Barriers to Education and School Attainment—Evidence from Secondary Schools in Rural Nepal

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Abstract

This paper examines the inequality in secondary school attainment and its determinants across gender, caste, and ethnic group in rural Nepal. Using the primary data from a questionnaire survey, a series of interviews, and school observations, this study found that girls' school attainment is significantly lower than that of boys'. Similarly, *Dalit* (the lowest caste) and *Janajati* (indigenous, disadvantaged ethnic groups) students' school attainment is considerably lower than that of *Brahman* and *Chhetri* (high caste and privileged ethnic groups) students. Furthermore, the regression analysis using the education production function approach revealed that household chores, father's education, land sufficiency, student/teacher ratio, and local caste/ethnic composition are significant determinants affecting students' school attainment. However, students' desired level of education and the number of siblings they have were insignificant in this study. The results indicate that policy for inclusive education should be based on the local socio-cultural environment, especially with regard to the caste/ethnic composition of the local community.

Keywords: barriers to education, caste, ethnic composition, gender, rural Nepal, school attainment, secondary education

1. Introduction

Nepal is a society in which different castes and ethnic groups live together in various compositions depending on the village and area. However, the educational access and school attainment of girls, *Janajatis* (indigenous, disadvantaged groups), and *Dalits* (the lowest caste) are far below the national average (Bennett et al., 2008). Due to the minimal amount of empirical study on this subject, the specific factors that cause lower participation and poor performance of *Janajatis* and *Dalits* in education compared to *Brahmans* and *Chhetris* (high caste and privileged groups) are unclear. Owing to the high level of caste/ethnic heterogeneity in the population in each village, existing studies on gender barriers to education have resulted in incomplete conclusions. Thus, the systematic relationship between such barriers and students' school performance is worth exploring.

Nepal is a diverse country in terms of its topography and culture. Located between two Asian giants, China and India, Nepal is a landlocked mountainous country with the Himalayas lining its northern border and valleys and plains to the south. Culturally, it is a diverse country with more than 125 caste/ethnic groups; they speak 123 different languages as their mother tongue and follow various religious beliefs, though the majority of the population are Hindu (Central Bureau of Statistics [CBS], 2012). Religion, caste, and ethnicity are the strongest determinants of identity and social status in Nepal. After the unification and establishment of modern Nepal, the National Civil Code (*Muluki Ain*) of 1854 implemented and endorsed the caste system in Nepal with the purpose of politically unifying its heterogeneous society (Bista, 1994). The caste system, a social stratification emerging from the Hindu tradition, is closely interwoven with ethnicity in Nepal. The *Muluki Ain* defines caste in terms of ritual "purity" and "pollution"; it places *Brahmans* in the highest ranks of the hierarchy and *Dalits* in the lowest. Other ethnic groups, the *Adivasi Janajati*, are placed in the middle, with numerous distinctions among them (United Nations Development Program [UNDP], 2009). Therefore, although caste and ethnic identity are not the same, in this system, they are intertwined. Although caste-based discrimination is now illegal, the caste structure remains deeply ingrained in Nepalese society, and it affects people in various socio-political ways, including their access to education.

Nepal is a nation with low literacy rates, a closed economy, and a new and inexperienced government; it is likely to remain in a slow to no-growth economy unless its citizens are educated in fields that contribute to social and economic stability (Acharya, 2002). The large low caste and marginalized population must be included in the design and execution of education plans to achieve these developmental goals. Encouraged by various global compacts and inspired by recent political and social movements in the country, inclusive education is becoming a primary socio-economic development goal at both the local and national level (Bhatta, 2009). With the recent political change in the country in the direction of a democratic federal system with a slogan of creating a "new Nepal," the struggles against inequality that always existed between men and women and among different castes and ethnic groups have intensified. Large disparities still persist, and educational access and achievement varies between and within various social groups and regions (Guinee, 2014). Girls belonging to marginalized groups such as *Dalits* or *Janajatis* are doubly deprived of their right to education due to their gender and caste (Chitrakar, 2009). The statistics on the education of *Dalit* and *Janajati* children reveal lower enrolment rates than for children from higher caste groups. Dropout rates among *Dalits* and *Janajatis* are also very high. These groups have higher gender disparities in education (Lohani et al., 2010), and overall, gender and ethnic origin are powerful determinants of exclusion in Nepal (Manzoor & Govinda, 2010). The interactions between caste/ethnic discrimination, gender inequality, and social exclusion are reflected in the wide disparities in educational attainment between the privileged and disadvantaged groups and individuals in Nepal (Neupane, 2012).

The double disadvantage of gender and culture is one of the major factors behind girls' poor educational attainment, especially in regions of high ethnic diversity. Studies show that children's low school performance is primarily stratified by gender, location, income, and ethnicity (Becerra et al., 2015; Rahman et al., 2010; Department for International Development [DFID], 2005; Birdsall, Levine, & Ibrahim, 2005). However, because of a lack of data and a comparable definition, the interactions between gender, caste, and ethnicity are rarely explored. Nevertheless, research and policy interest in the subject is growing because the groups being targeted by international organizations and national governments for universal schooling are girls, disadvantaged ethnic groups, and rural communities. Although girls' education is an effective and efficient investment for socio-economic development, girls' educational attainment continues to lag behind in many parts of the world, especially in Sub-Saharan Africa and South Asia (United Nations Educational, Scientific, and Cultural Organization [UNESCO], 2015; United Nations International Children's Emergency Fund [UNICEF], 2006). Girls and children from poor families and rural areas are at a much greater risk of being low performers both in and out of school. Out of 57 million out-of-school children, girls accounted for 54%; the proportion of out-of-school girls is highest in the Arab States at 60% (UNESCO, 2015). A significant number of children from marginalized groups are further deprived of even basic education in South Asia (Manzoor & Govinda, 2010).

