

## **Improving Health through Education:**

**The impact of school feeding and other school-based health interventions on dropout rates in primary education of girls in developing countries.**

**Jorien Nijland**

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Royal Tropical Institute  
Development, Policy and Practice  
Vrije Universiteit Amsterdam  
Amsterdam, The Netherlands

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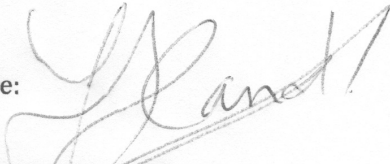
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## **Table of contents**

Abstract	iv
Abbreviations	v
Definitions	vi
List of tables and figures	vii
<b>1. Introduction</b>	<b>1</b>
1.1 School-based health interventions	2
1.2 School feeding	2
<b>2. Problem Statement</b>	<b>4</b>
2.1 Girl's education	4
2.2 Nutrition	5
2.3 School-based health interventions	6
2.3.a Health outcomes	6
2.3.b Educational outcomes	7
2.3.c Gender outcomes	7
2.4 This Study	9
<b>3. Objectives</b>	<b>10</b>
3.1 General objectives	10
3.2 Specific objectives	10
<b>4. Methods</b>	<b>11</b>
4.1 Framework	11
4.2 Literature search	12
4.3 Search engines	12
4.4 Search terms	12
4.5 Target group	13
<b>5. Results</b>	<b>14</b>
5.1 Education	14
5.2 Programs preventing dropout	16
5.2.a Impact of school feeding on dropout	16
5.2.b Impact of other school-based interventions on dropout	18
-Deworming	18
-Malaria prevention	19
-Water, Sanitation and Hygiene	20
-Sexual and Reproductive Health education	22
5.3 Other interventions to prevent dropout	27
5.4 Reasons to dropout	30
5.4.a Reasons to dropout: the girl	30
5.4.b Reasons to dropout: the household	31

5.4.c Reasons to dropout: school environment	31
<b>6. Discussion</b>	<b>33</b>
<b>7. Conclusion</b>	<b>37</b>
<b>8. Recommendation</b>	<b>38</b>
<b>9. References</b>	<b>40</b>

## **Abstract**

Many girls in developing countries face gender inequality in life every day: they still have lower access to health facilities than men. And although enrolment rates for girls in developing countries are increasing, rates are still lower than boys' enrolment rates.

Education for girls can lead to a wide range of benefits, from improved maternal health, reduced infant mortality and fertility rates to increased prevention against HIV/AIDS.

Preventing girls from dropping out of school is an important tool to improve school completion rates and reach higher levels of girls education. Dropping out of school is a long-term process and many reasons can provide the final push to dropout of school. This can be lack of resources for school costs, cultural and religious aspects, teenage pregnancies, lack of sanitary facilities, school environment or being no longer interested in school for examples.

School feeding and school-based health interventions as deworming, malaria prevention, WASH promotion and sexual and reproductive health education are all interventions to improve health and educational outcomes. For the impact of school feeding on the educational outcomes school enrolment and school attendance many has been written. However, the evidence is ambiguous.

This study investigates the impact of school feeding and school-based interventions on the educational outcome "dropout of school". Little has been written about this impact and evidence is unclear. To prevent a girl from dropping out of school in developing countries, more research should be done, taking into account the factors that are influencing the decision of dropping out.

Keywords:

dropout, girls, developing country, school feeding, school-based health interventions

## **Abbreviations**

AIDS	acquired immunodeficiency syndrome
EFA	Education for All movement'
FFE	Food for Education
FRESH	Focusing Resources on Effective School Health
GCE	Global Campaign for Education
HGSF	Home-grown school feeding
HIV	human immunodeficiency virus
IDA	iron-deficiency anaemia
ITNs	insecticide treated nets
IPT	intermittent preventive treatment
MDGs	Millennium Development Goals
NGO	non-profit organization
SRH	Sexual and Reproductive health
STDs	sexual transmitted diseases
UNESCO	United Nations Educational, Scientific and Cultural Organization
WASH	water, sanitation and hygiene programs
WFP	World Food Program

## **Definitions**

### **Attendance rate:**

Number of children who attend primary school.  
(UNICEF)

### **Deworming:**

A treatment to control the intestinal worm infections such as helminths (roundworm, ringworm and hookworm) and schistosomiasis.  
(The State of School Feeding Worldwide, WFP 2013.)

### **Enrolment rate:**

Number of children enrolled in primary school.  
(UNICEF)

**Fortification/supplementation:** The practice of deliberately increasing the content of essential micronutrients (such as Vitamin A, iron, iodine or zinc) to foods.

(The State of School Feeding Worldwide, WFP 2013)

### **Intermittent preventive treatment** of Malaria infection:

The periodic mass administration of a full therapeutic course of an antimalarial drug, irrespective of infection status.

(Effect of intermittent preventive treatment of malaria on health and education in schoolchildren. Clarke et al. 2008)

### **School meals:**

- In-school feeding: children are fed in school
- Take-home rations: families are given food if their children attend school

(The State of School Feeding Worldwide, WFP 2013)

## **List of tables and figures**

### **Tables:**

Table 1. Number of students (in millions) worldwide enrolled in school from primary to tertiary education, 1970, 2000 and 2009.

Source: UNESCO Institute for Statistics and United Nations Population Division.

Table 2. Decline of percentage of female out-of-school children of primary age, by region and worldwide, 1990-2009.

Source: UNESCO Institute for Statistics and United Nations Population Division.

Table 3. Annual dropout rates, 1999-2000,

Source: The Food for Education Program in Bangladesh: an Evaluation of its Impact on Educational Attainment and food security. Ahmed et al. 2002

table 4. Models of average school enrolment in hypothetical schools with different types of FFE programs.

Source: Does provision of food in school increase girls' enrolment? Evidence from schools in sub-Saharan Africa. Gelli et al. 2007.

Table 5. Impact of the Dropout Intervention Programs on Schooling Outcomes.

Source: Student Outcomes in Philippine Elementary Schools: An Evaluation of Four Experiments, Tan et al. 1999.

Table 6. Pupil-reported 2-week absence at baseline and follow-up by intervention status and geographical strata.

Source: Assessing the impact of school-based water treatment, hygiene and sanitation programme on pupil absence in Nyanza Province, Kenya: a cluster-randomized trial, Freeman et al. 2012.

Table 7. Attendance rates at period and non-period days.

Source: Menstruation, Sanitary Products and School Attendance: Evidence from a Randomized Evaluation, Oster et al. 2010.

### **Figures:**

Figure 1. School Feeding Beneficiaries around the world.

Source: World Food Programme. State of School Feeding Worldwide 2013

Figure 2: School feeding Investment Case Framework

Source: World Food Program, School Feeding: The Investment Case User's Manual, 2011.

Figure 3: Dropout rates high in two out of three sub-Saharan countries.

Source: World Atlas of Gender Equality in Education, UNESCO 2012

Figure 4: Drop Out Rates by Grade in Primary School in Africa.

Source: UNESCO (2006)

Figure 5: Drop Outs by Grade in Primary School in South Asia. Source: UNESCO (2006)



Figure 6: Percentage of women who know main ways to prevent HIV transmission.

Source: Learning to Survive: How Education for All Would Save Millions of Young People from HIV/AIDS. GCE 2004.

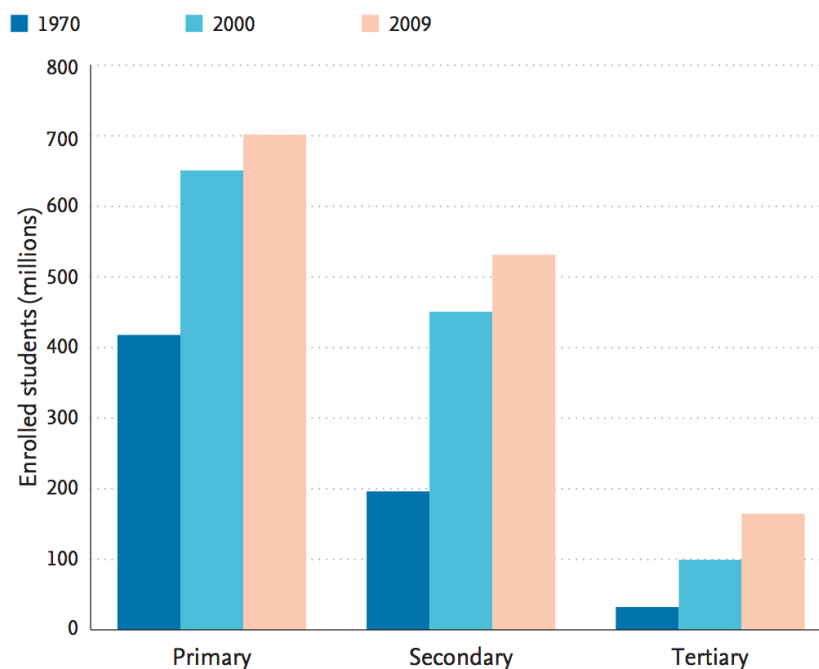
Figure 7. Health and Nutrition Interventions throughout Childhood Contribute to Education Outcomes.

Source: Rethinking school health, Bundy 2011.

## 1. Introduction

Reaching the year 2015 with rapid strides one can already carefully draw conclusions on reaching the targets of the Millennium Development Goals (MDGs). Most MDGs will not be reached by 2015 looking at the overall goals. But looking more into detail one can see great achievements have been made so far: although the goals will not be reached in 2015, Maternal and Child mortality has declined dramatically by almost 50% from the year 1990 till today (UN MDGs 2013abc).

The MDG targeting education, MGD2: “ACHIEVE UNIVERSAL PRIMARY EDUCATION”, has almost achieved its goal. Primary education enrolment in developing countries is 90% in 2010. From 2000 to 2011 the number out-of-school children dropped from 102 million to 57 million (UN MDGs 2013abc). The decades last millions of children have started with primary school (table 1).



Source: UNESCO Institute for Statistics and United Nations Population Division

Table 1. Number of students (in millions) worldwide enrolled in school from primary to tertiary education, 1970, 2000 and 2009

One of the initiatives that have made a huge contribution the MDG2, Universal Primary Education, is the ‘Education for All movement’ (EFA). In 1990, 155 countries launched this movement to provide quality basic education for all children, youth and adults. In 2000 the EFA (UNESCO, 2000) concluded much more needed to be done to achieve universal education. In this context the EFA set up a framework for school health programming, the ‘Focusing Resources on Effective School Health’ (FRESH) with the belief that “the goal of universal education cannot be achieved while the health needs of children and adolescents go unmet; and second, that a core group of cost- effective activities can and must be implemented, together and in all schools, in order to meet those needs and thus deliver on the promise of Education for All”.

With these school-based health interventions, schools can be made healthier for children, children more able to learn and Education for All more likely to be achieved” (UNESCO 2002).

### **1.1 School-based health interventions**

Some of the most common health conditions of school-aged children can affect learning and educational outcomes:

Malaria and worm infections are widespread in many developing countries and can lead to increased school absence. Hunger and malnutrition with anaemia and other micronutrient deficiencies due to poor diet can affect cognition and learning abilities. Lifestyle behaviours as drugs and alcohol abuse affect learning outcomes. Unprotected sex increases risk of sexual transmitted diseases like the human immunodeficiency virus (HIV) and can also lead to unplanned pregnancy. This will influence educational outcomes in a negative way (Bundy 2011).

School-based health intervention programs focus on these health conditions. Many programs that are used include one or more of the following interventions: deworming, malaria prevention, water, sanitation and hygiene promotion (WASH), micronutrient supplementation, school feeding programs, Sexual and Reproductive health (SRH) education (including HIV and acquired immunodeficiency syndrome (AIDS) education).

The number of developing countries that are implementing the school-based health interventions is rising; in sub-Saharan Africa the percentage rose from 4% in 2000 to nearly 50% in 2008. In South and East Asia the number of countries doubled in the same period (Bundy 2011).

Costs of the interventions vary considerably; “only a few U.S. dollar cents per child per annum for iodization of salt, deworming, chlorine water treatment, and iron supplements; several dollars for bed nets and hand washing; and 40 to 50 dollars for school feeding and some medical referrals” (Bundy 2011).

### **1.2 School Feeding**

School feeding is one of the oldest school-based interventions and is often part of a broader school-based health program including deworming and fortification of the school meals.

It is implemented worldwide in many schools and reaches millions of children every day: “at least 368 million children in the world are daily fed when they are at school” (WFP, 2013). (fig.1)

The goal of school feeding is to “generate greater impacts on school enrolment and retention rates and reduce gender or social gaps” (WFP 2013). Besides this goal, the program has multiple benefits; it increases children’s access to education and their learning abilities. The program support families through the provision of food and maintains the nutritional status and overall health of children. Unfortunately were “the need is the greatest, in terms of hunger, poverty and poor social indicators, this is often in the most food-insecure regions, the programs tend to be the smallest” (WFP 2013).

