts. The national dropout rate grades 1-9 for Zambia in 2005 stood at 2.36% (MOE, 2006). The national dropout rate for the year 2010 stood at 1.79% for boys and 2.33% for girls giving an overall dropout rate of 2.06%.

Economic hardships may force pupils whose parents or guardians are unable to provide school requirements to drop out of school. In Zambia, despite the government providing free primary education, training, recruiting and supplying teachers, providing school infrastructure, teaching and learning materials; learners are still seen dropping out of school. For instance, Solwezi district recorded 5,002 dropouts between 2010 and 2012. Dropouts due to marriage out of the total dropouts were 8.5% and dropouts as a result of early pregnancies were 17.6% (MOE, 2013).

1.2 Justification of the Study

Teenage pregnancies and early marriages are major constraints against girls' education in Zambia. Undoubtedly, the two factors are associated with the economic status of households; households from poorer societies are forced to marry off their children for economic liberation or girls' skipping schools because of the engagement in sexual affairs at an early stage for material gain. Where this is true, there is need to evaluate the extent to which empowerment of adolescents and their guardians affect adolescent girls' school dropouts.

The government of Zambia implemented the re-entry policy in 1997 for school girls who fall pregnant to be able to stay in school during pregnancy and return to school after. The government also introduced free education at primary school level in 2002. These policies were implemented in an effort to reduce school dropout. 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 (Mwanza, 2010).

The RISE trial which is an ongoing study has been giving cash transfers to girls and their parents or guardians in an effort to empower girls to stay in school and avoid early marriages and pregnancies. This study therefore, assessed the effects of these cash transfers on school dropouts.

Currently there is insufficient knowledge on the effect of adolescent girl's economic empowerment on school dropout rates in Zambia. This study may help in bridging the gap in existing literature on how economically empowering adolescent girls may be used to reduce adolescent girls' school dropout rates, early marriages and early pregnancies. This study may also help to identify the intervention that could work better between the Economic

intervention (material support and cash) and combined interventions (material support, cash and community dialog).

1.3 Research Hypothesis

Null Hypothesis of the study was that; cash transfers have no effect on adolescent girls' school dropout rate.

The primary outcome was school dropouts.

1.4 Objectives

1.4.1 General Objective

To establish the effect of cash transfers on adolescent girls' school dropout rates in selected schools of Southern and Central provinces.

1.4.2 Specific Objectives

1. To determine factors associated with school dropout rates of adolescent girls.
2. To determine the proportions of pregnancies of adolescent girls since baseline.
3. To determine the proportions of early marriages among adolescent girls since baseline.

1.5 Conceptual Framework

The conceptual framework of the study in figure 1 generally shows how cash transfer and other factors may affect school dropouts.

The age of the girl may influence their sexual behaviour which may lead girls getting pregnant early. Early pregnancy may influence the decision of the adolescent girl to either stay in school or to dropout. Early pregnancy may also lead to a girl being married off early, thereby dropping out of school in most cases. The age of the girl may also influence the decision for parents or guardians to marry off the adolescent girls. The older the girl gets the more at risk they are to being married off, when the girl gets married their chances of being in school reduce.

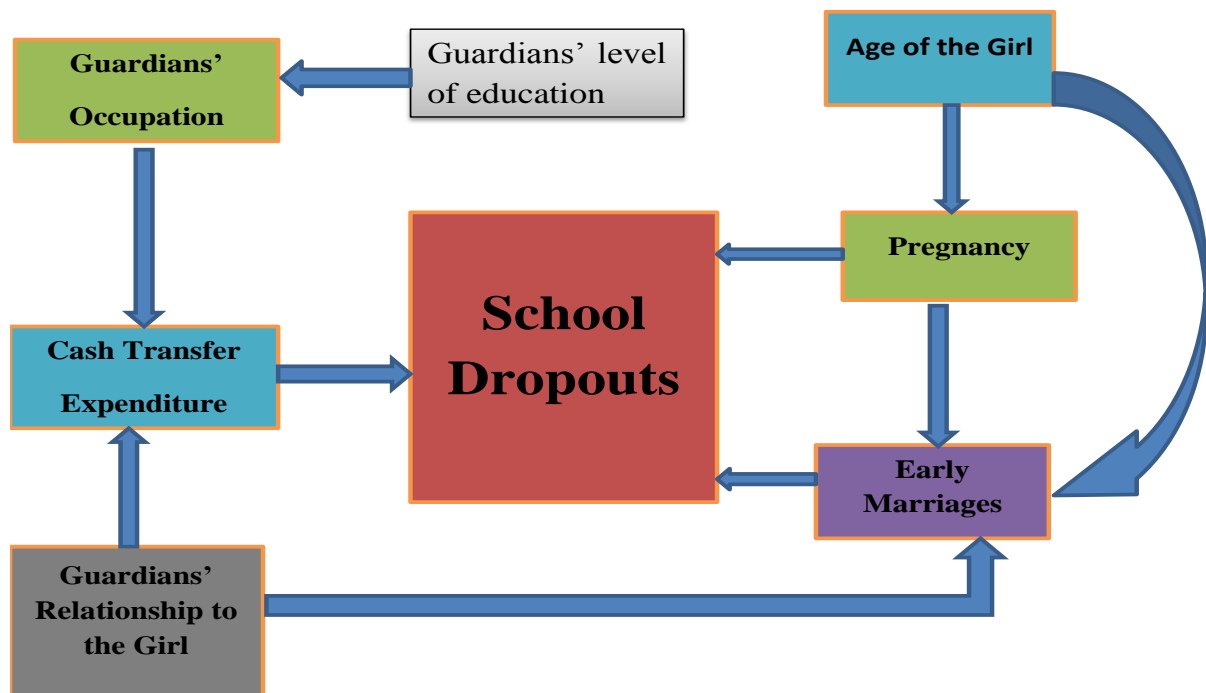


Figure 1.1: Conceptual Framework showing potential risk factors of school dropouts. Some ideas of this conceptual framework have been adapted from the RISE study (Sandøy *et al*, 2016).