The existing literature reports both positive and negative consequences of ethnic diversity on educational and other aspects of socio-economic development. Many cross-country empirical studies indicate negative consequences such as slower economic growth, higher levels of corruption, political instability, and lack of cooperation among ethnic groups (Easterly & Levine, 1997) in ethnically diverse societies. Ethnic diversity is also related to lower funding in local schools, low-quality school facilities and materials, and fewer recorded community social sanctions (Alesina et al., 2003). On the positive side, ethnic mixture is credited as resulting in more varied levels and types of abilities, experiences, and cultures; this variety leads to innovation and creativity, resulting in better human capital and thus overall development (Alesina & LaFerrara, 2000). However, most of the studies reporting such findings focus on developed countries, such as White and Black populations in the US (Ibid.). There are very few studies focusing on developing countries; those that do mostly concentrate on Africa, where ethnic conflict is very high compared to developing countries in Asia. In the Asian context, Wade (1994) provides evidence that socially diverse communities are more likely to develop effective collective action mechanisms in riskier economic environments. In a case study of Pakistan, Khwaja (2009) reported that social heterogeneity has a negative effect on the maintenance of community projects.

In spite of its high ethnic diversity, there are few studies focusing on Nepal with respect to the impact of ethnic diversity on education as well as on overall development. Among the few comprehensive studies that have been done, Maslak (2003) investigated the educational decisions of *Tharu* adults, one of the ethnic minority groups in Southern Nepal. Likewise, Stash and Hannum (2001) conducted an empirical study about educational stratification by gender, caste, and ethnic group and found large ethnic and caste differences in entrance and attrition rates in primary schooling. Scholars have not reached a consensus on the relationship between the caste hierarchy and gender gaps in Nepal (Acharya & Bennett, 1981; Maslak, 2003; Lewis & Lockheed, 2007). The general literature on caste/ethnic issues and education argues that high-caste households are considerably more likely to send their children to school regardless of gender (Jamison & Lockheed, 1987; Lohani et al., 2010;

UNESCO, 2010). In contrast, Stash and Hannum (2001) and Maslak (2003) found that more highly educated household heads or those in higher positions in the caste hierarchy—which are, in general, regarded as characteristics associated with increased educational participation—are not associated with decreased discrimination against girls in Nepal. More importantly, studies at the local level focusing on students' barriers to education are rare.

Therefore, studying the rural hilly region of Nepal, where different ethnic compositions occur from one village to the next, is unique. This paper examines the gender, caste, and ethnic barriers to education and their impacts on school attainment, reducing the research gap by analyzing the barriers to education from the secondary school perspective. Moreover, this study compares and contrasts the secondary education data between different socio-ethnic groups.

2. Study Site, Data, and Methodology

2.1 Study Site

The research site was chosen using purposive sampling techniques. As this study focuses on rural Nepal, the Sindhupalchowk district was selected because it is one of the most underdeveloped districts in Nepal in terms of socio-economic indicators; it had no municipalities at the time of sampling. As shown in Figure 1, the district borders Tibet and China, and it is almost entirely covered with hills and mountains. With difficult terrain and limited infrastructure, its inhabitants are generally poor and illiterate. The district has a high level of ethnic diversity, and one of Nepal's disadvantaged ethnic groups, the *Tamang*, comprises the majority (58%) of the population. There are 52 caste/ethnic groups living in the district (CBS, 2011).

Four villages were selected because they were deemed to be best serving the research focus of villages' ethnic compositions (marked with red circles in Figure 1). Lisankhu was chosen because the village has a majority *Tamang* population, which is also the majority within the district. Piskar was selected because it contains an endangered ethnic group, the *Thami*, and because it is a very remote village in the district with no access to a road. Tauthali is also very remote with no road access; furthermore, it is home to a majority *Newar* population. Finally, Thokarpa was selected because it has a significant population of the endangered *Pahari* ethnic group while still maintaining a very mixed ethnic population overall. Figure 1 illustrates the ethnic compositions of the selected villages.

The study covers all of the secondary schools contained in the four selected villages. Lisankhu and Thokarpa have two schools and Piskar and Tauthali each have one school. Therefore, the number of selected schools varies with each village. The school system in Nepal includes four levels: primary (six years, grades 1–6), lower secondary (two years, grades 7–8), secondary (two years, grades 9–10), and upper secondary (two years, grades 11–12). Secondary school was selected from these four levels because by this time, the students are mature enough to independently undertake the survey. In addition, gender is one of the determining factors of educational barriers, and gender-based parameters are easily visible in secondary school students compared to lower levels. Girls start facing more barriers from their family, society, and school at the secondary school age because they have entered their teenage years.
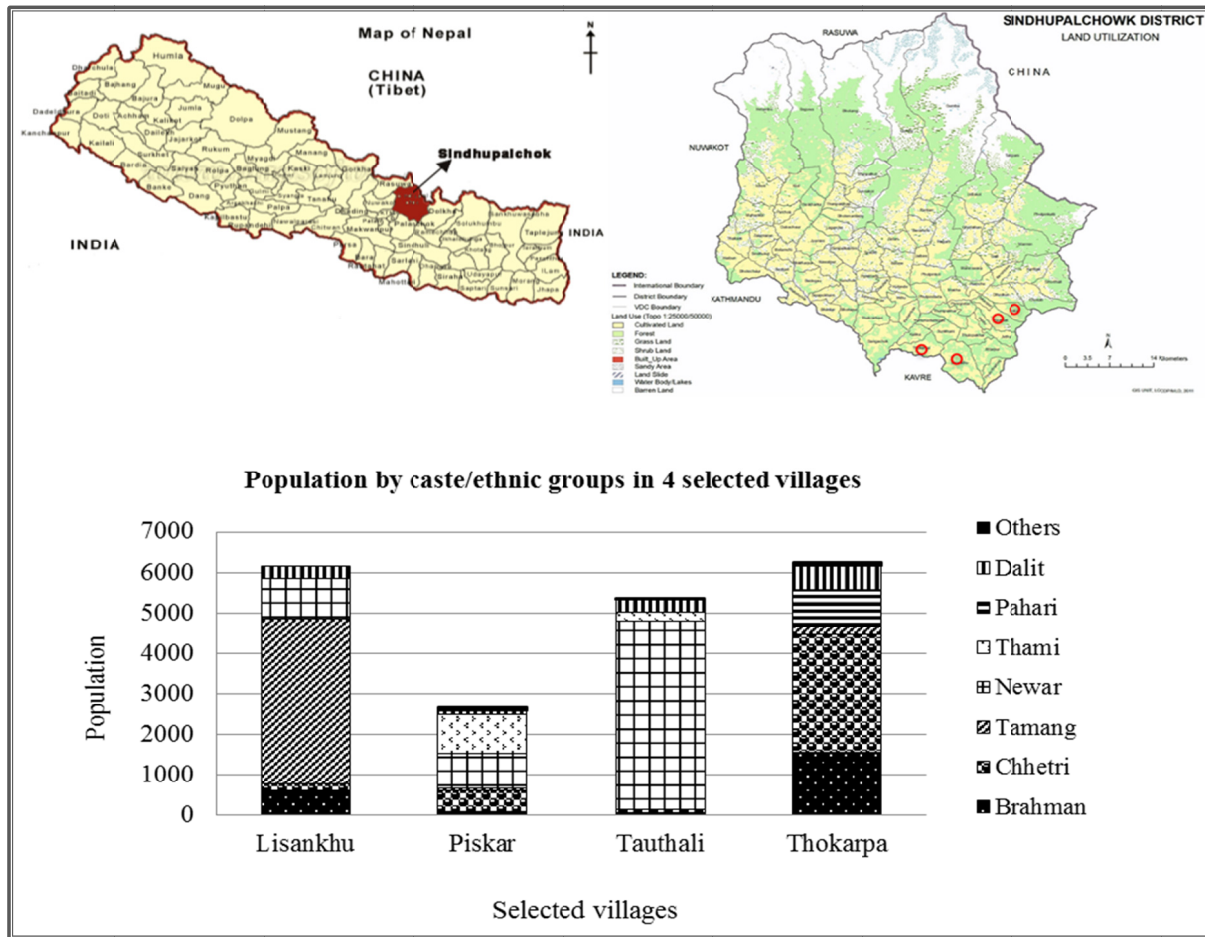
Figure 1. Location of Sindhupalchowk district (top left), four selected villages (top right), and population composition in each village by caste/ethnic groups (below)