Some countries give meals to all students, other focus on vulnerable students (often girls, children with HIV/AIDS). Other countries combine the two: in-school meals for all children and take-home rations for the more vulnerable students.

Most developing countries get their school feeding from donor support. To establish more sustainability in their school feeding programs and to stimulate their local economy, more and more countries transfer from donor support to locally sourced food. This so called Home-Grown School Feeding program (HGSF) links school feeding to local agriculture development through the use of locally produced food.

This paper will investigate the impact of school feeding and other school-based health interventions on educational outcomes. The paper will briefly explain the programs and describe possible health outcomes of the programs as well.

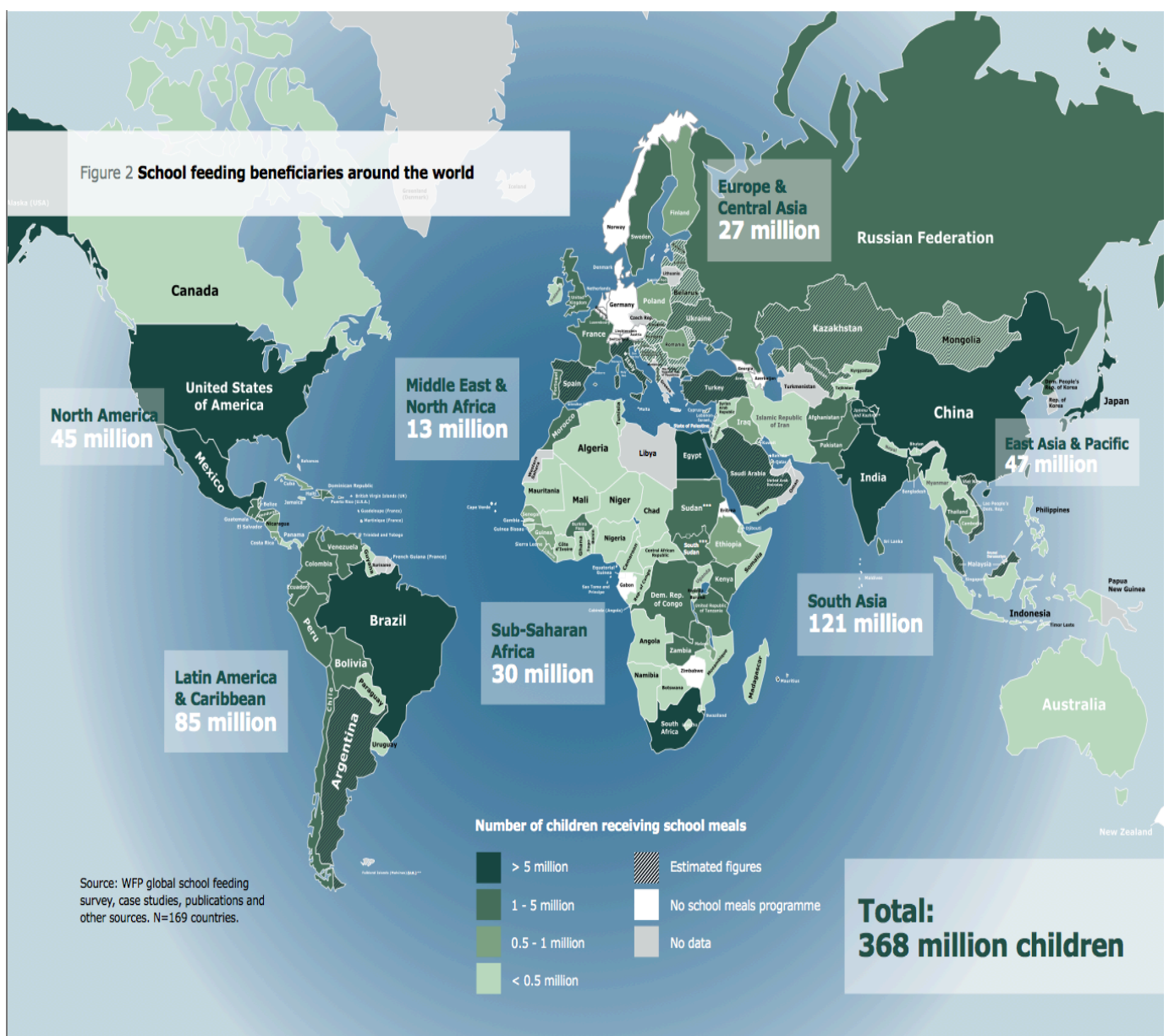


Figure 1. School Feeding Beneficiaries around the world.  
Source: World Food Programme. State of School Feeding Worldwide 2013

## **2. Problem Statement**

Many women and girls in developing countries face gender inequality in life every day. Even though tremendous efforts have been made to narrow this disparity, women and girls still have lower access to health facilities than men even though they are more at risk for some life-threatening conditions:

In countries where the HIV/AIDS epidemic is high, young girls are more at risk than boys of their age to become infected.

Early marriage often leads to early childbearing, which increases the risks of maternal mortality. "Complications during pregnancy or childbirth are one of the leading causes of death for adolescent girls. Most maternal deaths in developing countries are preventable through adequate nutrition, proper health care, including access to family planning, the presence of a skilled birth attendant during delivery and emergency obstetric care" (UN MDGs 2013c).

In most sub-Saharan countries there are still low levels of skilled birth attendance bringing the region to the highest maternal mortality ratio in the world.

To fight these gender issues for women and girls, education is one of the major possibilities to reduce this inequality:

"Education for girls is key to reducing maternal mortality. The risk of maternal death is 2.7 times higher among women with no education, and two times higher among women with one to six years of education than for women with more than 12 years of education" (UN MDGs 2013c).

The World Bank says in this context: "Women with some formal education are more likely to seek medical care during pregnancy, ensure their children are immunized, be better informed about their children's nutritional requirements, and adopt improved sanitation practices. As a result, their infants and children have higher survival rates and tend to be healthier and better nourished." (World Bank, 2011).

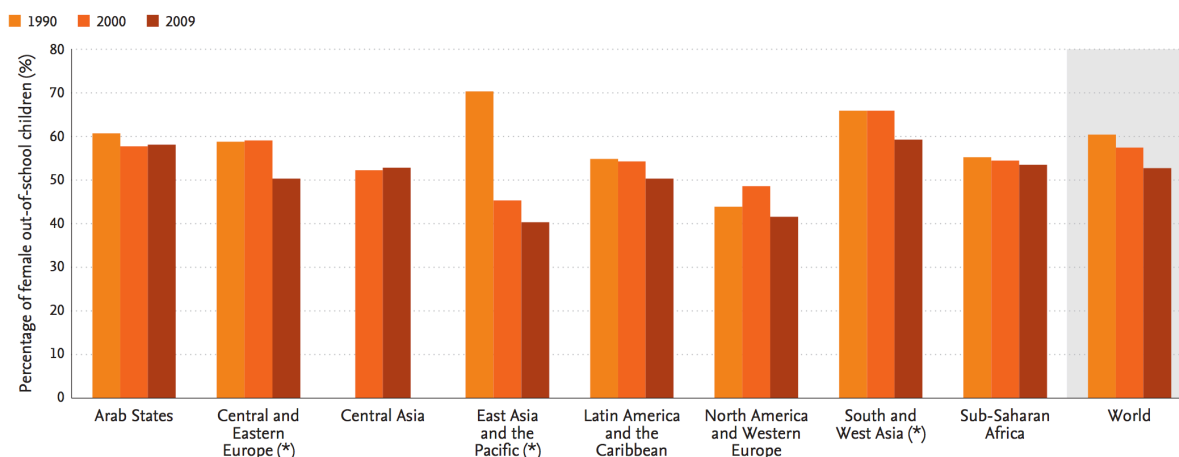
Both the EFA and the MDGs recognize the crucial role education plays in reducing poverty and sustainable human development. Both documents emphasize the importance of gender equality in education to reach their goals. "The education of girls and women can lead to a wide range of benefits – from improved maternal health, reduced infant mortality and fertility rates to increased prevention against HIV and AIDS. For this to happen, we need to target the gender gap at every level". (UNESCO 2012).

### ***2.1 Girl's education***

So education is an important determinant of health and can also reduce many gender disparities. The EFA aims for gender equality in primary education and this has been partly successful;

Sub-Saharan Africa had a dramatic fall in out-of-school children from 41% in 1999, to 23% in 2009. Girls' enrolment rates are increasing faster than that of boys. In most countries the gender gap is narrowing. However there are still millions of children out of

school and the majority of them are girls. The decline of girls who are out-of-school is the lowest in sub-Saharan countries (table 2) (UNESCO 2012).



Note: (\*) 1990 data for Central and Eastern Europe refers to the year 1993; 2009 data for East Asia and the Pacific refer to 2007; 2009 data for South and West Asia refer to 2008  
Source: UNESCO Institute for Statistics

Table 2. Decline of percentage of female out-of-school children of primary age, by region and worldwide, 1990-2009.

## 2.2 Nutrition

Another determinant of health is nutrition. Lack of dietary diversification and access to food can lead to malnutrition. Either malnutrition manifested as growth faltering (stunting), as thinness (wasting) or as micronutrient deficiencies or a combination of these. Vitamin A, iodine, zinc and iron, are examples of essential micronutrients. Low levels of vitamin A increases the risk of infections and may ultimately lead to blindness. Iodine is needed for the brain development of the foetus; deficiency can lead to lower IQ. Zinc is needed for the development of the central nerve system and helps the immune system to protect against infections. Iron is essential for producing haemoglobin, the motor of cognitive development in childhood and physical activity. In pregnant women iron demands are higher and supplementation can help to lower the risk of premature birth and low birth weight. Sufficient iron levels during the first years of life are essential for cognitive development. (Micronutrient Initiative 2009).

Stevens et al. (2013) found in their analysis that anaemia still is a major concern in developing countries. Although haemoglobin levels slightly improved from 1995 to 2011 and anaemia prevalence decreased, 273 million children, 496 million non-pregnant women and 32 million pregnant women still suffer from anaemia in 2011 throughout the world. Of them most live in central and west Africa and south Asia.

Poor nutrition is a vicious circle in developing countries. Insufficient and unbalanced diets lead to malnutrition. Malnourished mothers are more at risk to bear children with low birth weights. These children are more at risk of being stunted; stunted children are more likely to become stunted as an adult. And stunted women are more likely to have smaller babies at birth (Gillespie et al. 2000).

The first 1000 days of life (from conception to the first 24 months of life) are seen as the window of opportunity. Within this small period “damage to physical growth, brain development, and human capital formation is extensive and largely irreversible. Therefore interventions must focus on this window of opportunity. Any investments after this critical period are much less likely to improve nutrition” (Shekar 2006).

### ***2.3 School-based health interventions***

The introduction section already explained the most common health problems in school-aged children. For girls, these health conditions can be even a bigger burden; girls are more likely to have anaemia than boys and are more at risk of HIV infection due to physiological reasons (Bundy 2011). Also when starting menstruating, lack of safe water and sanitary facilities can be negatively affect girls.

School-based interventions that are aiming at health, educational and nutritional outcomes, are all important for overall health.

Through deworming and malaria prevention programs, anaemia can be reduced in girls. Also fortification of school meals with iron can contribute to a reduction in anaemia. Water, sanitation and hygiene programs can decrease worm- and other infections but can also safeguard proper sanitation for menstruating girls. SRH education can raise awareness among girls of their vulnerability to adolescent pregnancies, HIV and other sexual transmitted infections.

Many studies describe the impact of school feeding programmes on health and educational outcomes. The results vary widely and the overall picture is not clear. There are few studies that have a specific focus on gender differences in school feeding programmes.

To indicate what differences and ambiguities in the literature can be found about the impact of school feeding on health, educational outcomes and gender differences, a brief description follows below.

#### *2.3.a Health outcomes*

Most school-aged children in developing countries suffer from iron deficiency anaemia (IDA) due to malaria, worm infections and/or poor nutrition. The prevalence of anaemia in central and west Africa, east Africa and south Asia is at least 55% among all children. Severe anaemia is associated with worse mortality and adverse cognitive outcomes, mild anaemia can cause tiredness. In central and west Africa and east Africa 10% of the children suffer from severe anaemia; in south Asia this is 6% (Stevens et al. 2013). Suffering from IDA and other micronutrient deficiencies in younger years has a long-term impact on cognitive development and these negative effects can still be measured at school age (Bundy 2011).

School meals are mostly fortified with essential micronutrients and combined with deworming to lower the micronutrient gap.

Many have studied the effects of these micronutrients on cognitive performance. A distinction in short-term and long-term effects of nutrition can be made.

These effects of nutrition on cognition in school-aged children have also been questioned;

Khor et al. (2012) found in their review “a lack of consistency in the impact of micronutrient supplementation on intelligence, long term mental functions and school examination grades of the children. A beneficial effect of micronutrient supplementation on short-term memory was more consistently reported”.