1.6 Organization of the Dissertation

The dissertation has been organised in five chapter, comprising of the Introduction, Review of literature, Methodology, Presentation of results, Discussion of results, and Conclusion and recommendation respectively.

CHAPTER 2: LITERATURE REVIEW

Overview

Chapter two presents published studies that have been done on the effects of cash transfers by other researchers worldwide. These studies were searched from different search engines such as google scholar and pub med. The studies were disaggregated by; the Effects of Cash Transfers on School Attendance, HIV, Early pregnancy and Early marriages, the effects of Cash transfers on School Enrolment, and the effects of Cash transfers on school Dropouts

In order to have an in-depth understanding of the research problem, a comprehensive review literature was undertaken. The study reviewed similar researches conducted in various countries including Malawi and Kenya, these studies links cash transfers, school, enrolments, school dropouts and early marriages. Cash transfers play an important role in access to education, both by providing households with the means to pay school fees, but also to purchase peripheral requirements associated with attending school, such as uniforms, books, and stationery. Education is accepted as a critical means of reducing inter-generational poverty and promoting development, but access to it is often impeded by cost (Vincent and Cull, 2009).

2.1 Effects of Cash Transfers on School Attendance, Early Pregnancy and Marriages.

A study in South Africa showed that receipt of the Child Support Grant is positively correlated with the beneficiary attending school. Grant receipt appears to decrease the probability that a school-age child is not attending school by over half (Williams, 2007).

Once an investment has been made in education through the payment of fees, there is an incentive to let children attend, which reduces child labour and other absenteeism. A study in Malawi found that children in recipient households in the Mchinji cash transfer pilot were absent on average 1.6 days, compared with 2.6 days in non-recipient households. The average before the transfer was 2.6 in both household types (Miller *et al.*, 2008). Another study in South Africa, models showed that household receipt of an old age pension was associated with a 20% to 25% reduction in the school non-attendance gap, and receipt of a child support grant was associated with a 25% reduction in the non-attendance gap (Samson *et al.*, 2004).

A cluster-randomized trial conducted in Malawi found that payment of school fees combined with small cash transfers to adolescent girls and their families resulted in a lower prevalence of HIV and Herpes simplex virus type 2 (HSV-2) in the next 18 months among baseline

schoolgirls (Baird *et al.*, 2012). The trial randomly allocated school-girls to one of three arms: a conditional cash transfer (CCT), an unconditional cash transfer (UCT) and a control arm. In the UCT arm, marriage and pregnancy rates in the next two years were 48% and 34% lower, respectively, compared to the control arm despite only a slight increase in school attendance. No significant change was seen in marriage and pregnancy rates among schoolgirls in the conditional (CCT) arm (Baird *et al.*, 2010).

Two cluster RCTs of conditional cash transfer programmes have been conducted in South Africa. In the CAPRISA 007 study, girls and boys in grade 9 and 10 were offered cash transfers for participation in an education and skills training programme, HIV testing and a community project. Reduced incidence was found for HSV-2, but no significant effect was measured for HIV – most likely because of a very low HIV incidence. In the HIV Prevention Transmission Network (HPTN) study, girls were offered a cash transfer that was conditional on school attendance, and no effect was found on school attendance and HIV incidence. Thus the effects of cash transfer programmes appear to very context dependent, and there is a need for further evaluations of such programmes in new settings, alone and in combination with other interventions (Kirby, 2007).

2.2 Effects of Cash transfers on School Enrolment

A study by (Kremer *et al.*, 2013) on empowering young women showed that even very small cash transfers boost education for girls in Africa. An intervention in rural Malawi provided cash transfers, monthly transfers of varying size made to the girl and to the household. For some girls, these transfers were conditional on school attendance, for others they were not. The size of the transfer to each girl randomly varied between \$1 and \$5; transfers to households randomly varied between \$4 and \$10; the minimum transfer was \$5 per month, the maximum was \$15, and the average was \$10. The programme also paid school fees in full directly to the secondary school. An on-going randomised evaluation found that the intervention increased re-enrolment rates and reduced dropout rates. Higher transfers given to girl had a greater effect on attendance and progress than transfer given to the parent. CCTs increase school enrolment and have a negative effective on child work a randomized evaluation in Ecuador showed that CCTs had large, positive effects on school enrolment and large negative effects on child work.

Provision of cash increases enrolment rates, for example, Zambia's Cash Transfer increased school enrolment rates by 3% to 79.2%, and 50% of youth who were not in school at the time of the baseline study were enrolled by the time of the evaluation (MCDSS/GTZ, 2007).