Note. Adopted from Neupane (2012)

2.2 The Data

The quantitative data were comprised of a questionnaire administered to all of the grade 9 and 10 students at the six schools studied here. Their final exam scores were also obtained after receiving approval from all of the schools.

2.2.1 Questionnaire

A close-ended questionnaire was used to obtain information about the students' background demographics along with their perceptions of their schooling experiences. The questionnaire was administered in October and November of 2011 to all of the grade 9 and 10 students from the six selected schools. The questionnaire was written in the Nepali language and was administered in each classroom by the researcher. The students filled out their questionnaires individually, taking an average of 50 minutes to complete them. The researcher was present in each class to answer any questions the respondents had regarding the questionnaire. A total of 100% of the respondents returned the questionnaire as soon as they finished answering all of the questions.

The questionnaire was divided into three sections to collect information in the following areas:

Section 1: Students' background information. This section gathered data about the students' basic information and their families' socio-economic background. Specifically, these questions obtained information on age, sex, caste/ethnic group, mother tongue, number of siblings, parents' education and occupation, landholdings of the family, possession of household items/equipment, number of household chores, and whether they lived with their own families or not.

Section 2: Information on schooling experiences. This section asked questions on commute time to school, hours

spent at home studying, the perceived difficulty level of their homework, their attitudes toward their teachers, their beliefs about their schooling experiences, the number of days they were absent from school and why, and their beliefs about schooling and their future careers. Some of the questions in this section used a Likert scale.

Section 3: Gender, caste, and ethnic barriers. This section asked questions about the students' perceptions of gender, caste, and ethnic disparities in their school and in their society, including their teachers' and parents' treatment of boys and girls from different castes and ethnic groups. This section also asked them about their career expectations and the highest degree they wanted to earn. It mainly used Likert scale questions.

Figure 2 represents the composition of the respondents by gender, village, and caste/ethnic group. Among the 407 students who completed the questionnaire, 237 (58%) were female and 170 (42%) were male. With the largest population of the four sample villages, Thokarpa has the largest sample number (i.e., 129 students [32%]). Similarly, 123 (30%), 108 (26%), and 47 (12%) students were from the remaining three villages of Lisankhu, Tauthali, and Piskar, respectively. As for caste/ethnicity, the numbers of students from *Janajati* groups, including *Newar*, *Tamang*, *Thami*, and *Pahari*, were 150 (37%), 83 (20%), 10 (2%), and 2 (0%), respectively. The numbers of students from *Brahman* and *Chhetri* groups were 51 (13%) and 92 (26%), respectively. The total number of *Dalit* students was 15 (4%).
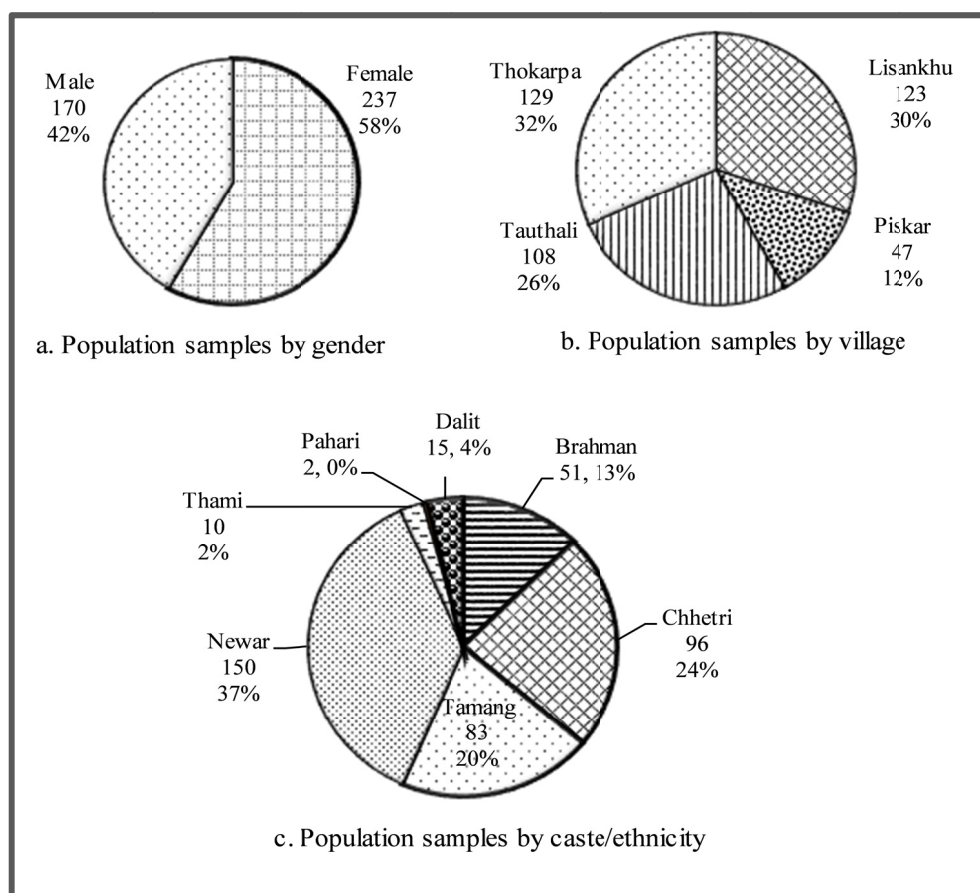