Short-term effects of nutrition on cognition and achievement can be due to the simple fact that taking away hunger with a meal improves paying attention at school. And in this way school results can improve.

A study on the effects of the provision of breakfast showed that undernourished children seemed to improve in cognitive functions after eating breakfast. In contrast, adequately nourished children did not show this effect. In this study, researchers were wondering if results were influenced by the quality of the school itself (Grantham-McGregor et al 1998).

The long-term effects of nutrition on cognition in schoolchildren were not clear in the literature. It seems that long-term effects of nutrition on cognition can only take place in early childhood, ‘the window of opportunity’ (Shekar 2006).

### *2.3.b Educational outcomes*

For the effect of school feeding on school enrolment and attendance literature is not clear and sometimes even inconsistent:

While the World Food Programme (2013) states that school feeding through in-school meals can improve enrolment rates, others found this effect would only be stable if the programme consisted of both in-school and take-home meals (Gelli et al., 2007).

School feeding programmes in Bangladesh (Ahmed 2004) gave an increase of school enrolment by 14.2%. The impact on school attendance in this study is positive though small: an increase of 6% in total school days a month.

And Abotsi (2013) discovered *enrolment* would increase with a school feeding programme but for school *attendance* there was no statistically significant difference with or without a programme.

Alderman et al. (2010) conclude after their research on the impact of enrolment of two different methods of school feeding (namely in-school meals and take-home rations) that, in general, both programmes performed similarly well. And their results suggest that school feeding programs remain an effective strategy for attracting children to school, though not all findings were statistically significant.

### *2.3.c Gender outcomes*

Most studies on school feeding programmes do not make a clear distinction between boys and girls, though most programmes initially started with the aim to increase enrolment of girls. Some studies see a positive effect on girl’s enrolment through the provision of take-home rations. Girl’s enrolment rates would reduce again after a year



with only in-school meals and figures would be the same as the ones before implementation of the programme (Gelli et al. 2007).

Bundy (2011) says that “there are many different ways in which school health and nutrition interventions can help address gender imbalances in education. Women and girls are, for physiological reasons, more likely to experience higher rates of iron-deficiency anaemia. Two of the most common school-based interventions, deworming and iron supplementation, each address anaemia directly and therefore offer particular benefits to girls”.

Considering all above, there maybe some evidence of a positive impact of school feeding programs on school enrolment. For school attendance the findings in literature were mostly not statistically significant and sometimes contradicted each other. Some studies strongly lean on the benefits of food to attract children into school, not taking into account possible other factors that can influence school enrolment.

Moreover most countries have universal primary education now and especially after abolishment of school fees, enrolment rates have been strongly influenced by these developments (Glewwe et al 2005).

Although school feeding programs have as aim to improve girl’s education there are no clear evidence based findings for this.

Apparently the impact of school feeding programmes on educational and gender outcomes is not as strong as it might seem.

This is also confirmed by Adelman et al. (2008) with their ‘Critical Assessment’ on the effectiveness of Food for Education Programmes (FFE, school feeding by the World Food Programme). They examined the economic motivation for the use of FFE programmes to increase investments in education and nutrition.

Their conclusions are that there is a lot of literature on the subject but little is of high quality. For educational outcomes they found:

- Small effects on school attendance for children already enrolled in school.
- Evidence on enrolment was insufficient.
- Proof of effects on grade repetition and dropout rates is inconclusive.
- Learning achievement and cognitive development can possibly be influenced but again, evidence is weak.

FFE programmes can improve nutritional status by closing the micronutrient gap but will not reverse damage caused by nutrient deficiencies earlier on in life. There is lack in studies of careful estimates of cost-effectiveness.

They also conclude that the impact of Food for Education Programmes can be larger in areas where school participation is low and nutrient deficiencies are significant. The suggestion is made that other programmes to improve school quality might be more cost effective than Food for Education Programmes. This needs to be further investigated.

## ***2.4 This Study***

Looking at findings of school feeding programmes and their impact on overall health, educational outcomes and gender aspects, a lot has been written already. For this study it would be difficult to come with new evidence, especially keeping in mind the extensive work Adelman et al. have done. More interesting is to look at the gaps in the literature written about school-based health interventions and school feeding; dropout and completion rates for example. Less has been written about these aspects of education.

Dropout and completion rates of girls probably say much more about their education than enrolment and attendance do. They tell more about the quantity of schooling; how many girls actually finish primary school and had education for a longer period. As said before the more educated a girl is, the more this will influence her health in a positive way. In general better-educated women marry later, get lesser offspring and have better health. Also their children will be more educated and will have better health.

So keeping a girl in school will give her more education and in the end a better overall health.

School feeding programmes pretend to decrease dropout rates for girls and so increase completion rates. In most studies this is not well investigated. This study wants to give an overview of the literature on the impact of school-based health and nutrition interventions, with a focus on school feeding programmes, on dropout rates in primary education of girls in developing countries.

By mapping causes that influence the decision to drop out of school, future programmes can focus on these causes to keep girls in school. In this way the overall health of these girls will be improved through more education.

Because dropout rates by definition have a negative impact on completion rates, this study will only focus on factors that may influence dropout rates and keep in mind this will have an impact on completion rates as well.

### **3. Objectives**

#### ***3.1 General objective***

To investigate if school-based health interventions and school feeding have an impact on dropout rates of primary school girls in developing countries.

#### ***3.2 Specific objectives***

To assess if school feeding programmes have an impact on dropout rates of primary school girls in developing countries.

To examine if other school-based health interventions other than school feeding, have an influence on dropout rates of primary school girls in developing countries.

To investigate factors that can affect dropout rates of primary school girls in developing countries.

## 4. Methods

### 4.1 Framework

The World Food Programme (WFP) is a major partner when it comes to school meals, often referred to as 'Food for Education'.

In their User's Manual 'School Feeding, the Investment Case' the WFP uses an analytical framework (fig. 2.) "to assess the monetary cost and economic benefits of providing school feeding and to identify the value created in terms of increased education, improved health and nutrition and value transfer to the beneficiaries".

The framework implies that school feeding with deworming improves education, nutrition and health, which lead to higher productivity and longer life expectancy. Furthermore the free meals save money from households and this can be used for other investments (WFP 2011).

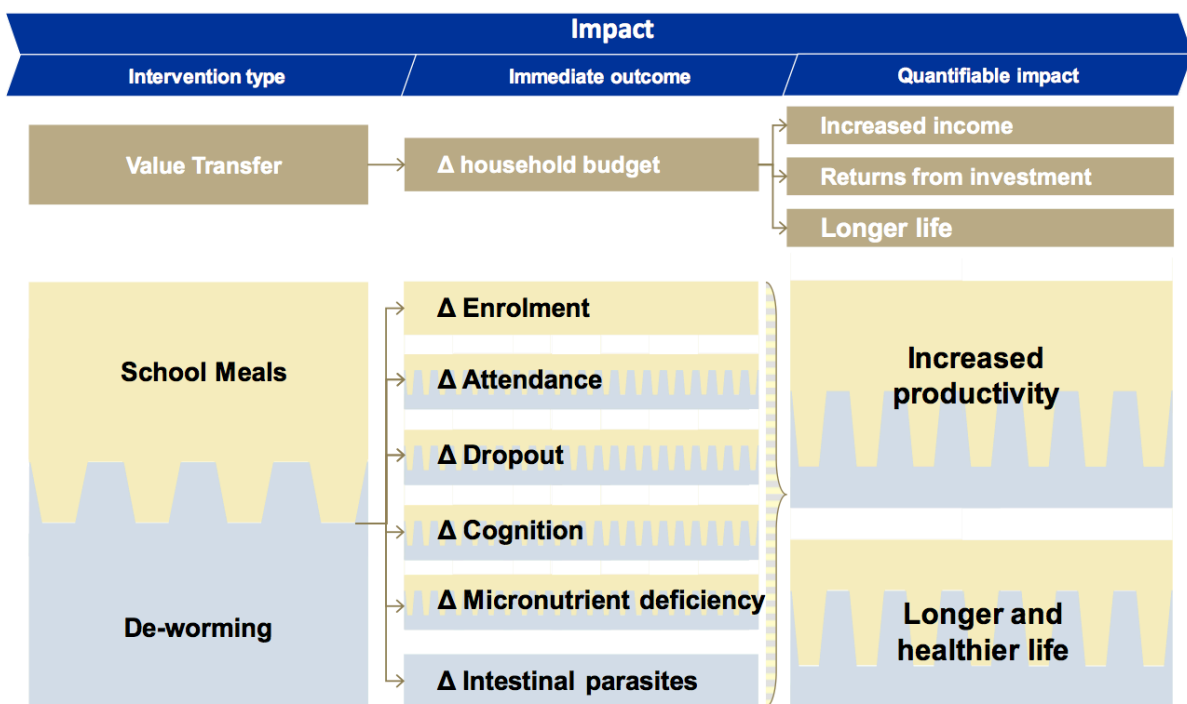


Figure 2: School feeding Investment Case Framework  
World Food Program, School Feeding: The Investment Case User's Manual, 2011.

Although this framework is used by the WFP only for advocacy purposes and not for programme design, this study will use the part with school meals and deworming as intervention type for its literature review.

The researcher thinks the use of the framework is justified because the overall goal of school feeding is to generate greater impacts on school enrolment and retention rates (and so reduce dropout rates) and reduce gender or social gaps. These outcomes of school feeding are the same outcomes as used in the framework.

## **4.2 Literature search**

Looking at the literature, the impact of school feeding on the outcomes of the framework (enrolment, attendance, dropout, cognition, micronutrient deficiency and intestinal parasites) is unclear for most of them. This is already described in the chapter problem statement above. There seems to be a gap in the literature on the impact of school feeding programmes on the dropout rates of girls in primary school in low-income countries.

Enrolment rates are improving for girls in developing countries, but do these girls actually finish their education?

Dropout rates give an indication how many girls are likely to not finish primary education. Education is an important tool to improve health and reduce gender disparity:

“The education of girls and women can lead to a wide range of benefits. From improved maternal health, reduced infant mortality and fertility rates to increased prevention against HIV and AIDS. For this to happen, we need to target the gender gap at every level”. (UNESCO, 2012).

Finding the main causes of dropping out from school can lead to an effective way of reducing dropout rates to improve girl’s health and that of the future generations.

This study wants to assess what is known about the impact of school feeding on dropout rates of girls in developing countries. Do other school-based health interventions, like deworming, malaria prevention, WASH promotion and SRH education influence the decision of a girl to drop out of school? What are the reasons for a girl to dropout of school? Are these reasons the same as the outcomes where school feeding and other school-based interventions are aiming at?

The study will try to see if it is possible to conclude if school feeding programmes are the major factor that can reduce dropout rates of primary school girls in developing countries. At the end it will give recommendations on ways to reduce dropout rates of these girls and in this way improve their health with more education.

There were many significant changes in education worldwide last decades; earlier studies probably don’t give a correct image of current conditions. That is why only literature studied from the period 1998 to 2013 has been studied.

Literature reviewed is in English and consists of published articles, grey literature and internet web sites. Also references of articles found were looked up and some were used for this study. Articles that were used can all be found on the internet.

Literature search was for developing countries in general; however most studies that have been found were about sub-Saharan countries. Most of literature in this study will be on these countries unless indicated otherwise.

## **4.3 Search engines**

Pubmed (MEDLINE), Google Scholar, Google.

## **4.4 Search terms**

“School feeding”, “school meals”, “school food”, “Food for Education”, combined with:

“dropout rates developing countries”, “dropout rates low-income countries”.

All these terms above combined with “girls”.

“Water+ Sanitation+ Hygiene” combined with “school”

“sanitation” combined with “girls”

“cash for education” combined with “low-income countries”

“deworming” combined with “low-income countries” and “school”

“deworming” with “dropout”

“School-based health” with “dropout”

“School-based health” with “developing countries”

#### ***4.5 Target group***

This paper targets decision makers and other parties involved in improving health for girls in developing countries.

By looking at education possibilities for girls and ways to reduce dropout rates, the education levels will increase. More education leads to better nutrition, improves health and reduces poverty.

This will give higher productivity and can influence a country's economy in a positive way.

A better insight will be given in reasons why girls drop out of school. Knowing these reasons, existing programs that claim to reduce dropout rates, have to look critically at their outcomes and see if these match with the findings in this paper.