2.3 Effects of Cash transfers on school Dropouts

A Randomised Controlled Trial in Rural China's Junior High Schools found that the dropout rate of the students receiving cash transfers (Treatment Group) was 5.3%, the dropout rate of Control Group was 13.3%. The CCT may motivate students to study harder and thus improve their academic performance. In turn, increased academic performance encourages students to stay in school (Mo *et al.*, 2013)

In a trial in Kenya, girls who were provided with free school uniforms were less likely to drop out before completing primary school. Proxy-reports by classmates (which have a questionable validity), indicated reduced risks of early marriage and childbearing (Hallfors *et al.*, 2011). Similar findings were obtained in a cluster-randomized trial in Zimbabwe which found that a programme targeted at orphan girls in grade 6, offering payment of school fees, free uniform and a school-based assistant who dealt with problems of absenteeism, led to an 80% reduction in school dropout, increased school attendance, and 60% reduction in marriage rates in the next 2 years (Hallfors *et al.*, 2011).

A study by (Baird *et al.*, 2010) shows that 10.8% of students in the control group had dropped out of school after one year. The impact of the program is 4.5 percentage points, indicating that the programme led to a 42% reduction in the probability of dropping out of school. Evidence from a cluster-randomised experiment in Malawi among baseline schoolgirls, on the other hand, there was no evidence of a significant impact of the CCT intervention on marriage during or after the programme. UCT treatment led to a significant reduction in both marriage and pregnancy by the end of the programme. UCT programme significantly reduced the dropout rate among its beneficiaries.

In Zambia, from grade 1 to 7, education is free. This also means that the learners do not pay any examination fees for the two public examinations at Grade 7 and 9. However, learner absenteeism from the two public examinations is a potential threat to the attainment of the EFA and MDG goals (ECZ, 2013).

CHAPTER 3: METHODOLOGY

3.1 Study Design

This was a nested cluster randomised controlled study design in the RISE study. The RISE study had a control arm and two intervention arms namely; material support, economic support and combined intervention arm respectively. The randomisation units were basic schools and their surrounding communities, and the randomised schools were at least 8 km apart from each other (Sandøy *et al.*, 2016). The study therefore, adopted the cluster randomised study design as the study considered all participants who were randomised to the two intervention arms through cluster randomisation.

3.2 Study Setting and Participants

The study population was girls who were in grade seven in 2016 and were enrolled in RISE study and randomised to either the economic intervention arm or the combined intervention arm. The participants came from 12 districts of the Central and Southern Provinces of Zambia namely: Kalomo, Choma, Pemba, Monze, Mazabuka, Chikankata, Chisamba, Chibombo, Kabwe, Kapiri Mposhi, Mkushi, and Luano. These districts were selected as they have medium school dropout rates, and adolescent marriage and childbearing are common (Sandøy *et al.*, 2016).

3.2.1 Inclusion Criteria

All girls who were enrolled in grade 7 in 2016 and provided assent to participate in the RISE study were included in the study. The study also included;

All girls who dropped out of school after they had been recruited in the RISE study

3.2.2 Exclusion Criteria

All girls who were in the control arm because these did not receive the cash transfers.

3.3 Sample Size

To calculate sample size required for a cluster randomized trial the RISE study used PASS 14 (NCSS Statistical Software, Kaysville, UT, USA). The RISE study included 63 economic intervention clusters, 63 combined intervention clusters, and 31 control clusters, a total of 157 clusters with 31 girls in each cluster, bringing the total sample of girls to 4,867 with an approximation of 4,900 girls (Sandøy *et al.*, 2016).

The sample size for this study included all the girls enrolled in the RISE study and were randomised to the two arms that were receiving cash transfers, that is the economic arm and the combined intervention arm. The total sample size was 3,400 girls.

3.4 Data Extraction

Secondary data was extracted RISE study. The RISE study routinely collects information on the girls every six months from baseline September 2016 and the study will run up to 2020. The study used the data collected from baseline to December 2017.

3.5 Variable Identification

The outcome variable was school dropouts. The study also assessed early marriages, and early pregnancies. The girls were classified as having dropped out of school according to their school status. Early marriages and early pregnancies were classified as those who had fallen pregnant and those who had been married off after the baseline.

Independent variables included; cash transfer receipt, girls' age, girl ever married after baseline, Girl ever given birth after baseline, girl ever been pregnant after baseline, girl shared the cash transfer received, is the girl living with her biological parents, intervention arm. Cash transfer and treatment arm were priori variables; they were kept in the model regardless of whether or not they were statistically significant.

3.6 Statistical Analysis

Data was analysed using Stata software version 14.0 (Stata corporation, college station, TX, USA). The Continuous variable age was checked for normality using the Shapiro-Wilk W-test, age was found to be normally distributed, and therefore, the mean and standard deviation were reported. A chi-square test was used to check for association between the school dropout and other categorical variables, Percentages and frequencies were reported. For variables whose expected frequencies were less than five, Fishers exact test was used.

A key issue in the analysis of longitudinal data is that outcome values measured repeatedly within the same subjects tend to be correlated, and this correlation structure needs to be taken into account in the statistical analysis. The random intercepts model for binary data was used to account for correlation in the data.

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + u_j + e_{ij}$$

$$e_{ij} \sim N(0, \sigma^2_e) \quad u_j \sim N(0, \sigma^2_u)$$

where e_{ij} were the residual errors following a normal distribution with a mean of zero and a variance σ^2_e , and u_j were the random errors following a normal distribution with mean Zero and variance σ^2_u .

In Stata, data which was initially in wide format was changed to long format enabling each respondent to have all three observations in a row, that was observations at baseline, first follow up and second follow up. Using the `xtset` command in Stata, data was recognized as panel data.

An investigator led forward stepwise regression model was used to identify factors affecting school dropout rates. Two models were fitted, a naive model which assumed independency and a random intercepts model for a binary outcome, which assumed dependency, which may have been due to clustering and longitudinal nature of the study. Odds ratios were reported, diagnostics for the best fit model were performed using a wald test, Akaike Information Criteria and Bayesian Information Criteria.