Figure 2. Population samples by: (a) gender, (b) village, and, (c) caste/ethnicity

These percentages raised the following question: Why are there such high proportions of female students in the schools? Of course, this is not due to gender discrimination against boys; instead, it is because boys from wealthier families are sent to private schools in Kathmandu and other large cities. The quality of public and private schools in Nepal varies widely, as do school fees. Another reason for this inequality is that for some students in the *Janajati* groups, such as *Thami* and *Pahari*, when boys reach secondary school or they become able to do physical labor, they drop out of school and choose to pursue paid work instead of continuing their educations.

2.3 Method of Data Analysis

The questionnaire data were used to analyze the attainment gap between different gender, caste, and ethnic groups. Both the data from the questionnaire and the final year exam scores were statistically analyzed to locate the most relevant determinants affecting students' final exam scores. In addition to the quantitative data, qualitative data were collected via classroom observation and in-depth interviews at each of the six schools.

2.3.1 Estimation Strategy

A large body of empirical literature has examined the relationship between various educational inputs and students' school performance as the educational output. To do so, most of them used the education production function in a multiple regression model. Lamdin (1996) proposed a new concept, the input–output approach, over the production function approach; that being said, the basic structure of the models is the same.

In this newer model, the measure of the students' cognitive performance, test scores, is generally considered as the output variable. Hanushek (1986) claimed that test scores are the most appropriate measure, particularly in formal school education, because the main goal is to optimize students' cognitive skills. This paper applies the same methodology as Lamdin (1996), who examined the impacts of policy variables such as student/teacher ratios, school attendance, and other socio-economic variables on students' school attainment.

Lamdin (1996) divided the educational input variables into two groups based on their sources: student and school. The variables related to students' personal ability, family background, and socio-economic characteristics belong to student input variables. The school input variables include the quality of the teachers, student/teacher ratios, expenditure per student, etc. While school input variables can generally be improved through better policy design, student input variables cannot be changed as easily.

In general, the existing literature suggests that students' socio-economic indicators affect their school performance consistently, whereas school input indicators are not consistent (Hanushek, 1986). The relationships are unknown in Nepal because there is very limited research on the divergent socio-economic context of the country.

In the context of Nepalese rural society, there are several aspects that potentially affect secondary school students' performance. Existing education production function analyses usually ignore these factors. One of the most ignored factors is the ethnic composition of the community where the school is located. As each community is composed of highly divergent ethnic groups with a different set of mixed populations, whether a student's ethnic identity within the wider community's unique ethnic composition affects his or her school performance is an empirical question. The other variables considered in the present study include students' daily household chores and their families' land sufficiency, as almost every villager depends on agriculture in rural Nepal. The following general education production function was used to develop the regression model:

$$A = f(X[1], X[2]) \tag{1}$$

where A represents student performance, X[1] represents student input variables, and X[2] represents school input variables. The dependent and independent variables are described below.

Dependent variable. According to Kutnick (2000), test scores not only provide immediate feedback to students about their academic achievement, but they also reflect their motivation for learning. Thus, to measure the students' performance as a dependent variable, the average grade score in the final exam is used in the regression analysis. All six schools in the four villages test each student within each area of the curriculum at the end of each term.

Independent variables. Student or family and school inputs are used as the independent variables. This study follows the standard approach to measure both the students and the school inputs. For example, student inputs cover a number of socio-economic measures such as household chores, father's education, number of siblings, land sufficiency, and desired level of education.

Similarly, school inputs include student/teacher ratios (i.e., average class size). Although other variables exist in the literature, such as school infrastructure, teachers' salary, etc., it is assumed that the student/teacher ratios can serve as a proxy for these (Neupane, 2012).

This study uses the proportion of population of each caste/ethnic group within a village, which is defined as the ethnic composition of a village, as a unique and important predictor of the test score (see Table 1).

Table 1. Proportion of population of each caste/ethnic group in the selected villages (%)

	Brahman	*Chhetri*	*Tamang*	*Newar*	*Thami*	*Pahari*	*Dalit*	Total
Lisankhu	10	3	66	16	0	0	5	100
Piskar	4	19	2	33	36	0	3	100
Tauthali	1	1	0	87	4	0	6	100
Thokarpa	25	47	3	0	0	15	10	100

Data source: District Development Committee (DDC) Sindhupalchowk (2010).

Based on the education production function approach, the following ordinary least square (OLS) regression model was developed to analyze the data:

$$\text{SCORE}_i = \beta_0 + \beta_1\,\text{CHORE}_i + \beta_2\,\text{FEDU}_i + \beta_3\,\text{SIBL}_i + \beta_4\,\text{LAND}_i + \beta_5\,\text{S/T}_j + \beta_6\,\text{DEDU}_i + \beta_7\,\text{ECOM}_i + \in_I \quad [2]$$

where

$SCORE_i$ = Average percentage score of student "*i*" in the final exam

$CHORE_i$ = Number of different types of household chores done by student "*i*"

$FEDU_i$ = Father's level of education of student "*i*"

$SIBL_i$ = Number of siblings of student "*i*"

$LAND_i$ = Land sufficiency of the family of student "*i*"

S/T_j = Student/teacher ratio in school "*j*"

$DEDU_i$ = Desired level of education by student "*i*"

$ECOM_{kl}$ = Proportion of population of ethnic group "*k*" in village "*l*"

Beta (β) is the main parameter of interest in the regression analysis. In addition, *i*, *j*, *k*, and *l* represent the group identifiers (i.e., 407 sample students, 6 sample schools, 7 caste/ethnic groups, and 4 sample villages, respectively). $\in$ is the error term. Robust OLS regression results are reported to correct the possible problem of heteroskedasticiy. Furthermore, several dummy variables are generated and added to the regression analysis to account for the effects of gender, caste/ethnic groups, and the composition of village in terms of caste/ethnic groups.