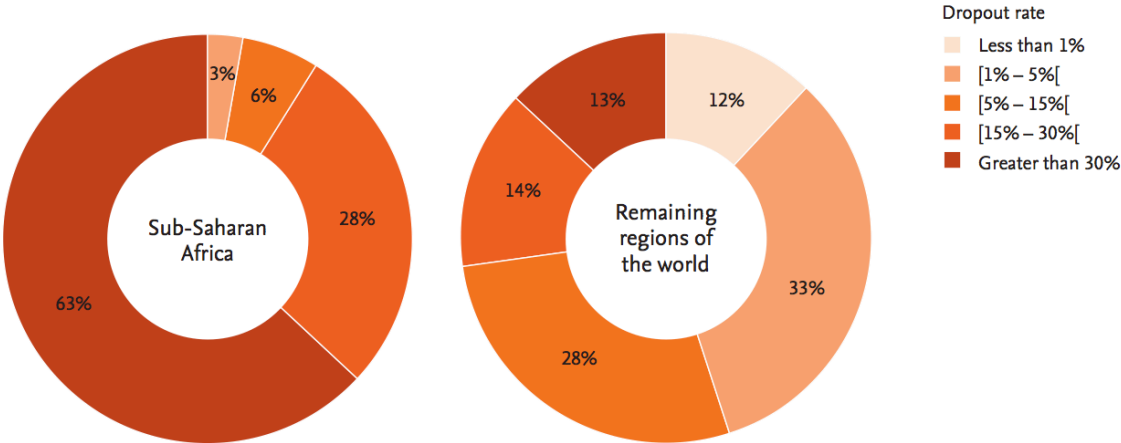
**5. Results**

**5.1 Education**

While universal enrolment for primary education is increasing from 2000 to 2011 the number out-of-school children dropped from 102 million to 57 million, the numbers for dropout are not that cheerful (UN MDGs 2013b).

Dropout rates vary widely within countries and regions; for 63% of sub-Saharan countries rates are even greater than 30%, while only 13% of the remaining regions of the world have such rates (fig.3).

Percentage of countries according to dropout rates in primary education for sub-Saharan Africa and the remaining regions of the world, 2009



Source: UNESCO Institute for Statistics

Figure 3: Dropout rates high in two out of three sub-Saharan countries. Source: World Atlas of Gender Equality in Education, UNESCO 2012

In sub-Saharan countries most dropouts are in grade 1, reducing in the next grades and tending to rise again in grade 5. In South Asian countries dropout rates are the highest in grade 1 and stabilize afterwards (fig.4, fig.5) (Hunt 2008, UNESCO 2012).

Differences between boys and girls in dropout rates are in favour of girls: boys seem to dropout of primary school more often than girls. Often the number of boys enrolled decline in the later grades. Nevertheless completion rates for girls are still lower than for boys. This can be explained by a lower enrolment rate for girls. Completion rates increase worldwide with large gains for sub-Saharan countries: from 47% to 64% for girls and from 55% to 71% for boys since 1999 to 2009 (UNESCO 2012, Morara et al. 2013).

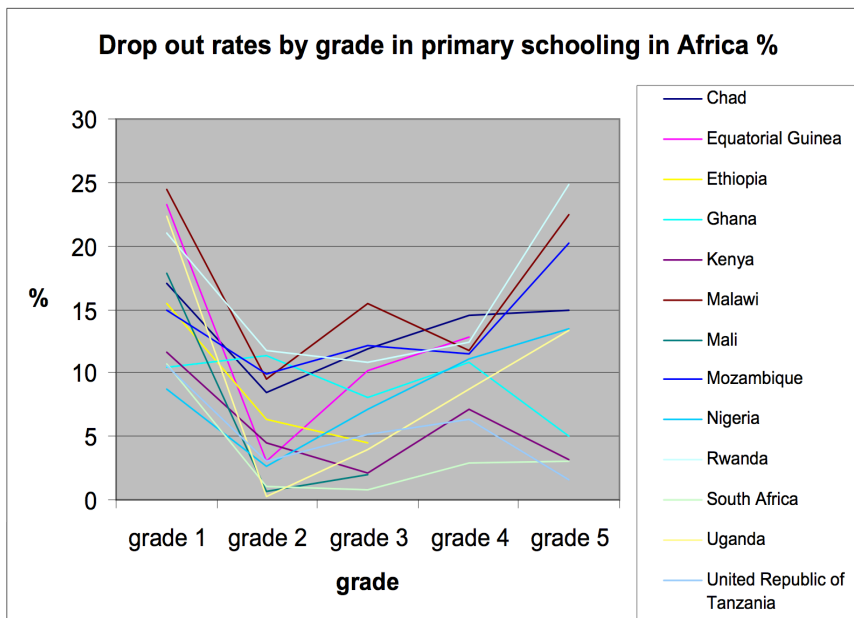


Figure 4: Drop Out Rates by Grade in Primary School in Africa. Source: UNESCO (2006)

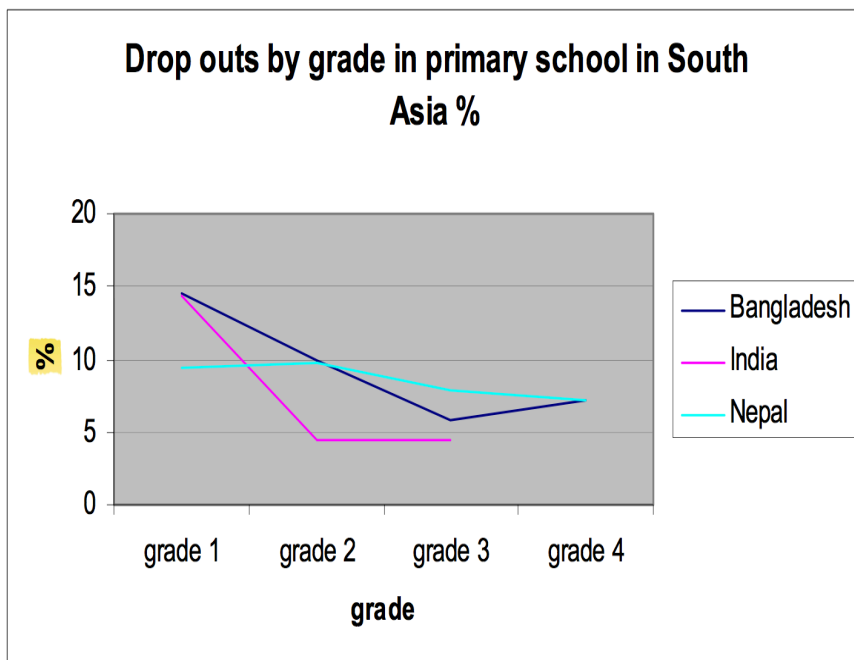


Figure 5: Drop Outs by Grade in Primary School in South Asia. Source: UNESCO (2006)



## 5.2 Programs preventing dropout

The literature describes different factors that are preventive for dropping out of school. Educational status of parents or caregivers is associated with fewer dropouts: the more educated the lower the risk of dropping out from school. Smaller family-size also seems to decrease the risk of dropping out compared to larger families. A girl is more likely to return to school instead of dropping out after a pregnancy when she lives with an adult female. (Grant 2006, Morara 2013).

There are several programs that have as goal the prevention of dropping out from school. These include school-based health program with different interventions, like school feeding, deworming, malaria prevention and WASH or SRH education.

First the outcomes of a literature search on the impact of school feeding on dropout rates will be presented. Hereafter the impact of school-based deworming, malaria prevention, WAHS programs and SRH education on dropout rates is given. Other factors that can prevent a girl from dropping out of school will be explored at the end of this study.

### 5.2.a Impact of school feeding on dropout:

Little has been written about school feeding and the impact on dropout rates. Ahmed et al (2002) found in their evaluation of the FFE program in Bangladesh that 7% of girls who received school feeding dropped out compared to 15% who did not received the food in the same school. Schools with no school feeding programs had dropout rates for girls of 11% (table 3).

The authors stated that the FFE program became a “victim of its own success”. By encouraging children to attend school, the student-teacher ratio was higher than for the control schools. On average the control schools had 62 students per teacher and the FFE schools had 76 students per teacher.

	Government schools	Nongovernment schools	All schools
	(dropout rates in percent)		
<i>FFE schools (all students)</i>			
All students	10.4	12.5	10.9
Boys	9.6	13.5	10.5
Girls	11.1	11.6	11.2
<i>FFE schools (FFE beneficiary students)</i>			
All students	5.3	10.1	6.3
Boys	4.5	7.7	5.2
Girls	6.1	12.2	7.4
<i>FFE schools (Non-FFE beneficiary students)</i>			
All students	15.0	14.6	14.9
Boys	13.9	18.3	14.9
Girls	16.2	11.1	14.9
<b>Non-FFE schools</b>			
All students	11.2	8.3	10.8
Boys	10.9	7.5	10.8
Girls	11.4	9.8	11.3

Source: Computed by authors based on data from IFPRI's "Food for Education Evaluation Survey, 2000: School Survey," Bangladesh.

Table 3. Annual dropout rates, 1999-2000, from Ahmed et al. 2002

A study in the State of Karnataka, India, found a significantly lower number of dropouts

(14-18%) for girls attending Mid Day Meal programs in school, compared to girls who did not had these programs in school (27-36 % dropout). This was for several years in a row (Laxmaiah et al. 1999).

Gelli et al. (2007) describe the effect of different FFE programs from the WFP (on-school meals or in-school meals combined with take-home rations for girls only) on the access to primary education, especially for girls, in sub-Saharan countries. They used data of 32 sub-Saharan Africa between 2002 and 2005. The primary schools that were studied were usually located in food-insecure areas that also suffered from lack of access to education.

In the first year of FFE implementation girl’s absolute enrolment for both in-school meals and in-school meals combined with take-home rations increased by 28%. After this year, enrolment rates sustained in schools with in-school meals combined with take-home rations. For schools with only in-school meals enrolment rates were reduced to the same level as the year prior to the FFE implementation.

With a simulation Gelli et al. (2007) showed that “after 3 years, in schools with combined on-site feeding and take- home rations, girls’ absolute enrolment would be higher than in schools providing only on-site feeding” (table 4). In the same simulation they estimated that schools with only in-school meals have the highest enrolment rates in grade 1, after this grade schools with in-school meals combined with take-home rations have higher girl’s enrolment rates. “These results suggest that take-home rations can significantly both sustain girls’ absolute enrolment and reduce girls’ dropout particularly in the higher grades”. With these findings they plead for in-school meals for all students with take-home rations only for girls in grades 4 and 5 (rather for all girls to reduce costs).

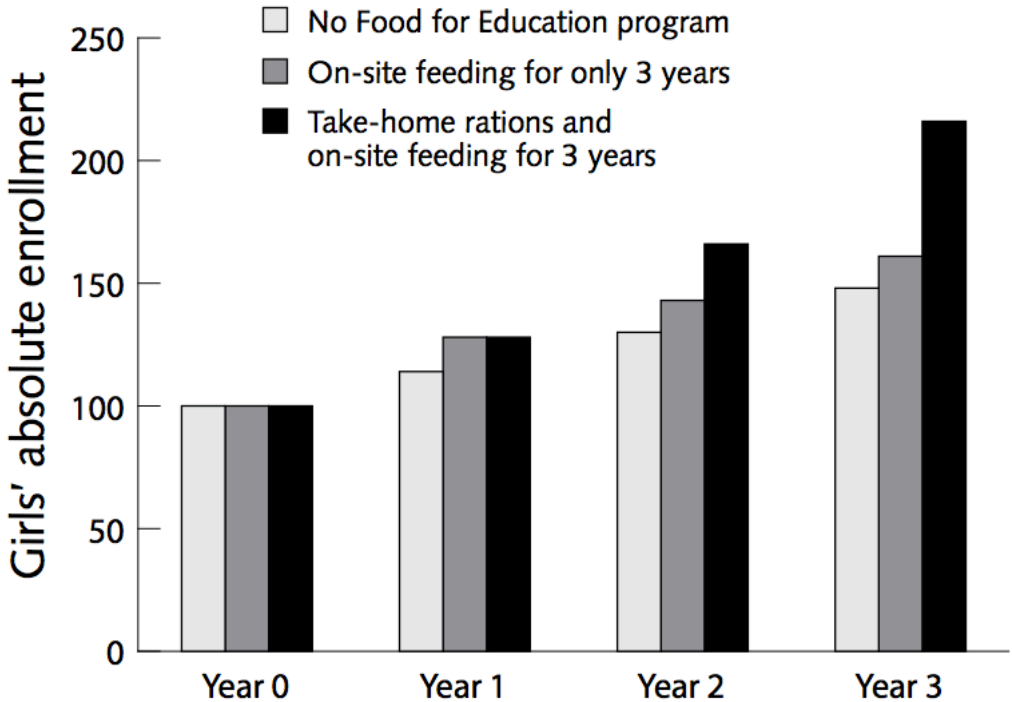


Table 4. Models of average school enrolment in hypothetical schools with different types of FFE programs. Source: Does provision of food in school increase girls’ enrolment? Gelli et al. 2007.

An older study of a school breakfast program in Peru showed a significant decline in the prevalence of anaemia, improved verbal skills and also lower dropout rates (Jacoby et al. 1998).