3.7 Ethical Considerations

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 (Sandøy *et al.*, 2016). The protocol for this study was submitted to University of Zambia Biomedical Research Ethics Committee (UNZABREC) and approval was granted (ref 065-06-17).

Confidentiality was ensured by obtaining and using participants study IDs and not participants' names. No physical harm was inflicted on the participants as the data used was secondary data.

3.9 Dissemination

The findings from this study will be highly relevant for programmes aiming to improve adolescent reproductive health in Zambia and in similar contexts. A copy of the report will be put in the University of Zambia library. The study has been published in a peer-reviewed journal.

3.10 Limitations and Strengths

The RISE study has a long follow up period going beyond 2020; therefore, further effects of the interventions will not be captured in this study. The study did not analyse the economic or social-demographic characteristics of parents or guardians as potential risk factors of school

dropouts, this was because the information was collected after the period under consideration for this study, these would have been insightful on the role of parents or guardians in keeping their adolescent girls in school.

Despite these limitations, evidence generated from this study can aid policy makers and education planners by helping them better understand the magnitude of the effect of early marriage on school attendance and who is at the highest risk of school dropout due to early marriage. The evidence could potentially inform policy making and advocacy for eliminating child marriage.

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Flow Chart showing the number of participants at baseline and at first and second follow-up visits.

Figure 4.1 illustrates the population of girls enrolled at baseline and interviewed at first and second follow up. At first follow up, the number of girls interviewed reduced from 100% to 85% and 81% in the economic arm and combined intervention arm respectively. The population increased at second follow up to 95% and 97% in the economic arm and combined intervention arm respectively.

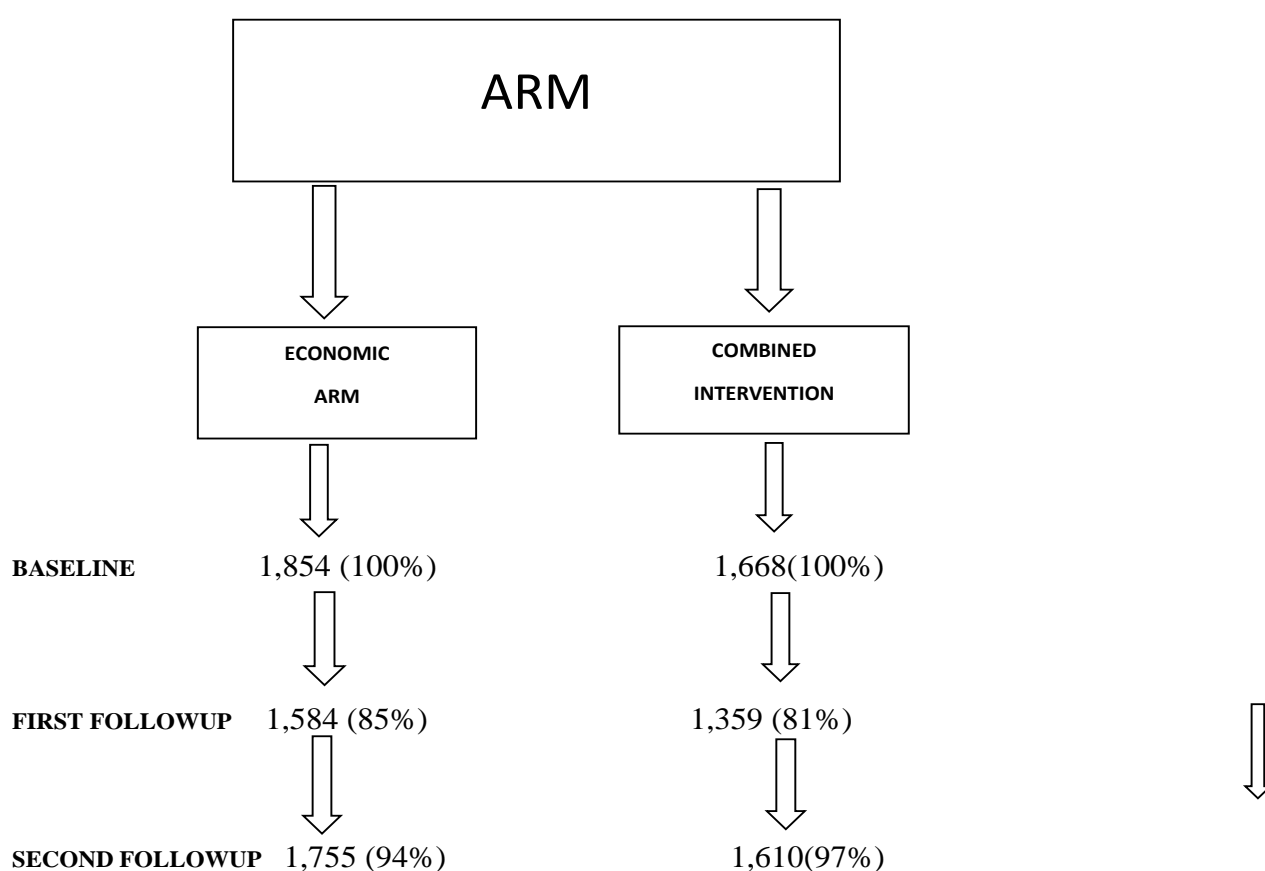


Figure 4.1: The population in the intervention arms at the three time points.