The quantitative results were complemented by in-depth interviews with selected students, parents, teachers, and members of school management committee, as well as via classroom and participant observation and field notes.

3. Results and Discussion

3.1 School Attainment of the Respondents

The students' average test scores in the final exams are used in the regression analysis to measure their performance. The average test scores by caste/ethnic group, village, and gender are presented in Table 2. They show that Thokarpa village has the highest average test score (56%), followed by Piskar, Lisankhu, and Tauthali. Female test scores follow the same pattern.

Table 2. Average test score of respondents in their final exam by gender, caste/ethnic group, and village (%)

Group	Lisankhu			Piskar			Tauthali			Thokarpa		
	F	M	T	F	M	T	F	M	T	F	M	T
Brahman	52		52	64	60	62				50	65	58
Chhetri	44	49	47	52	59	56				51	63	57
Tamang	46	50	47	40		40				46	49	48
Newar	45	46	46	42	45	43	43	50	46			
Thami				42	46	43						
Pahari										39		39
Dalit	35	43	42	40		40	38	42	39	39		39
Total	**46**	**48**	**47**	**47**	**55**	**50**	**43**	**50**	**46**	**50**	**63**	**56**

Note. F=female; M=male; T=total.

Figure 3 presents the average test scores by village and gender. It illustrates that females' average test score is 46% and that males' is 55%. Thus, the overall gender gap in school achievement is quite large, and female students are lagging behind male students.

Comparing the gender gaps of the test scores by village, Lisankhu has the smallest gap in the average test score between male and female students, at 46% for females and 48% for males. On the other hand, Thokarpa has the biggest gap, at 50% for females and 63% for males. The village with a majority *Tamang* population (i.e., Lisankhu) has the smallest gender gap.

On the contrary, Thokarpa village, which has a majority *Brahman* and *Chhetri* population, has the widest gender gap in terms of its test scores. Piskar has an 8% gap between male and female students, with males at 55% and females at 47%. Tauthali has a 7% gap, with 50% for males and 43% for female. In general, the average test scores for the boys and girls differ significantly, with girls lagging behind in all four villages.
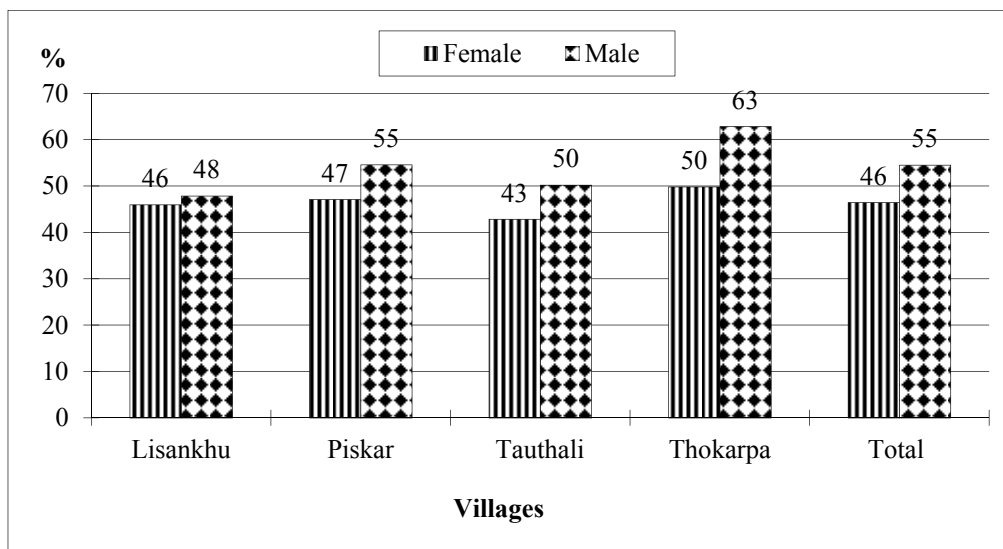

Figure 3. Average test score of the respondents by village and gender (%)

Figure 4 shows the average test scores by caste/ethnic group and gender. With average test scores of 65% for males and 52% for females, *Brahman* students are the highest achieving among the caste/ethnic groups studied here. However, the gender gap is also the highest among *Brahman* students at 13%. On the other hand, *Tamang* and *Thami* students have the lowest gap between males and females: both groups have a 4% gap. The test score for female *Tamang* students is 46% and for male *Tamang* students is 50%. Female *Thami* students' score is 42%, whereas for male *Thami* students it is 46%. *Dalit* and *Pahari* female students have the lowest test scores at 39%. The gender gap among *Dalits* is 4%. There is a huge problem with school attrition in the *Pahari* male population. When they grow old enough to work, they drop out of school and opt to engage in paid physical labor; therefore, there were no male *Pahari* students in the study.
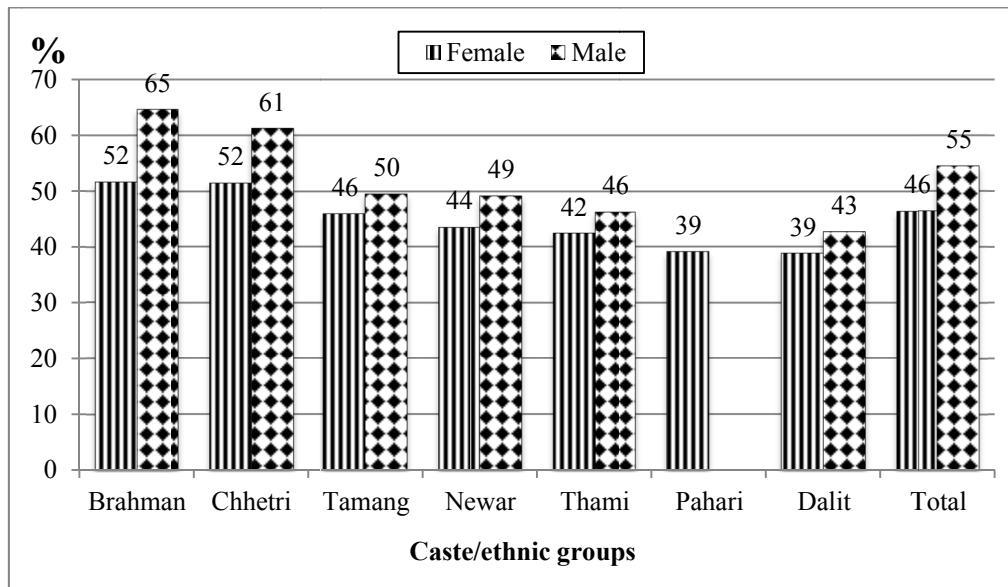
Figure 4. Average test score of the respondents by caste/ethnicity and gender (%)