The Philippine government has implemented several experimental interventions as part of its 'Dropout Intervention Program'. Tan et al (1999) investigated these interventions: school feeding; multi-level learning materials, which are pedagogical materials for teachers; school feeding combined with parent-teacher partnerships; and multi-level learning materials combined with parent-teacher partnerships. Although the evaluation period was short (2 years) they concluded that dropout rates in all interventions decreased, but only the decline in the multi-level learning materials, with or without parent-teacher partnership, was statistically significant (table 5). Results were not disaggregated by sex.

Variable	Control schools	School feeding		Multi-level learning materials	
		Alone	With parent-teacher partnership	Alone	With parent-teacher partnership
<i>Dropout rates</i>					
Percentage change	-1.2	-2.9	-2.8	-4.8	-6.4
P-value	0.328	0.104	0.110	0.004***	0.005***

\* Statistically significant at the 10 percent level.  
 \*\* Statistically significant at the 5 percent level.  
 \*\*\* Statistically significant at the 1 percent level.

Table 5. Impact of the Dropout Intervention Programs on Schooling Outcomes, from Student Outcomes in Philippine Elementary Schools: An Evaluation of Four Experiments, Tan et al. 1999.

Additional they found that “on a per-student basis school feeding is very expensive, the use of multi-level learning materials is considerably cheaper, and parent-teacher partnerships entail minimal additional costs because they involve mostly an adjustment in the way parents interact with teachers”.

#### 5.2.b Impact of other school-based interventions on dropout:

##### - Deworming

School feeding is often combined with other school-based health interventions, as Tan et al. (1999) already demonstrated. A common school-based health intervention is deworming.

Worm infections can lead to anaemia and this can affect cognitive and motoric

development or causes tiredness.

Treatment for worms is a simple, safe and inexpensive intervention.

A study of a deworming program in Kenya compared the educational outcomes of schools with a school-based deworming program and schools without such a program. The results showed significantly higher school participation after two years of the program. There was a reduction of school absence (dropout) of one-third. Distinction between boys and girls was not made. Girls older than 12 years were excluded from the program due to potential embryo toxicity of the deworming drugs. There was no association with deworming and academic test score performance or promotion rates (Miguel et al. 2000).

In an extended study of the Kenyan project, Miguel et al (2004) not only found an increase in participation levels and health of all *treated* students. They also found an increase of these outcomes in *untreated* children in the surrounding area of the schools. They note that there were “substantially fewer dropouts” in the study, but did not publish the results. Remarkably was the improved attendance of older girls, 13 years or older, because they did not received the deworming treatment. The investigators attributed this to the improved school participation of younger siblings, which implied that the older girls did not have to stay to attend those being sick due to worm infections.

However, a Cochrane review on the provision of deworming drugs done by Taylor-Robinson et al. (2011) showed that “only one out of seven trials that assessed school performance (including dropout rates) had a positive effect on these performance indicators. It seems unlikely that there is a benefit of deworming programs on school performance”.

Of these 7 trials, 4 were before the year 1998 and not considered to be relevant for this study. One trial was unpublished and data could not be found. The remaining two had a target population of pre-school children; which is not the population for this study. So these articles are not discussed here. Taylor-Robinson et al. in their review further concluded “A meta-analysis of trials showed that children gained more weight with a single dose of a deworming drug compared to those who did not receive a deworming drug. However, there was variation between trials, with some demonstrating substantial effects and others not detecting a difference. And in a meta-analysis of six trials examining weight and height change, no significant difference was detected”. The results of deworming programs are not conclusive. It seems that deworming programs do not have an impact on dropout rates.

#### - *Malaria prevention*

In regions where the transmission of malaria infection is high, most often young children are seriously sick from the infection. At the time the child is at school age, it will have a certain level of immunity and the infection can cause mild illness or anaemia. As mentioned before in the problem statement section, anaemia has adverse effects on cognition and can cause tiredness. Both affects school achievements in a negative way. In regions where malaria transmission is lower, school children do not have immunity for the infection and can become seriously ill from the infection.

Noor et al. (2009) found that in endemic regions school children are the least protected with insecticide treated nets (ITNs) among all age groups. More females in the age 10 to 44 years slept under an ITN.

School-based malaria programs can include health education: how to prevent the infection or how to recognize symptoms of the infection. Also it can include the distribution of ITNs or intermittent preventive treatment (IPT) (Bundy 2011).

Clarke et al (2008) studied the impact of IPT on anaemia in schoolchildren. The intervention group received IPT on three occasions within a 12-months period; the other group received a placebo at the same times. All groups received a deworming treatment. The prevalence of anaemia before the intervention was comparable between groups. After the 12 months the prevalence in the treatment group was 6.3% and in the placebo group 12.6%, the difference was statistically significant. There was also a significant difference in paying attention in class between the treatment and placebo group but no difference in educational achievement. The study did not describe the impact of IPT on school attendance or dropout.

The impact of IPT on anaemia in girls was slightly greater than in boys.

Fernando et al. (2006) did find a difference in school attendance between treatment and placebo groups. Their study in an endemic area of Sri Lanka, studied the days absent from school due to malaria infection. The results showed that "malarial prophylaxis not only reduced the incidence of malaria but increased school performance relative to the placebo group. It also reduced school absenteeism". Besides this they also concluded: "Repeated attacks of malaria appear to affect physical growth of children as shown by an improvement in weight- for-age of female children, and higher hemoglobin levels in both sexes in the treatment group compared with the placebo group".

#### *- Water, Sanitation and Hygiene*

Water, sanitation and hygiene promotion (WASH) are setup in many schools. Its overall objective is "to contribute to the realization of children's rights to survival and development through promotion of the sector and support to national programmes that increase equitable and sustainable access to, and use of, safe water and basic sanitation services, and promote improved hygiene" (UNICEF 2005).

Poor sanitation, unsafe water and poor hygiene practices are the main causes of diarrhoea. This can lead to malnutrition and long-term stunting in children. Other diseases like worm infections can be linked to poor sanitation, unsafe water and hygiene. Better hand-washing practices seem to reduce acute respiratory infections (UNICEF 2005).

WASH promotion includes improving drinking water and sanitation facilities and promoting behaviour change like hand washing. They can also contribute to gender equality: in most countries where water is scarce, women and girls are traditionally responsible for fetching water. With clean water sources nearby girls have more time for school (UNICEF 2005).

This was confirmed by the study of Freeman et al. (2012) in different regions in Kenya. In this study it was found that hygiene promotion and water treatment with or without sanitation had a significant reduce in absence of primary school pupils compared to

control groups at school without an intervention. The impact of the interventions showed significant more reduction of girl's absence than that of boys. The absence reduction among girls was between 6.1 to 6.8 days per year in the treatment groups (table 6). There was no explanation for this positive gender disparity of the WASH interventions.

Because frequent absence can lead to dropout of school, Freeman's study is considered to be relevant for this paper.

Geographical strata	Intervention package	Pupil-reported		Pupil-reported (Girls)	
		Baseline <i>n</i> = 2595	Follow-up <i>n</i> = 3394	Baseline <i>n</i> = 1227	Follow-up <i>n</i> = 1640
Nyando/Kisumu	Hygiene promotion & water treatment (HP & WT)	16.3 (1.8)	4.8 (1.1)	14.5 (3.8)	3.7 (1.3)
	HP & WT + Sanitation	18.3 (3.8)	6.9 (2.0)	15.9 (4.3)	5.9 (2.9)
	Control	27.0 (4.2)	4.5 (0.8)	27.1 (6.6)	3.7 (1.3)
Rachuonyo	HP & WT	24.5 (2.4)	17.8 (2.4)	25.9 (3.9)	15.2 (2.2)
	HP & WT + Sanitation	16.5 (2.8)	15.2 (2.7)	18.0 (4.4)	19.0 (3.4)
	Control	17.4 (3.0)	22.6 (2.9)	15.1 (4.5)	28.2 (4.8)
Suba	HP & WT	24.6 (3.4)	14.3 (2.1)	24.8 (4.1)	16.9 (3.3)
	HP & WT + Sanitation	30.3 (4.3)	21.0 (3.3)	37.9 (7.7)	22.8 (4.1)
	Control	28.9 (3.4)	23.0 (3.4)	26.6 (4.8)	24.3 (3.8)
All regions	HP & WT	22.2 (1.6)	12.3 (1.4)	22.1 (2.5)	11.9 (1.6)
	HP & WT + Sanitation	21.5 (2.5)	13.8 (1.7)	23.3 (3.9)	15.2 (2.3)
	Control	24.4 (2.3)	16.2 (1.8)	22.8 (3.3)	18.2 (2.6)

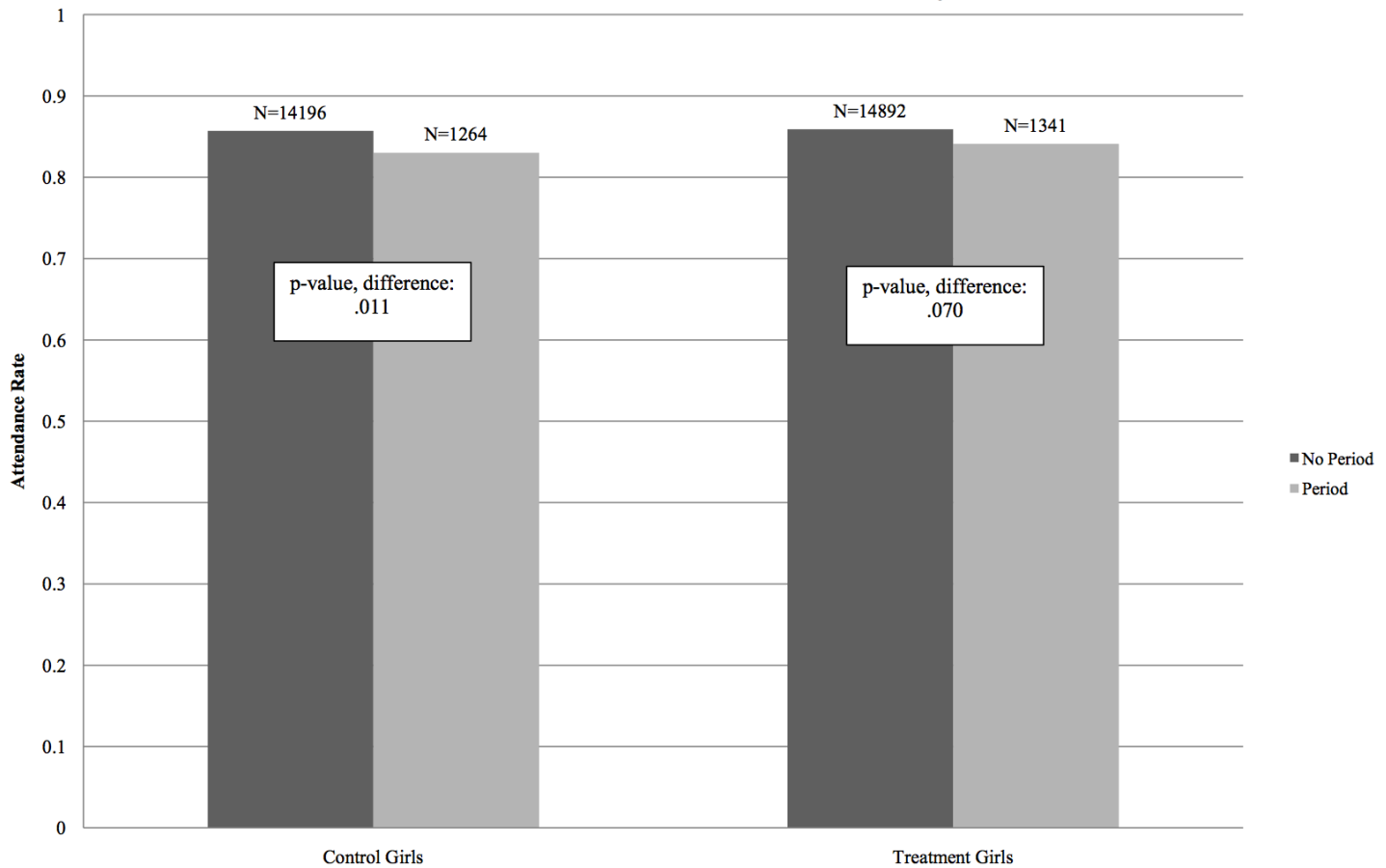
Table 6. Pupil-reported 2-week absence at baseline and follow-up at follow-up by intervention status and geographical strata. From Freeman et al., 2012. Assessing the impact of a school-based water treatment, hygiene and sanitation programme on pupil absence in Nyanza Province, Kenya: a cluster-randomized trial.

In many developing countries menstruation is surrounded by mystery and myths. Due to this believe menstrual hygiene practices are poor. Most girls use cloths or rags as sanitary napkin during their period. These cloths are often reused after washing. Because of shame or cultural believes, the washing is poor and girls hide them to dry. These unclean cloths can lead to serious reproductive tract infections. These infections and the limited access to washing facilities at school can cause a decreased in school attendance and in the end lead to dropping out of school (Garg et al. 2011).