4.2 Background characteristics of participants

Table 4.1 below shows the basic characteristics of adolescent girls. The results for categorical variable were from Pearsons chi-squared test and Fishers exact test, while for the continuous variable age a student's T test was used.

Table 4.1: Basic Characteristics of the Population

Factors	In school n (%) N=3,162 (94%)	Not in school n (%) N=203 (6%)	P-value
Girl received cash transfer			
No			
Sometimes	93 (3%)	35 (17%)	
Every time	171 (5%)	50 (25%)	<0.0001 ^a
	2,898 (92%)	118 (58%)	
Arm	1,644 (52%)	111 (55%)	0.457 ^a
Cash only	1,518 (48%)	92 (45%)	
Cash/community dialog			
Girl living with parents			
Yes	2,318 (75%)	126 (65%)	0.001 ^a
No	757 (25%)	68 (35%)	
Girl ever been Pregnant			
Yes	14 (0.5%)	59 (50%)	<0.0001 ^a
No	3,103 (99.5%)	59 (50%)	
Girl currently pregnant			
Yes	11 (22%)	55 (41%)	0.022 ^a
No	38 (78%)	80 (59%)	
Girl ever given birth			
Yes	47 (1%)	85 (42%)	<0.0001 ^a
No	3,115 (99%)	118 (58%)	
Girl married/living with a man			
Yes		49 (24%)	
No	3 (0.1%)	154 (76%)	<0.0001 ^b
	3,159 (99.9%)		
Shared cash transfer			
Yes	1,073 (35%)	51 (30%)	0.225 ^a
No	1,999 (65%)	117 (70%)	
Age in years	15.1 (1.30)	16.4 (1.31)	< 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 biological parents, ever being pregnant, currently being pregnant, being married/cohabiting and age of the adolescent girl were found to be associated with school dropouts, while girl sharing the cash transfers and a girl being in either of the two intervention arms were seen not to be associated with school dropouts rates.

4.3 Proportions of early marriages since baseline

At baseline all 3,522 girls were in school. 3,384 reported their marital status at baseline, among these only 2 (0.1%) reported to have been married. At first follow up a total of 2,935 girls who were in school and reported their marital status, among these only 5 (0.2%) were married. Among the 8 girls who were not in school at first follow up, only 1 (12.5%) reported to have been married. At second follow up 3,162 were in school and reported their marital statuses, among those 3 (0.1%) reported to have been married. Adolescent girls who were not in school were 203, among those 49 (24%) reported to be married.

4.4 Proportions of early pregnancies since baseline

At baseline all 3,522 participants were in school. 3,400 girls reported whether they were pregnant or had ever, among these 13 (0.4%) reported to have ever been pregnant at enrolment. Information on girls who had ever been pregnant was not collected at first follow up. At second follow up a total of 3,152 were in school and 194 were not in school, among those who were in school 73 (2.2%) reported to have ever been pregnant/currently pregnant and among girls who were not in school 14 (0.4%) reported to have ever been pregnant/currently.

4.5 Factors associated with School dropout rates

The best factors associated with school drop out rates as the result of the statistical analysis were; age, being married/cohabiting, having given birth before, living with biological parents, receiving cash transfer and being either in the economic arm or the combined intervention arm. Receiving cash transfer and being in either of the intervention arms were kept in the model at every stage of analysis.

As shown in Table 4.2 , results indicate 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 others explanatory variables in the model (OR=0.003, P-value<0.0001). Girls who were married/cohabiting were 97% significantly less likely to be in school than girls who were not married/cohabiting (OR=0.004, P-value<0.0001).

Table 4.2: 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	1.29(0.78-2.14)	0.313	1.38 (0.65-2.92)	0.397
Yes every time	9.27(6.03-14.26)	<0.0001	8.51 (4.50-16.08)	<0.0001
No	1		1	
Arm				
Cash/community	1.00(0.74-1.34)	0.981	0.89 (0.59-1.36)	0.606
Cash	1		1	
Age	0.49(0.33-0.73)	<0.0001	0.63 (0.54-0.75)	<0.0001
Living with biological parents				
Yes	1.47(1.07-2.02)	0.019	1.46 (0.94-2.28)	0.094
No	1		1	
Ever given birth				
Yes	0.02(0.002-0.133)	<0.0001	0.03 (0.02-0.04)	<0.0001
No	1		1	
Married/living with a boyfriend				
Yes	0.003(0.001-0.012)	<0.0001	0.004 (0.001-0.02)	<0.0001
No	1		1	
ICC			0.000005	

Values are: 1 reference category, COR=crude odds ratio, AOR=Adjusted odds ratio, ICC =Intra Class Coefficient.

A year increase in age significantly reduced the chances of a girl being in school by 37% (OR=0.63, P-value<0.0001, taking other variables into account. Girl 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, 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, P-value<0.0001 and OR=1.38, P-value=0.397 respectively), there was however, insufficient evidence to rule out chance finding for those who received cash transfers sometimes.

Table 4.2 evidently shows that the chances of the girls being in school for the two intervention arms were not different as the odds ratio was approximately equal to one and there was no sufficient evidence to rule out chance finding of any minimal effect observed in the cash/community arm (OR=0.89, P-value=0.606).

The intraclass correlation coefficient was approximately equal to zero indicating that variation as a result of clustering was zero (ICC=0.000005). The likelihood ratio test testing the null hypothesis that there is no variability between clusters was not statistically significant (P-value=0.498), this indicates that there was no sufficient evidence to reject the null hypothesis therefore, there was a possibility that ICC could be equal to zero. Indicating that dependency in the study was not an issue.