3.2 Determinants of School Attainment

Table 3 shows the results of the OLS estimations; the robust standard errors are in parentheses. Column 1 presents the results of the baseline equation without any dummy variables. Column 2 and Column 3 present the results of the added gender and caste/ethnic group dummy in the baseline equation, respectively, which captures the significance of these socio-cultural differences in school attainment. Finally, Column 4 includes the ethnic composition of the village population and its interaction term with the caste/ethnic group dummy. While the ethnic composition variable captures the impact on school attainment, the interaction term captures the variation of such impact in different villages with different caste/ethnic group compositions.

The coefficients indicate the magnitude of the effect. Whether the effect is positive or negative can be seen by the positive or negative value of the coefficient. The coefficient matters only if the effect is significant; the number of asterisks (*) indicates the level of significance (* = 10%, ** = .5%, and *** = 1%). No asterisk means that there was no significant effect.

In Column 1, the household chores variable has a negative relationship with students' final exam scores; the effect is significant at the 5% level because the coefficient is negative. This result is as expected: if students need to do more work at home, they have less time to study and will have more trouble concentrating on their studies (Chinyoka & Naidu, 2014; Okeke, Nzewi, & Njoku, 2012). Many studies conducted in developing countries have found a strong association between children's involvement in economic activities or household chores and their academic achievement (Akabayashi & Psacharopoulos, 1999; Heady, 2003; Ray & Lancaster 2004).

Similarly, father's level of education has a positive effect on students' exam scores (significant at the 5% level). This result also aligns with the existing research on the topic (Breen & Jonsson, 2005; Buis, 2013). If a father has a higher level of education, he can assist his children to study at home. Better educated fathers also have a better perspective about educating their children, so they are more likely to create a better study environment at home, having a positive effect on their children's school performance. This study does not consider the mother's level of education because almost all of the students' mothers have no or very little education. Because of such little variation in the data, the mother's education cannot explain the effect in the regression analysis.

Table 3. Impacts of gender, caste and ethnicity together with family, school and individual characteristics on the average grade score of secondary school students in selected rural villages of Nepal, 2011

Dependent variable: Average score in the final exam (%)

	[1]	[2]	[3]	[4]
Household chores	-0.391**	-0.368*	-0.371*	-0.381*
	(0.220)	(0.216)	(0.194)	(0.198)
Father's education	0.947**	0.685*	0.254*	0.173
	(0.418)	(0.388)	(0.427)	(0.429)
Number of siblings	-0.459	-0.303	-0.0761	-0.168
	(0.307)	(0.281)	(0.264)	(0.274)
Land sufficiency	0.420***	0.393**	0.277*	0.222*
	(0.151)	(0.140)	(0.141)	(0.146)
Students teacher ratio	-0.251***	-0.238***	-0.1587*	-0.1395*
	(0.0667)	(0.0634)	(0.0728)	(0.0746)
Desired level of education	0.556	0.502	-0.0211	0.0275
	(0.485)	(0.443)	(0.439)	(0.450)
Gender dummy				
Girls dummy		-7.326***		
		(1.034)		
Caste/ethnic dummy				
Chhetri dummy			-1.071	
			(2.082)	
Tamang dummy			-9.624***	
			(2.212)	
Newar dummy			-10.82***	
			(2.059)	
Thami dummy			-12.97***	
			(2.135)	
Pahari dummy			-18.58***	
			(1.860)	
Dalits dummy			-17.87***	
			(2.195)	
Interaction term: caste/ethnic group *dummy ×caste/ethnic composition (ECOM)*				
ECOM (proportion of population of a caste/ethnic group in a village)				0.415***
				(0.103)
Cheetri_dummy × ECOM				-0.200**
				(0.0912)
Tamang_dummy × ECOM				-0.407***
				(0.0988)
Newar_dummy × ECOM				-0.416***
				(0.0974)
Thami_dummy × ECOM				-0.491***
				(0.0958)
Pahari_dummy × ECOM				-0.973***
				(0.0936)
Dalits_dummy × ECOM				-1.569***
				(0.254)
Constant	52.18***	55.06***	58.54***	47.85***
	(3.979)	(3.721)	(3.934)	(3.937)
Observations	407	407	407	407
R-squared	0.122	0.236	0.307	0.283

Notes. Ordinary Least Square (OLS) robust estimations are reported. Standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

As expected, land sufficiency, which is measured by the number of months in which the student's family can survive off of the production from their own land, also positively affects school performance. This effect is highly significant at the 1% level. This relationship is also in line with many existing studies that confirm the positive effect of family income-related variables on students' educational performance. Stash and Hannum (2001) found that land ownership was strongly associated with school attendance in Nepal.

The only school input measure in the regression model, student/teacher ratio (i.e., average class size), is also highly significant at the 1% level; it has a negative relationship with students' exam scores. When teachers have smaller class sizes, they can better guide and monitor students, leading to higher exam scores.

A couple of variables are insignificant. Firstly, students' desired level of education is insignificant, although the coefficient is positive, which illustrates the positive effect of the variable on the test score. This might be due to the very low level of dispersion of the data. Looking at the descriptive statistics (Appendix 1), the coefficient of variation (CV) measured by the ratio of standard deviation and mean is only 0.35. Similarly, number of siblings is also insignificant. This might be due to the fact that the deterioration of family care and investment in education occur only in larger families. In fact, the negative relationship between educational attainment and number of siblings was found to be significant only in large households (a family size greater than five) in a study conducted in Vietnam (Anh et al., 1998).