According to UNICEF (2005) girls who are menstruating often hesitate to go to school "when toilet and washing facilities lack privacy, are unsafe or are non-existent".

A study (Oster et al., 2010) in Nepal found a small but significant negative impact of menstruation on school attendance. In this study the average schoolgirl misses 1 school day year (which is longer than a school year) due to menstruation (table 7). This study also investigated the impact of sanitary products (in this case a menstrual cup) on school attendance. There was no significant difference in attendance between the treatment group and the control group.

**Attendance Rates, Period and Non-Period Days**



Notes: This figure shows attendance rates (from official attendance data) for girls in our sample on period and non-period days. The first set of columns uses control girls, who have access only to poor sanitary technology. The second set of columns uses treatment girls, who have access to the menstrual cup.

*Table 7. Attendance rates at period and non-period days, from Menstruation, Sanitary Products and School Attendance: Evidence from a Randomized Evaluation, Oster et al., 2010.*

Grant et al. (2013) showed that there was “no association between girls’ school attendance and female toilet availability” in southern Malawi. Girls were more absent from school if toilets were filthy and 2.4% were absent because of menstruation. Surprisingly they did find that *boys* were more likely to be out of school if there were no male toilet facilities at school. But overall there was no significant difference between sexes in absence.

*- Sexual and Reproductive Health education*

HIV/AIDS has had and still has a tremendous impact on the lives of many children in developing countries; parents die or are not able to take care of the child due to the infection. Children have to work to generate income if parents are too sick to work. Most often girls have to stay home to take care of the household and family members. Also in education the impact of the disease is visible: teacher cannot teach anymore because they are too sick or because of the stigma’s still surrounding the disease. This creates lack of teachers and increases the pupil-teacher ratio, which can affect school achievements on a negative way.

School-based SRH education (including HIV/AIDS) focuses on knowledge of sexual issues, including HIV, other sexual transmitted diseases (STDs) and pregnancy. The program also addresses risk behaviors, condom use and attitudes toward people living with HIV/AIDS (Visser- Valfrey, 2009).

The content of the programs often varies per country due to the fact that there is still a taboo on the subject.

For girls in particular SRH education including HIV/AIDS is important:

“HIV/AIDS is spreading fastest among young women (ages 15-24), not only because their physiology puts them at risk, but also because they have little access to knowledge, economic resources and decision-making power” (Global Campaign for Education 2004). The Global Campaign for Education (GCE) has estimated that universal primary education would prevent 700,000 new HIV infections each year. The GCE made an analysis from UNICEF’s Multi-Indicator Cluster Survey data for 12 countries and found that “women with a primary education were 2.5 times more likely than women with no schooling to correctly identify the main ways to prevent HIV transmission” (fig. 6). Their data did not show if the women with education had SRH education specifically (Global Campaign for Education, 2004).

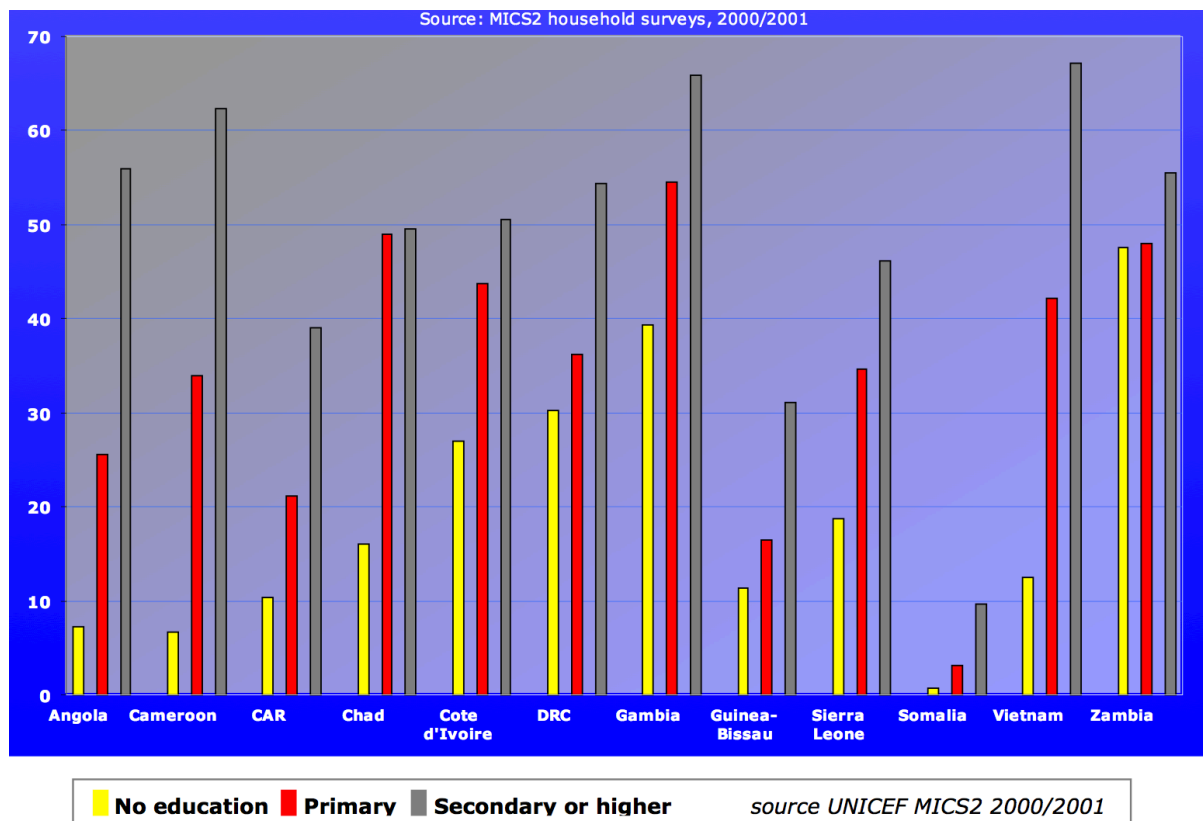


Figure 6: Percentage of women who know main ways to prevent HIV transmission. From *Learning to Survive: How Education for All Would Save Millions of Young People from HIV/AIDS*. GCE 2004.

Bollinger et al. (2004) describe the impact of different HIV/AIDS prevention interventions, including school-based interventions. They found that school-based interventions could lead to more delay in first sexual activity and reduce the number of sexual partners compared to other interventions. The evidence though, was not very convincing due to gaps in the literature.



School-based SRH programs can strengthen the impact of education on HIV/AIDS prevention, but Kelly (2006) states “schooling in itself is an effective way of responding to HIV and AIDS”. So children with an education already have lower risk of HIV/AIDS infection than those without education regardless a SRH education program at school or not (Kelly, 2006).

Studies on the impact of school-based SRH education on educational outcomes as attendance or school dropout were not found.

Bundy (2011) describes that different types of childhood interventions together help ensure child development throughout the life cycle. These interventions are: maternal and child health, early child development, school health and school feeding. The interventions take place in different stages of the life of a child. Different sectors are responsible for the interventions. The health sector is responsible for the maternal and child health, covering foetal development and the first two years of life, the so-called ‘window of opportunity’. In the intervention that comes after this age group, the early child development intervention, the health and education sector share responsibilities. At school age, mostly starting with the age of six, the education sector is responsible for school health and school feeding.

To illustrate how age-specific patterns of education are related to age-specific patterns of disease and programmatic intervention, Bundy uses figure 7. In this figure the key objectives for basic education are central:

1. Ensuring children are ready to learn and enrol in time
2. Keeping children in school by increasing attendance and reducing dropout rates
3. Improving learning at school by increasing cognition and school achievements

Improving health and nutrition and avoid hunger contribute to these objectives.

Bundy states that “it is clear that the later interventions build on the early intervention, and that it is important to start early with interventions. Especially where early deficits cannot be rectified subsequently”.

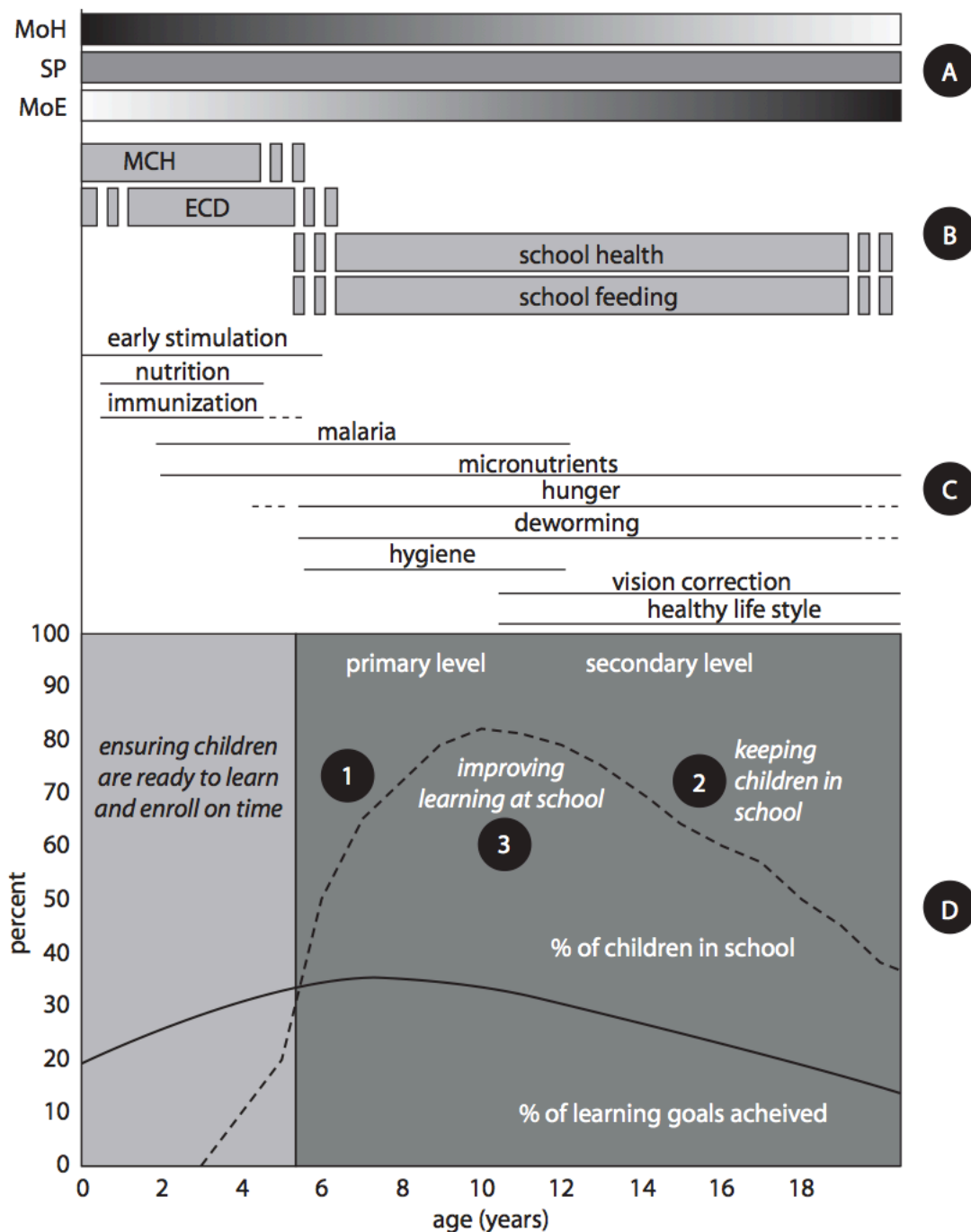


Figure 7. Health and Nutrition Interventions throughout Childhood Contribute to Education Outcomes. Source: Rethinking school health, Bundy 2011.

ECD = early child development, MCH = maternal and child health, MoE = ministry of education, MoH = ministry of health, SP = social protection

A: responsible sector

There are at least three main sectors that are involved throughout this age range, with the strongest role usually played by health in early life, education during school age, and social protection throughout.

B: intervention:

Maternal and child health programs (including early nutrition and integrated management of childhood illness), early child development programs (including early stimulation), and school health and nutrition programs (including school feeding).

C: examples of intervention:

Early immunization against diseases of childhood is important because both the risk of disease and the

likelihood of infection are greater in young children. Similarly, early nutrition during the window of opportunity is essential for physical and mental growth and development. Other interventions, such as malaria control and micronutrients, may be viewed as relevant throughout the intersection between early life and school age, while some, such as deworming, are especially important at school age because the infection is most prevalent and intense in this age group. Behavioural-change interventions related to sexuality are more relevant in early adolescence

D: key objectives for basic education:

A typical education pattern in a developing country. Some children enrol in school early; most enrol much later than the official age. Attendance and enrolment peak around age 10 and then decline, as attendance becomes erratic and children drop out of school. These trends are most marked for girls. This part of the figure also shows an illustrative line for learning, as assessed in comparison with normative, age-specific standards. Learning is shown to start before school age and increase slightly with early schooling, but often deteriorates thereafter.