Shown in the Table 4.3 is the best fit model using the a naïve model assuming independence in the data. The naïve model exhibited similar results as those from the random intercepts model in Table 4.2. The results from the naïve model clearly indicates that girls in clusters were different from each other, hence, the ICC value in the random intercepts model.

Table 4.3: Factors affecting School dropout rates from the model that fit the data well (Model assuming independence).

Variables	COR (95% confidence interval)	p-value	AOR (95% confidence interval)	p-value
Cash transfer				
Yes sometimes	1.29 (0.78-2.14)	0.314	1.38 (0.66-2.89)	0.391
Yes every time	9.27 (6.03-14.27)	<0.0001	8.51 (4.50-16.08)	<0.0001
No	1		1	
Arm				
Cash/community	0.99 (0.74-1.35)	0.981	0.90 (0.59-1.365)	0.606
Cash	1		1	
Age	0.53 (0.47-0.59)	<0.0001	0.63 (0.54-0.75)	<0.0001
Living with biological parents				
Yes	1.47 (1.07-2.02)	0.019	1.46 (0.96-2.22)	0.076
No	1		1	
Ever given birth				
Yes	0.02 (0.01-0.03)	<0.0001	0.03 (0.01-0.05)	<0.0001
No	1		1	
Married/living with a boyfriend				
Yes	0.003 (0.001-0.01)	<0.0001	0.004 (0.001-0.02)	<0.0001
No	1		1	

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

CHAPTER 5: DISCUSSION OF RESULTS

Improving education is one of the Sustainable Development Goals, and underlies others: increasing education improves health, reduces poverty and helps gender equality. Being out of school can lead to risky sexual behaviour, pregnancy and marriage, but 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 (Glynn *et al.*, 2018).

This study found that receiving cash transfers reduced the chances of dropping out of school. This finding was consistent with findings from other studies. A cluster randomized control trial in eastern Zimbabwe (Luseno *et al.*, 2017), which explored marriage among young orphaned women. The RCT tested whether school support reduces HIV and related risk factors, including marriage and school dropout. School support was found to significantly reduce early marriage among orphan adolescents over both a two-year period and a five-year period (Hallfors *et al.*, 2015). A study done in rural Zimbabwe utilizing data from the RCT in eastern Zimbabwe (Iritani *et al.*, 2016) found that providing comprehensive school support to orphan girls in rural Zimbabwe for five years helped them to stay in school, to complete O-level schooling, and to experience less absence from school.

A study in Malawi whose aim was to assess short-term impact of an unconditional cash transfers on child schooling using data from a cluster randomized study of Malawi's Social Cash Transfer Program (SCTP), found that the cash helps poor children to attend school by alleviating the financial burden of schooling for the household (Kilburn *et al.*, 2017). A randomised controlled trial in rural China's junior high schools found that the dropout rate of the students receiving cash transfers were 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 (Mo *et al.*, 2013). In a trial in Kenya (Hallfors *et al.*, 2011), girls who were provided with free school uniforms were less likely to drop out before completing primary school, indicating that providing school support is a significant predictor for keeping adolescent girls in school.

The study in Nepal, however, found that the 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. Marriage was the most common reason given for girls' school dropout` (Sekine and Hodgkin, 2017).

Contrary to what was found in this study, A phase three RCT in rural South Africa (Pettifor *et al.*, 2016), found that cash transfer did not increase school attendance. School attendance was very high with 95% of girls in both the control and intervention groups attending school during the trial. The reason for this finding could have been because at baseline, 80% of girls were living in homes receiving the Child Support Grant provided by the government of South Africa to poor households. Additionally, because of high poverty levels in the study area, primary and secondary schools were free and most schools had feeding programmes. Cash transfers however, did have some important benefits in the trial; young women who received cash transfers reported significantly lower rates of physical violence by partners, were less likely to have had a sexual partner in the past 12 months, or to have had unprotected sex in the past 3 months compared with those in the control group (Pettifor *et al.*, 2016). The difference in findings to this study could have been because the study in South Africa used individual-randomisation rather than cluster level randomisation, which could have led to possible spill-over effects of the intervention.

The findings on the significant effect of early marriage on adolescent girls school dropouts are consistent with those of earlier studies in Nepal and Malawi (Sekine and Hodgkin, 2017, Baird *et al.*, 2014) suggesting that marriage curtails girls' schooling. A study in Nepal (Sekine and Hodgkin, 2017), found that early marriages is the most common reason given for leaving school. Married girls in Nepal 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 union before age 18 years than those with a secondary or higher education. The incompatibility between marriage and schooling is partly attributed to social norms towards married girls in Nepal. Despite relatively low costs in the form of fees, books, and transport, as well as fairly good access to schools in much of the country, marriage puts an end to girls' education, this is because of safety and security concerns, especially fear of rape and abduction, restrictions on married girls' movements by their husbands and parents-in-law are common particularly in rural areas where many villages have no secondary school and girls are forced to travel outside their villages (Sekine and Hodgkin, 2017).

In this study being married was seen to be negatively associated with adolescent girls being in school, unlike in Nepal where girls were getting married for safety and security concerns (Sekine and Hodgkin, 2017). Girls are seen as a symbol of wealth especially in the rural areas of Zambia. Parents or guardians benefit from the bride price paid by the man's family. In a household with limited funds, parents would rather send a boy child to school and marry off the girl child, therefore leading to higher school dropout rates among girls than boys in the rural areas.