Column 2 shows the results of adding the dummy variable for girls (girls dummy) to the baseline equation. Only the girls dummy is used to compare the results with the boys dummy. The coefficient of the girls' dummy is -7.3; it is significant at the 1% level. The result indicates that the girls' final exam scores are 7.3% lower than the boys'. The result confirms that gender gap between girls and boys is greater than 7%, which is a result of different types of educational barriers.

In general, the magnitude and sign of the coefficients of the other variables are firmly consistent with Column 1. However, as the gender effect is controlled, some of the variables lost magnitude and some variables lost any significant effect. For instance, in Column 2, the level of significance of household chores is only 10%; the magnitude of the coefficient also decreases from -0.391 to 0.368. A similar effect is observed for the father's level of education. In the case of land sufficiency, the significance level drops from 1% to 5%; the magnitude of effects also decreases from 0.42 to 0.32. Clearly, the effect of gender on school performance is very strong; thus, if gender is controlled for, the effects of the other variables will decrease. In other words, if the gender barrier to education can be reduced, the effects of other barriers to students' school achievement will also automatically be reduced.

Interestingly, the significance level of the student/teacher ratio is unchanged, although the magnitude decreases from -0.251 to -0.238. This indicates that school inputs contribute equally to both the male and female students' school achievement. The other two variables, number of siblings and desired level of education, are insignificant (Column 2), indicating the consistency of the model used.

Column 3 shows the variation of the effects across different caste/ethnic groups by using their dummy variables in the regression. As the caste/ethnic dummy for *Brahmans* is not used in the regression, the results for the dummy variable are a reference to *Brahmans*, the highest group in the Hindu caste system. For example, though the final exam score of *Chhetris* (the second-highest caste group) is less than that of *Brahmans* (as the coefficient is -1.071), the difference is not significant. However, the difference between the final exam scores of the other caste/ethnic groups and *Brahmans* is significantly low at the 1% level. The magnitudes of the coefficients are also very high, indicating a large disparity. For instance, *Tamang* students' final exam scores are 9.6% lower and *Pahari* students' final exam scores are 18.6% lower than *Brahman* students' exam scores. The differences for the other caste/ethnic groups fall in between the difference of the *Tamangs* and the *Paharis* with the *Brahmans*. Notably, despite the higher status in the caste system, *Pahari* students scored below *Dalits* students (the lowest caste group).

The results of the other explanatory variables are generally consistent with the results from Column 1 and Column 2, although the level of significance and the magnitude of the effect are diminished. However, this does not deteriorate the credibility of the model; rather, it increases its explanatory power, as the R-squared increased from 0.122 to 0.307 when controlling for caste/ethnic group. In fact, the model reveals that caste/ethnic group is an important determinant affecting students' overall scores in their final exams. Therefore, if the caste/ethnic group-related barriers to education are reduced, overall school performance will improve significantly.

Column 4 accounts for the intra-caste/ethnic group differences in the population composition of each village. To achieve these findings, the proportion of all of the caste/ethnic groups in each village was calculated and termed "caste/ethnic composition" (ECOM). Then, an interaction term was created by multiplying this variable with the

caste/ethnic dummy variables. The variable ECOM and the interaction term were added to the regression equation in place of the caste/ethnic dummy variables. Here too, the interaction term with *Brahmans* was not included in the regression equation in order to reference the results with the highest caste/ethnic group.

Interestingly, ECOM is highly significant at the 1% level, positively affecting students' final exam scores. It indicates that students from a certain caste/ethnic group with a higher proportion of population in a village have higher scores on their final exams than the same caste ethnic group with a lower proportion of the population in another village.

The results of the dummy variable show that the effect is significantly higher for *Chhetri* students compared to *Brahman* students. However, the effect on the other caste/ethnic groups is significantly lower than on the *Brahman* students. Interestingly, the level of significance of the effect is very high at 1%.

The effects of other explanatory variables are generally consistent with the results from the previous columns. However, the significance of the effect of father's education disappears in this equation, as the ethnic composition shares more of the effects in this case.

In short, the overall results from the regression analysis demonstrate the adverse impacts of gender and caste/ethnic hierarchy on the final exam scores of female and lower caste/ethnic group students. The effects of other explanatory variables captured by this model are as expected and are in line with the existing literature. More importantly, the ethnic proportion of a certain caste/ethnic group matters, so minority groups in a community need special policy treatment to help uplift their educational level.

3.3 Observation and Interview Results

The quantitative results are supported by the researcher's interviews with certain stakeholders and classroom observations. The researcher witnessed many pieces of evidence that clearly explain the aforementioned quantitative results. Even though many local people said that they did not discriminate against lower caste people, the researcher clearly observed discriminatory practices. The interviewees also expressed many instances of discrimination. For instance, a *Dalit* girl shared her experience as follows:

> … I was not allowed to eat together with higher caste friends. When I went to their houses, I always had to stay outside alone. One day, their dog almost bit me when I was waiting for them outside of their house. After that incident, I stopped playing with them.

Another *Dalit* girl who is married to a higher caste boy and lives in Kathmandu highlighted the problem of inter-caste marriage:

> We live in a rented apartment in Kathmandu, hiding our caste identity. If people know we are *Dalit*, they will misbehave and discriminate [against] us when we use common facilities such as [the communal well]. We might also be kicked out from the apartment by the owner. Therefore, we have to hide our caste.

There were many unique caste-related observations noted during the field visit. For example, in villages where there are relatively low numbers of high caste *Brahman/Chhetri* inhabitants and more *Matwali* (*Tamang* or *Newar*) inhabitants, *Dalits* are more engaged in community social activities. For instance, the school performances of *Dalit* students in Lisankhu VDC, where *Brahmans* and *Chhetris* are in the minority, were competitive with *Tamang* and *Newar* students. *Dalit* students were also actively engaged in teaching and learning activities.