### **5.3 Other interventions to prevent dropout**

Besides school-based health interventions and school feeding, there are other interventions to prevent girls from dropping out of school. These range from a single activity such as the distribution of free uniforms, to more extended programs where girls are not only supported with goods (books, uniforms, pens, soap, sanitary napkins) but also by a teacher appointed as a personnel helper.

Other interventions are more aimed at parents: reducing costs or providing psychosocial support in keeping their daughters in school.

In their paper where they discuss Kenya's education system, Kremer et al. (2003) evaluate a program by a non-profit organization (NGO) that provided free uniforms, textbooks, and classroom construction to targeted schools. They compared educational outcomes and test scores with control schools. The outcomes showed that students in targeted schools remained longer enrolled in school and had lower dropout, than those in control schools. Also participation was higher in targeted schools.

The program decreased dropout rates of students in treatment schools but also attracted students from schools in the area. Although this increased the class sizes, this had no negative effect on test scores. There were no significant differences between boys and girls in this program.

Kremer et al. (2003) tried to give an explanation for the decrease in dropout rates within this program. They did not think the decrease could be because of the building of new classrooms: dropout rates declined already before the construction of the classrooms. Upper classes also showed decline in dropout rates and most often these pupils already had good classrooms. Also they thought decline of dropout rates was not due to the free textbooks, based on an unpublished study of a program that provided free textbooks where the authors did not find a reduce of dropout rates. Kremer et al. (2003) concluded that the decline in dropout rates and the attraction of new students was probably because of the financial benefit of free uniforms.

Another study also found decreased dropout rates by providing free uniforms. In this program "three school-based HIV/AIDS interventions were compared. One intervention consisted of training teachers in HIV/AIDS-education. The second intervention was to encourage students to debate about the role of condoms and to write an essay on how to protect them against the infection. And the third intervention was the reduction of the costs of education by providing free uniforms and so prolong years in school" (Duflo et al. 2006).

The teacher training did not show a decline in dropout rates but the reduction of educational costs did. In fact, they found a reduction in dropout rates of 15% among girls who received a free uniform. They also found that girls within the free uniform program were less likely to start motherhood.

Their overall conclusion was that "reductions in the cost of schooling led to reductions in the dropout rates and reductions in teen pregnancies and marriage".

School support also led to reduced dropout rates in the study of Hallfors et al. (2011). Girl orphans received fees, exercise books, uniforms, school supplies, soap, underpants and sanitary napkins in order to keep them in school and prevent them from HIV

infection. Together with the school support, they also got a female teacher as a personnel helper.

While others found a positive effect on dropout rates due to the provision of school supplies, Kremer et al. (2007) did not find a significant effect on the reduction of dropout rates in their study on scholarships for girls if their school results were high. The authors studied a program where girls could win a scholarship at the end of grade six if they scored well on their exams. The scholarship would pay school fees and school supplies for the next two years.

In this study, school attendance and even test scores of boys, who did not participate into the program, improved. Dropout rates were likely to decrease but there was no statistic significance of the numbers.

The PROGRESA program in Mexico to reduce poverty consists of different components: educational grants to encourage the education of children, improvement of the quality of education and the quality of schools. Also the improvement of the quality of health services for all members of the family is part of the program. Monetary transfers (which increase per grade in school and are greater for a female child) and nutrition supplements for children between the age of 4 months and 2 years old and for breastfeeding and pregnant women are given. To receive these benefits, it is required to attend a health check at a preventative health clinic.

In the pre-program period the authors found that girls progressed more quickly than boys through primary school, but dropped out at an earlier age. At the age of twelve 30% of the girls dropped out as compared to 15% of boys. Once dropped out from school, girls were less likely than boys to re-enter.

After the start of the program, Behrman et al. (2002) used a model to assess the impact of the program on educational outcomes. They found that girls had higher enrolment rates than boys. Both sexes experienced less grade repetition and better grade progression. At the age of eleven, twelve, dropout rates decreased both for boys and girls in a similar pace (table 7). After this age, once entered into secondary school, the program had little impact on dropping out of school for girls, for boys there was a decrease in dropout rates. The investigators found with their model that the long-term effects of the program entailed an increase of 0.68 grades per girl and a 19% higher enrolment into secondary school, for boys the gains were slightly higher. They also estimated that re-entry after dropping out was higher in the program group than those not attending the program.

**Overall Average Effect of Program on Probability of Repeating a Grade,  
Dropping Out, and Reentering School  
(standard error in parentheses)**

Age (in 1997)	Prob Repeating Among Those Enrolled in School			Prob Dropout Among Those Enrolled in School			Prob Reenter Among Those Dropped Out of School		
	T	C	Diff	T	C	Diff	T	C	Diff
6	36	41	-4.59 (2.45)	0.8	1.6	-0.8 (0.56)	*	*	*
7	27	34	-7.1 (2.17)	1.0	1.0	0.0 (0.47)	100.0	100.0	0.0 (0.00)
8	27	32	-5.4 (2.15)	0.3	0.7	-0.4 (0.36)	100.0	96.0	0.0 (5.81)
9	24	30	-6.5 (2.16)	1.0	1.4	-0.4 (0.55)	97.2	94.7	2.5 (5.81)
10	24	25	-0.8 (2.01)	1.6	2.9	-1.4 (0.73)	94.4	87.5	6.9 (7.76)
11	20	25	-5.0 (2.00)	6.3	12.2	-5.9 (1.46)	65.5	45.8	19.7 (12.02)
12	30	34	-3.7 (2.31)	10.4	16.8	-6.4 (1.85)	44.5	29.7	14.8 (6.65)
13	35	40	-5.1 (2.56)	12.2	22.7	-10.5 (2.41)	34.1	16.9	17.2 (4.33)
14	49	47	1.9 (2.75)	23.3	34.9	-11.6 (3.28)	16.9	15.5	1.33 (3.23)
15	58	62	-4.1 (2.92)	31.3	37.7	-6.4 (4.43)	14.2	10.8	3.4 (2.62)

Table 7. Overall average effect of Program on probability of dropout. From Progressing through PROGRESA; an impact assessment of a school subsidy experiment in Mexico, Behrman et al., 2002.

In a study in Brazil “a package of universal preventive interventions” was implemented in a test school to reduce dropout rates. Investigators compared this test school with a school that did not receive this package (Graeff-Martins et al., 2006). The interventions consisted of workshops for teachers on children’s normal development and how to recognize and manage emotional and behavioural disorders in children. Also there were informative letters to parents that were sent during the school year. These letters contained information about the prevalence of school dropout rates in Brazil, reasons of dropping out, whether a child really attended school and how to improve communication with the child and school personnel. The last letter provided information to keep parents motivated including the first findings of the program and closing statements. There were parent meetings in school, addressing school dropout. A telephone helpline for parents was setup and a cognitive intervention for students was arranged. This intervention aimed at keeping students at school by “combining the concepts of employability, qualification and education.” Students, who stayed at home for ten days in a row without reason, got a visit at home by a mental health team and were offered to be referred to mental health services. In this program, significant differences in dropout rates were found between the intervention school (3.85%) and the comparison school (9.54%).

## ***5.4 Reasons to dropout***

Having looked at programs that can prevent a girl from dropping out of school, one should also know what reasons drive a girl to actually dropout? Do these match with the existing programs? What are the risk factors of dropping out?

A girl does not wake up one morning and decide to stop with school; stopping with school must be seen as an outcome of a long-term process (Hunt 2008). Many reasons can provide the final push to drop out of school; from lack of resources for additional school costs, to cultural and religious aspects, teenage pregnancies, lack of sanitary facilities, school environment or to being no longer interested in school. These factors can be roughly divided in reasons within the girl herself, reasons within the household and reasons within the school environment. These reasons are described below.

### *5.4.a Reasons to dropout: the girl*

If a girl starts at a late age with school she will be over-aged compared to most of her classmates. When being two to three years older than other classmates it can take away the motivation to stay in school. In general, boys are more likely to be over-aged than girls (Grant et al. 2006, UNESCO 2012, Strassburg et al. 2010).

Low academic achievements with failing exams as a result can also make a girl decide to quit school. Sometimes failing an exam can mean the girl can't continue to the next level. She has to repeat the exam and especially if this happens more than once, the temptation to dropout of school will be high (Morara et al. 2013).

"Women who had repeated a grade were 64% more likely to have dropped out of school relative to those who had not" (Gant et al 2006).

Peer pressure can play a part in school dropout, if peers or the community do not see the value of education it can be hard to stay in school if everybody else tells you not to. Strassburg et al. (2010) provide additional evidence with their survey, in which 17% of children between 7 and 18 had left school "because they simply no longer wanted to attend".

Of course chronic sickness can also make a girl to drop out of school.

Pregnancy plays a major part in dropping out of school.

Strassburg et al. (2010) found in their household survey in South Africa that "teenage pregnancy was the most common reason why girls left school. According to caregivers, 44 per cent of girls who had left school had done so because they had fallen pregnant."

Grant et al (2006) found in their study in South Africa, that of the 14-19-year-old girls who became pregnant, 76% said the pregnancy was the reason for dropping out. Other reasons were lack of money to pay school fees. "Young women who are the primary caregivers to their children are also significantly more likely to have left school". They also found that "prior school performance, (measured as grade repetition or temporary withdrawal from school) is strongly associated with a young woman's likelihood of becoming pregnant while enrolled in school, and, among pregnant schoolgirls, with the likelihood of dropping out of school at the time of pregnancy".

#### *5.4.b Reasons to dropout: the household*

Many studies found poverty as one of the leading causes of school dropouts (Strassburg et al. 2010, Morara et al. 2013). Although most countries have abandoned school fees, there are still extra costs. School uniforms, textbooks, writing materials, school transport, registration and exam fees are all examples of costs that stress the household budget. Sometimes the girl herself has to work to contribute to her schooling costs. When families can't afford to send all of their children to school anymore, often girls lose out of boys and have to dropout (UNESCO 2012).

On the other hand Colclough et al (1998) describe that gender disparities in education are more "the product of cultural practice, rather than poverty per se. Gender inequalities in schooling outcomes will not necessarily be reduced as incomes rise". In this context, other studies found that younger siblings in the household can also lead to dropout of the oldest girl. She has to quit school to look after the younger ones. Sometimes girls have to do domestic work to make a contribution to the household and this can distract them of their schoolwork.

Especially with the high HIV/AIDS burden in most sub-Saharan countries, girls have a higher probability to dropout to take care of their sick family members than boys. When parents die, most often the girl will not return to school (Colclough et al. 1998, UNESCO 2012).

If parents do not see the value of education, sometimes due to their own lack of education, the girl will receive less support in her school career. Risk of dropping out will be increased especially if there is high unemployment amongst those who have completed their education.

Girls from unstable households (abusive parents, abandonment, neglect) are also more likely to drop out from school (Sottie et al. 2011).

Religion can also be a reason while a girl drops out of school prematurely.

UNESCO (2012) describes that in some countries girls are expected to marry at an early age, so parents consider education of their daughter a waste of time and money. "The girls are aware of their parents' perceptions regarding their education. They do not find it necessary to work hard because they assume that they will probably drop out of school early". Also in more traditional households girls are expected to know how to clean, cook and take care for children and these are skills she can't learn in school. In these traditional areas, if a girl actually goes to school, chances of dropping out in higher grades will be significant (Colclough et al. 1998).

#### *5.4.c Reasons to dropout: school environment*

The school environment can also be the cause of girls dropping out of school. In areas where there aren't sufficient schools; distance to school might be considered to be too far. Parents not only thought their daughters to be weaker than boys for the journey, they were also afraid of sexual harassment on the way to school.

Sexual harassment and gender-based violence by teachers or fellow students can make school unsafe environment, which clearly contributes to the decision to drop out of school (UNESCO 2012, Visser-Valfrey et al. 2009).



Sottie et al (2011) describe the widespread corporal punishment by teachers as a factor that can lead to dropping out from school.

The quality of school facilities and learning materials should be adequate. Overcrowding often happens, desks and learning materials must be shared; some pupils have to sit on the floor. In these settings it is difficult to stay motivated to remain in school (Sottie et al. 2011).

Lack of female teachers can become a problem when a girl reaches puberty. Male teachers are not able to support guidance concerning menstruation due to the fact that girls could see this as a sexual threat, -as the teachers assume. This can lead to girls not coming to school during their menstruation and in the end can lead to dropping out before they have finished primary school (Colclough et al. 1998).

Another major concern regarding risks of dropping out is the lack of toilet facilities for girls. As Colclough et al already mentioned, girls often stay home when they have their period. This absence from school will lead to dropout when there is no place in school where girls can clean themselves privately or change clothes in school (Sottie et al. 2011).