A cluster randomized experiment in Malawi found that unconditional cash transfers treatment (UCT) led to a significant reduction on both marriage and pregnancy by the end of the programme (Baird *et al.*, 2014). The results from the study in Malawi were similar to results found in this study, this could be because Malawi and Zambia are both third world countries and rural areas in both countries are dependent on subsistence farming, and also these similarities would be because similar study designs employed in both studies which was cluster randomised study design.

This study found that pregnancy reduces the chances of adolescent girls being in school, this was consistent with findings from a study in Kenya which indicated that cash transfers had significantly reduced the likelihood of pregnancy, although the study had no significant effect on likelihood of early marriage (Handa *et al.*, 2015). However, contrary to what was found in this study that adolescent pregnancies and early marriages are significantly associated with school drop outs, 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 (Bird, 2010).

The study found that the older the girl gets the more likely they are to drop out of school, this finding was in agreement with what other studies found. A study in Nepal also 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. As their age increased, girls were more likely to have dropped out of school due to marriage (Sekine and Hodgkin, 2017). 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 (Sekine and Hodgkin, 2017).

The study in rural Zimbabwe (Iritani *et al.*, 2016) also found that age was a significant predictor of school dropout, with older girls being more vulnerable to dropout. The study in Eastern Zimbabwe found that advancing age was a strong predictor of marriage, but certain religious sects are also associated with early marriage in Zimbabwe and these may have overridden the beneficial effects of the intervention (Luseno *et al.*, 2017).

The proportions of marriages and pregnancies were seen to increase at subsequent follow up visits in the study. Regardless of the proportions, the actual numbers of adolescent girls who were married/cohabiting and those who had ever been pregnant were increasing at first and second follow ups compared to what was seen at baseline. This could have been due to underreporting marital status and whether or not the girl had ever been pregnant by adolescent girls. The observed results could have also been due to the duration of the study under consideration which was approximately one year, it could have been too early for the effects of the cash transfers to be observed within this period. This could have been the case in a study in Malawi which found no significant changes in early marriages and adolescent pregnancies among school girls who were receiving cash transfers and girls who were not (Bird *et al.*, 2010).

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The findings suggested that there was no difference between the two arms (the cash arm and the combined intervention arm) on school dropouts. However, consistently receiving cash transfers was shown to be a protective factor of school dropout rates. The findings also indicated that early marriages and adolescent pregnancies were some of the factors negatively affecting schooling.

The study found that factors that were associated with school dropouts were; age, being married or living with a boyfriend, ever giving birth and cash transfer receipt. The study also found that the proportions of adolescent girls who were married/cohabiting and the proportions of girls who had ever been pregnant increased at first and second follow ups compared to what was observed at baseline.

6.2 Recommendations

Based on the findings of this study, Recommendations: Based on the findings of this study, it appears like supporting girls in the way it was done in the study has some beneficial outcomes. It follows that policy makers should find ways of helping adolescent girls in this way. Cash transfers seems 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 ways to prevent early pregnancies.

Further research on this topic can be done focusing on the use of survival analysis to assess the time it takes for the girl to drop out of school given the intervention (cash transfers)

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APPENDICES

Appendix 1: Data Request Letter

University of Zambia,
School of Public Health,
P.O Box 50110,
Lusaka.
10th April, 2017

The Data manager
CISMAL RISE study.
Lusaka.

U.F.S: Dean,
School of Public Health,
P.O Box 50110,
Lusaka.

Dear Sir/Madam,

**RE: REQUEST FOR ACCESS TO DATA COLLECTED FOR CISMAL RESEARCH
INITIATIVE TO SUPPORT THE EMPOWERMENT OF GIRLS (RISE) STUDY**

Reference is made to the above subject.

I am a female student currently in my first year at the University of Zambia's School of Public Health pursuing a master of science in Medical Statistics. I am currently working on my protocol for which I am required to submit a dissertation to the university and to publish in peer reviewed journal as a requirement for completion of the program.

The aim of my study is to investigate the impact of cash transfers on adolescent girl's school dropout rates and to determine the factors that contribute to girls dropping out of school. The study is quantitative; in order to effectively determine the impact of cash transfers on school dropouts the study will employ data collected at different points in time on the same individuals. I am seeking permission to have access your data because the aim of the study will be sufficiently addressed using the data that was collected in the RISE study.

I would like to assure you that confidentiality will be highly ensured as the data will only be obtained in a de-identified state, and the data will only be used for the purpose of this study.

Awaiting your favourable response

Yours sincerely

A handwritten signature in black ink, appearing to read 'Mutale Sampha', with a stylized, cursive script.

MUTALE SAMPA

Appendix 2: Letter of Approval to Access Data



THE UNIVERSITY OF ZAMBIA SCHOOL OF PUBLIC HEALTH

Telephone: 252641,
E-mail: commmed@unza.zm

P.O. BOX 50110
Lusaka, Zambia

The Chair
UNZABREC
UNIVERSITY OF ZAMBIA

11th October, 2017.

Subject: Access to CISMALC RISE DATA for Mutale Sampa's study

Dear Sir or Madam:

It is with great pleasure that I write to acknowledge that the RISE study will allow Ms Mutale Sampa the masters student to access the necessary data for her study?

As the RISE study, we look forward to working with Ms Mutale Sampa.

Yours truly,

Professor Patrick Musonda (Principal Investigator, RISE study).