The researcher witnessed different forms of gender discrimination during the field study. For example, while girls were busy with daily chores such as cooking and collecting grass, wood, or water, boys were studying at home or playing with their friends. Girls are obliged to do manual labor, even at school. For instance, in one of the schools, a teacher asked the grade 10 students to clean their classrooms after morning prayers. The boys were very reluctant to do so, and many of them shirked this duty; however, all of the girls actively cleaned the classroom and surrounding premises. When the researcher asked one of the male students why he was not helping to clean, he replied that "cleaning is girls' work. But this is school and I cannot say no to my teacher. So I am just pretending that I am cleaning."

In one interview, a female school management committee (SMC) member explained the gender-specific barriers to secondary school education in her village:

> People say they don't discriminate [between] their sons and daughters, but it's not true. I have a recent example from a nearby village. It was so unfortunate that two sisters even tried to kill themselves once. I have heard that the reason behind that was her mother's discrimination in favor of their brother. Their

mother discriminated acutely and always scolded her daughters. Eventually, the two girls left home and got married, though they both were below the legal age for marriage.

The SMC member further pointed out that early marriage is a strong barrier to secondary education for girls. Usually, parents begin to push for their daughters' marriage when they reach secondary school or when they become teenagers. Consequently, many of them get married before completing their secondary education, which keeps them from completing their education. Even if they do complete secondary education, the quality of their education is very low, so there is little chance that they will continue on to higher education.

Beside the above-stated traditional and attitudinal barriers, many *Dalit* families are financially deprived and uneducated. Among the interviewed students, most of the *Dalit* students stated that they often could not pay their school fees on time because their parents are very poor. One of the interviewed *Dalit* girls shared her story:

We are six siblings and I am the eldest. Now I am living in my grandparents' place because if I stay here and help my grandparents and uncle's family they will pay my school fees. My parents do not have money to pay my school fees. They work as wage laborers in Kathmandu. My brother and sisters are with my parents, but I am here alone. I wanted to go there [with them], but my parents want me to stay here for a few more years.

In sum, these rural villages have a high degree of ethnic diversity, and the population composition of ethnic groups in each village is different. An ethnic group that is in the majority in one village can be in the minority in another village. Thus, understanding specific barriers to a particular group is essential to overcoming the problem of educational inclusion in that particular community.

4. Conclusion

A questionnaire survey revealed female students', *Dalit* (the lowest caste group) students', and *Tamang* (one of the *Janajatis* groups) students' final exam scores were significantly lower than that of male and high caste *Brahman* and *Chhetri* students' scores. Although students in the second highest caste group, *Chhetri*, scored lower than *Brahman* students, the difference was not significant. Among all of the groups, *Pahari* students had the lowest scores. Even though *Paharis* rank higher in the traditional caste hierarchy than *Dalits*, *Pahari* students' educational and other development indicators were far worse than *Dalit* students. Some of the family input variables (household chores, father's education, and land sufficiency) and the school input variable (student/teacher ratio) were significant factors affecting students' academic performance. However, number of siblings and students' desired level of education were insignificant.

Exploring some of the unique features of caste/ethnic groups that cause a specific barrier to education for their children, the interviews conducted as part of this study revealed several reasons for the results of the questionnaire analysis. First, the *Janajati* people have high alcoholism rates, as they use alcohol regularly, including for religious events. Thus, most of the fathers of *Janajati* students are heavy drinkers, creating an unhealthy home environment for education. During the interviews, some of the students, especially girls from *Janajati* groups, expressed a desire for early marriage in order escape from their unhealthy home environments. The researcher observed that the incidence of early marriage is very high among *Janajati* groups in the villages. The researcher also learned that *Dalit* girls performed many hours of household chores. One *Dalit* girl said that several of her friends dropped out of school due to an overload of work at home, explaining that she feels studying is a large additional burden for her.

Caste/ethnic composition, measured by the proportion of the population of each caste/ethnic group in each village, had a highly significant and positive impact on the students' school attainment. As these rural villages have a high degree of ethnic diversity, and because the population composition of caste/ethnic groups in each village is different, a caste/ethnic group that is in the majority in one village can be the minority in the other villages. Thus, understanding specific barriers to particular caste/ethnic groups is essential to overcoming problems with educational inclusion in each particular caste/ethnic group in different villages.

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Appendices

Appendix 1. Descriptive statistics of the variables

Variables	Mean	Std. Dev.	Min	Max
SCORE	49.54	10.48	30.90	79.80
CHORE	6.47	2.28	1.00	10.00
FEDU	2.35	1.23	0.00	7.00
SIBL	4.39	1.65	1.00	10.00
LAND	11.72	3.20	0.00	15.00
S/T	27.60	8.47	13.33	44.50
DEDU	3.02	1.06	1.00	4.00
ECOM	50.50	28.23	0.47	87

Notes. SCORE=Average percentage score in the final exam; CHORE=Number of different types of household chores done by student; FEDU=Father's level of education of student; SIBL=Number of siblings of student; LAND=Land sufficiency of the family of student; S/T=Student/Teacher ratio; DEDU=Desired level of education of student; ECOM=Proportion of population of certain ethnic group in certain village

Source. Author's calculation using the primary data from schools for the final exam score (SCORE) and questionnaire for all the remaining variables

Appendix 2. Correlation matrix of the variables

	SCORE	CHORE	FEDU	SIBL	LAND	S/T	DEDU	ECOM
SCORE	1.00							
CHORE	-0.11	1.00						
FEDU	0.21	-0.14	1.00					
SIBL	-0.14	0.04	-0.18	1.00				
LAND	0.16	-0.05	0.11	-0.04	1.00			
S/T	-0.25	-0.03	-0.24	0.16	-0.02	1.00		
DEDU	0.14	-0.05	0.16	-0.06	0.05	-0.24	1.00	
ECOM	-0.11	-0.05	-0.04	0.005	-0.04	0.32	-0.22	1.00

Notes. SCORE=Average percentage score in the final exam; CHORE=Number of different types of household chores done by student; FEDU=Father's level of education of student; SIBL=Number of siblings of student; LAND=Land sufficiency of the family of student; S/T=Student/Teacher ratio; DEDU=Desired level of education of student; ECOM=Proportion of population of certain ethnic group in certain village

Source. Author's calculation using the primary data from schools for the final exam score (SCORE) and questionnaire for all the remaining variables.

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