## **6. Discussion**

Although enrolment rates in primary education for girls in developing countries are rising, keeping these girls in school is still a puzzle.

Education is one of the most important tools to break the vicious circle of poverty and poor health:

“Children who grow up with too little education will be poorer, less productive, less well nourished, more vulnerable to HIV/AIDS and other illnesses themselves, and less likely to send their own children to school. At the same time, if fewer children complete school, the general level of skills and knowledge in the population, and hence the economy’s capacity to grow, will be slowed down. The impact will be magnified in the next generation” (Global Campaign for Education, 2004).

The aim of this study was to investigate if school-based health interventions and school feeding have an impact on dropout rates of primary school girls in developing countries. Reducing dropout rates leads to more completion of education and this improves overall health outcomes.

For this study the ‘Investment Case Framework’ of the WFP was used. In this framework outcomes of the interventions (school meals and deworming) were: enrolment, attendance, dropout, cognition, micronutrient deficiency and intestinal parasites.

For the outcomes enrolment and attendance many has been written and although the literature is ambiguous, it seems that school feeding can have a positive impact on school enrolment (Gelli et al. 2007, Ahmed 2004, Alderman et al. 2010, WFP 2013, Abotsi 2013). For school attendance the literature is more contradicting. Some studies do find a positive impact on school attendance; others did not find this impact (Ahmed 2004, Abotsi 2013).

For intestinal parasites the evidence in the literature is not conclusive. School feeding combined with deworming is common at schools in many developing countries. Deworming is reducing worm infections in schoolchildren. Because worm infections can cause IDA, deworming has a positive impact on lowering IDA. The impact on enrolment, attendance and dropout rates is not clear (Miguel et al. 2000, Miguel et al 2004, Taylor-Robinson et al. 2011).

IDA and other micronutrient deficiencies can also be lowered with fortified school meals and most countries are fortifying their school feeding. Lowering IDA can improve cognition (Bundy 2011, Stevens 2013).

Further the literature is unclear on the impact of school feeding on cognition. It seems that nutrition in early years, in the ‘window of opportunity’, has a stronger long-term impact on cognition than school feeding. School feeding seems to have more an impact on short-term memory than on long-term cognition (Grantham-McGregor et al. 1998, Shekar 2006, Khor et al. 2012).

For the outcome ‘dropout’ there is a gap in the literature. This study reviewed the literature on the impact of school feeding on dropout rates for girls in developing countries in primary education.

Because school feeding is often combined with other school-based health interventions (like deworming, malaria prevention, SHR education and WAHS promotion), this study also reviewed the literature on the impact of these interventions on dropout rates of girls in developing countries in primary education.

Little studies have studied the impact of school feeding and school-based health interventions on dropout rates.

Older studies in Peru (Jacoby 1998) and India (Laxmaiah 1999) found a reduction in dropout rates with school feeding.

A study on the FFE program in schools in Bangladesh (Ahmed et al. 2002) showed that girls who received school feeding had a dropout rate of 7% compared to 15% of girls in the same school that did not receive school feeding. Strangely dropout rates of girls in schools with no school feeding were less (11%) than girls in schools with school feeding but not receiving the meals. To compare schools with and without school feeding, dropout rates should be the same for girls who are not receiving school meals regardless the school that they are in. In this study dropout rates differ for girls who are not receiving school feeding. Maybe there was a selection bias between schools, or this difference can be explained by the fact that the FFE schools had higher student-teacher ratio than the control schools.

The authors were not clear on this.

In a meta-analysis of data from 32 sub-Saharan countries on the impact of FFE programs, Gelli et al. (2007) find that the type of school feeding can make a difference in enrolment rates and dropout rates for girls. Schools with no school feeding had lower enrolment rates for girls than schools with any form of school feeding. Schools with in-school meals combined with take-home rations for girls had higher absolute girls' enrolment rates than schools with only in-school meals for every student. They suggested that take-home rations significantly sustain girls' absolute enrolment rates and reduce dropout particularly in higher grades.

Enrolment in school does not always mean a child is actually attending school. To draw the conclusion that with increased enrolment rates dropout rates would automatically decrease seems somewhat premature.

Tan et al. (1999) did also find a reduction in dropout rates with school feeding interventions though this was not statistically significant. The data were not disaggregated by sex. They find that multi-level learning materials with or without parent-teacher partnership *did* had a significant impact on dropout rates. The authors suggest that other interventions as multi-level learning materials were more cost-effective than school feeding.

School-based deworming and malaria interventions seem to have a direct impact on health outcomes rather than on dropout rates (Miguel et al. 2000, Miguel et al. 2004, Clarke et al 2008). But by improving health outcomes, educational outcomes such as dropout rates can indirectly be improved.

Iron-deficiency anaemia is a huge health problem in schoolchildren, especially in girls. IDA can have adverse affects on school achievements. Reducing IDA through deworming or malaria interventions improves the health and cognition of schoolgirls. Children who are healthier will attend school on a more regular basis and do better in school. One of

the reasons to dropout of school, besides illness, is low academic achievement with failing exams as a result. Failing exams can lead to grade repetition and this can lead to a higher risk of dropping out of school (Morara et al. 2013, Gant et al. 2006).

Studies found positive effects of deworming on school participation levels of students (Miguel et al. 2000, 2004). But a Cochrane review contradicted the evidence for school outcomes, including dropout rates, for deworming interventions on schools. The literature on the impact of deworming on dropout rates is therefore unclear.

For the impact of school-based malaria prevention on dropout rates the literature is also limited. One study (Clarke et al. 2008) finds a difference in the prevalence of anaemia between the treatment group and placebo group after IPT treatment of schoolchildren. There was also a difference in paying attention in class between the two groups but no difference in school results. This study did not describe the impact of IPT on school attendance or dropout rates. Others (Fernando et al. 2006) did find a difference in attendance rates for IPT malaria treatment for schoolchildren between treatment and placebo groups.

There is more evidence-based literature for the impact of water, sanitation and hygiene promotion in schools on dropout rates of schoolgirls.

Although the objectives of WASH promotion do not include impacts on school achievements, it has an impact on dropout rates of girls. Overall health will improve and lead to less school absence for girls at schools where WASH is promoted (Freeman et al. 2012). Because a higher rate of absence increases the risk of dropping out, WASH promotion has indeed an impact on dropout rates.

One of the reasons for girls to dropout of school is the lack of sanitation in school when they are menstruating (Sottie et al. 2011). However, two other studies (Oster et al. 2010, Grant et al. 2013) did not find evidence for this. WASH promotion seems to improve girl's health and in this way can reduce dropout rates. But for menstruation and WASH promotion and the impact on dropout rates, the literature is ambiguous.

There seems to be evidence that school-based interventions should be combined to other interventions that are improving children's health and nutrition to reduce dropping out of school (Bundy 2011). By ensuring children are ready to learn and enrol in school on time, improving learning in school and keeping children in school (hence reduce dropout) the EFA goals will be reached.

Another reason to dropout is teenage pregnancy. Sexual and Reproductive health education in schools can tackle this problem. Studies show that education of girls has an impact on risky sexual behaviour. Girls with more education are more likely to start having sex at a later age, use condoms more often and have less sexual partners (Bollinger et al. 2004). With this less risky sexual behaviour the chance of becoming pregnant is reduced. There was no literature found if the SRH education had this impact on behaviour or if this impact was due to *any* education. But still it seems that any education, SRH education or any education whatsoever, improves the overall health of girls. Also with no child to take care of the risk of dropping out of school is lower than with a child. No literature specific on the impact of dropout rates was found for SRH education.

Direct impact on dropout rates should come from interventions that focus on mitigating the causes of girls' drops out of school. Hence aiming at reducing costs, teenage pregnancy, grade repetition, lack of sanitary facilities for example. Indeed, reducing school costs seem to decrease dropout rates (Duflo et al. 2006, Kremer et al. 2003). As mentioned before WASH promotion also has a positive impact on dropout rates (UNICEF 2005, Freeman et al. 2012). Although one of the reasons mentioned to dropout of school is menstruation, the evidence that WASH promotion has a positive impact on this, is less clear.

As mentioned before, the fact that a girl gets any education whatsoever already reduces the risk of teenage pregnancy and so the risk of premature dropout of school. Education of parents also reduces the risk of dropping out.

Psychosocial programs are aiming at more than one reason of dropping out. These causes are more elusive: reducing grade repetition or motivate a girls for school for example. With social support, the motivation of a girl to stay in school and to try even harder to pass her exams, will improve and this can lead to reduced dropout rates (Hallfors et al. 2011). Psychosocial support for parents with or without grants also seems to reduce dropout rates (Behrman et al. 2002, Graeff-Martins et al., 2006). Maybe this support or the grant can motivate parents to motivate their daughter or to give permission to stay in school.

## **7. Conclusion**

Evaluating the literature found on the impact of school feeding on dropout rates of girls in developing countries, it seems that evidence is not clear. It seems that there might be a small reduction of dropout rates with school feeding, depending on the type of school feeding. To have more evidence base of the impact on school feeding on dropout rates more research should be done.

For the school-based health interventions deworming, malaria prevention, WASH promotion and SHR education, literature is scarce as well. The literature found on WASH promotion seems to be clearer on dropout rates; by improving health school absence is less and chance of dropping out of school is decreased. This also seems to be the case for malaria prevention and deworming: increasing health will lead to more school attendance and can reduce the chances of dropping out. Still there is too little evidence in the literature to confirm this tentative conclusion.

For these school-based health interventions further research must be done to draw a definitive conclusion of their impact on dropout rates.

The literature was not clear if SRH education specific had an impact on dropout rates of girls in developing countries. It seems that any education whatsoever has a positive impact on reducing dropout rates. To find out if SRH education specific has an impact on dropout rates, further research should be done.

There seems to be evidence that school-based interventions should be combined to other interventions that are improving children's health and nutrition to reduce dropping out of school. By starting at early age with health and nutrition interventions, children will be ready to learn and can start with school at the right age. With continuing health and nutrition interventions (school feeding) at school age the chance of dropping out will be reduced.

Interventions that reduce costs for school reduce dropout rates of girls. This can be for example paying the school uniform or grants that either pay school utilities (pens, books, uniform etc.) or educational grants for parents to encourage the education of their children.

To get clear evidence based picture on interventions that can reduce dropout rates of girls in developing countries in primary education, more research should be done.

## **8. Recommendations**

Education is an important tool to improve the health of girls and the future generation in developing countries. Investing in education of girls can not only help a girl out of the vicious circle of poverty, poor health and nutrition but can also help a countries economy to grow and lower the burden of maternal and child mortality.

By finding ways to keep girls in school, hence reducing dropout rates, higher completion of girls' education will be achieved.

School-based health interventions and school feeding are imbedded in many schools in developing countries and should also be remain in schools but maybe to a different extent.

The health interventions have a positive impact on the health of girls at school and school feeding takes away hunger. But the impact on dropout rates is not clear.

First there need to be further research on reasons for girls to drop out of school. When there is sufficient evidence for this, existing programs to prevent girls to drop out, should be critically examined to see if they indeed have an impact on dropout rates. If this is the case the program should be extend because apparently it is not working on its full extend: still many girls are dropping out of school.

If the program does not have an impact on dropout rates, it should be considered if there are other impacts of the program, for example on health outcome or enrolment or attendance rates. If not, the program should stop. The money spend on a program without any impact can be well spent on programs that *do* have an impact.

For now programs that aim at reducing school costs, changing cultural and religious aspects, reducing teenage pregnancies and improving school environment (that is better sanitary facilities but also a more safe environment) seem to have a positive impact on reducing girls dropout rates. This should be further investigated.

By integrating all child health and nutrition interventions, interventions can be more coordinated and be more cost-effective. Research should be done on the impact of the interventions in different age groups. The age group that benefits the most of the intervention should receive this intervention to full extend. The intervention should stay in other age groups but with less emphasis.

For example: at the moment it seems that nutrition is the most important for brain development in the age group – 9 months (this is during foetal life) to 2 years. If this is confirmed with more evidence based research, focus of nutrition interventions should be in this age group, so focus on maternal and child health and early child development interventions. School feeding is expensive in developing countries and often comes from donor support. This support can then better be used for early child and maternal nutrition interventions. School feeding should remain but in a different way. More and more developing countries transfer to HGSF and let go of donor support for their school feeding. This support can be used for other interventions.

All this requires strong and stable government policies. Close cooperation between governments Ministries of Health and Education and all other parties (national and

international) evolved in children's health and nutrition interventions, should work closely together.

Developing countries will become less dependent on donor support and can build on a more stable and growing economy.

Looking more into depth on the causes to dropout of school for girls in developing countries and finding ways to reduce these dropouts, educational opportunities for girls will be improved and by doing so the overall health of girls in developing countries will improve.



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