Appendix 3: Letter from the Supervisor



**THE UNIVERSITY OF ZAMBIA
SCHOOL OF PUBLIC HEALTH**

Telephone: 252641,

P.O. BOX 50110

E-mail: pmuzho@hotmail.com

Lusaka, Zambia

DATE: 03rd April 2019

**The Assistant Dean (Post Graduate)
The University of Zambia
School of Public Health
Ridgeway Campus
LUSAKA, ZAMBIA**

Dear Madam,

**RE: Addressing concerns arising from examiners following the dissertation submitted
by Ms Mutale Sampa**

This letter serves to confirm that I have looked at the corrections made by Ms Mutale Sampa in her dissertation following the examiners comments. I would like to state that all corrections have been addressed and the dissertation has been revised accordingly. I am unreservedly recommending the work done that the candidate has addressed all the comments that were raised in her dissertation.

This work can proceed to the necessary required stage.

Kind regards,
Yours Sincerely,

Professor Patrick Musonda
(Head of Department and Supervisor of Ms Mutale Sampa)

Appendix 4: Published Paper for the Study

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The Open Public Health Journal

Content list available at: www.benthamopen.com/TOPHJ/
DOI: 10.2174/1874944501811010507, 2018, 11, 507-515



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

Mutale Sampa¹, Choolwe Jacobs¹ and Patrick Musonda^{1,2,*}

¹*School of Public Health, Department of Epidemiology and Biostatistics, University of Zambia, Lusaka, Zambia*

²*Centre for Intervention Science in Maternal and Child health (CISMAC), Centre for International Health (CIH), University of Bergen, Bergen, Norway*

Received: September 18, 2018

Revised: October 31, 2018

Accepted: November 9, 2018

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

* Address correspondence to this author at the School of Public Health, Department of Epidemiology and Biostatistics, University of Zambia, Lusaka, Zambia; E-mail: pmuzho@hotmail.com

Appendix 5: Ethical Approval


THE UNIVERSITY OF ZAMBIA
BIOMEDICAL RESEARCH ETHICS COMMITTEE

Telephone: 260-1-256067
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Telex: UNZALU ZA 44370
Fax: + 260-1-250753
E-mail: unzarec@unza.zm
Assurance No. FWA00000338
IRB00001131 of IORG0000774

Ridgeway Campus
P.O. Box 50110
Lusaka, Zambia

3rd November, 2017.

Your Ref: 065-06-17.

Ms. Mutale Sampa,
University of Zambia,
Department of Epidemiology and Biostatistics,
P.O Box 50110,
Lusaka.

Dear Ms. Sampa,

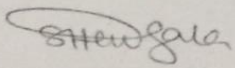
RE: RESUBMITTED RESEARCH PROPOSAL: "LONGITUDINAL DATA MODELLING OF THE EFFECTS OF CASH TRANSFER EXPENDITURE AMONGST GIRLS AND THEIR GUARDIANS ON SCHOOL DROPOUT RATES IN THE RESEARCH INITIATIVE TO SUPPORT THE EMPOWERMENT (RISE) OF GIRLS' TRIAL IN SELECTED DISTRICTS OF CENTRAL AND SOUTHERN PROVINCE" (REF. 065-06-17)

The above-mentioned research proposal was presented to the Biomedical Research Ethics Committee meeting on 12th October, 2017. The proposal is approved.

CONDITIONS:

- This approval is based strictly on your submitted proposal. Should there be need for you to modify or change the study design or methodology, you will need to seek clearance from the Research Ethics Committee.
- If you have need for further clarification please consult this office. Please note that it is mandatory that you submit a detailed progress report of your study to this Committee every six months and a final copy of your report at the end of the study.
- Any serious adverse events must be reported at once to this Committee.
- Please note that when your approval expires you may need to request for renewal. The request should be accompanied by a Progress Report (Progress Report Forms can be obtained from the Secretariat).
- Where appropriate, apply to National Health Research Authority for storage of samples before you embark on the study.
- **Ensure that a final copy of the results is submitted to this Committee.**

Yours sincerely,



Dr. S.H Nzala
VICE-CHAIRPERSON

Date of approval: 3rd November, 2017. Date of expiry: 2nd November, 2018.

Appendix 6: Summary of Variables

	Variable	Indicator	Type of Variable
Dependant	School dropout	In school or not in school	Binary
Independent	Received cash transfers	No, sometimes or Everytime	Categorical
	Shared cash transfer	Yes or No	Binary
	Girls age	Age in years	Continuous
	Girl married/ living with a boyfriend	Yes or No	Binary
	Girl ever given birth since baseline	Yes or No	Binary
	Girl living with biological parents	Yes or No	Binary
	Intervention Arm	economic intervention or combined intervention	Binary
	date of Event	Enrolment, 1 st follow up and 2 nd follow up	Categorical
	School		categorical

Appendix 7: Data Extraction Tool

Variable	Questions	Responses
Girl in school	Are you currently going to school?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Cash transfer	In the last 6 months, did you receive the monthly cash transfer from the project	<input type="checkbox"/> Yes, every month <input type="checkbox"/> Yes some months <input type="checkbox"/> No <input type="checkbox"/> Don't know
Girls age	What is your date of birth?	Date of birth
The school the girl goes to.	Name of school	Name of school
Is the girl living with biological parents	What is your relationship to the girl?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Girl married/ living with boyfriend	Are you married or living with a boyfriend?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Girl ever been pregnant	Have you ever been pregnant?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Girl ever given birth since baseline	Have you ever given birth?	<input type="checkbox"/> Yes <input type="checkbox"/> No
The district the school belongs to.	District name	District name