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Carrying of School-Bags by Primary School Learners in Ghana: Observation of Parents

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Abstract

Heightened demand and utilization of school-bags by primary school learners, has come with its attendant, the concern of parents' perception of the increasing weight attached to the bags carried by these primary school learners in Ghana. There is still lack of evidence in Ghana that underlies guidelines for school bag weight limits, so this pioneering study was conducted on the weight of school bags in the field of primary education in Ghana to help guide policy making. The binary probit model was used for a self-administered questionnaire to gauge parents' intent on whether they consider the weight of their primary children's schoolbags weight as being heavy or not, using a research data realized from a cross-sectional sample survey in the greater Kumasi area, Ghana. The estimated effect implies that a female parent, on average and ceteris paribus, is 36 percentage points more likely to consider the schoolbag weight of her primary school child as heavy than a male parent. There are several noteworthy strengths of this study such as recommending to the central government of Ghana, the promotion of e-Schoolbags among primary school learners, and ensuring that provisions are made for lockers in the classrooms to store books or bags after class sessions.

Keywords: *Ghana, probit model, parent, child, learner, schoolbag, weight, e-Schoolbags*

1. Introduction

Education serves as the catalyst of economic growth in Ghana, a view supported by (Azevedo & Nnadozie, 2019; Hanushek & Woessmann, 2021; McGrath, 2018; Rodrigues & Souza, 2020). Successive central governments since Governor Guggisberg (1919-1927), who started the 10-Year Educational Advancement Plan, have determined to support education more by concentrating on the growth of education for the citizens up to the current Education Strategic Plan 2018-2030, as well as the country's signature to the SDG 4 targets. All these education advancements post-date the Christian missionaries who pioneered the Castle Schools in 1776 (Lindsay, 1976). Ghanaians have embraced the concept of formal education including primary schooling, where private families spend their money on the educational safety and security of their primary school learners.

Ghana has kindergarten, primary, basic, secondary, post-secondary and tertiary education structure. During primary education, the curriculum emphasizes the development of reading and writing, study of mother tongue, numeracy and problem-solving skills. Certificates are not issued upon completion of primary education in Ghana. Ghana Statistical Service (2021) reported that 62.4% of female urban dwellers and 37.6 male urban dwellers respectively have primary education.

Maximized need for households' education has resulted in households giving all the required tools for their primary school learners successful education. Recently, one of the tools that Ghanaian families have provided to make their primary school learners feel comfortable and completely satisfied is the school bag. Historically, school bags were not counted as educational material by learners at primary schools. The trend however has changed since the start of the millennia and now both the private and public primary schools' learners have to adopt school bags as part and



parcel of educative materials, to carry their books and school materials utilizing a school bag. With the heightened in demand and utilization of school bags by primary school learners, has come with its attendant, the concern of parents the perception of the increasing weight attached to the bags carried by these primary school learners in Ghana.

Malhotra & Gupta (1965) were the first to investigate concerns about the increasing weight of school bags in developing economies. More recently, research has linked schoolbag weight to low back pain (LBP) among older school students in multiple economies. LBP is experienced as pain between the inferior gluteal folds and the costal margins, alongside painful movement limitations and may be accompanied with leg pain, which is not fracture related, endocrine-related processes, metabolic, or systemic diseases, such as infectious, vascular, neoplastic or a direct trauma, (Kanani, 2019).

This parental perception of the effect of the heaviness of the school bags of their primary school learners has been exacerbated by the absence of studies on the effect or otherwise of schoolbags on primary school learners in Ghana as has been undertaken elsewhere (Calvo-Muñoz et al., 2019). Whilst the government of Ghana continues to provide the school infrastructure, little or no attention has been paid to the health or behavior of the users of the school infrastructure. Worse of all is the design of modern-day classrooms in Ghana as no provisions are made for lockers in the classroom to store books or bags while classes are in session. Some private primary schools also do not provide the time table so learners have to be carrying their books to and fro all the time, coupled with no precise official guideline or policy on the prescribed textbooks that have to be used by primary school learners. Each private primary school prescribes different textbooks for its students. There is still a lack of evidence in Ghana that underlies guidelines for schoolbag weight limits, so this study needs to be conducted as a pioneering study in the field of primary education in Ghana.

This being a cross sectional study, analyses the perception of parents of the school bag weight of their primary school learners and contribute to the inconclusive debate on the effects of weight of school bags, although high incidences of musculoskeletal symptoms among school learners who travelled to and from school on foot and in those who carried their schoolbag in their hands have been established by (Górna et al., 2022). (Malhotra & Gupta, 1965) opined that, learners carrying in their hand, low-back or side position offers the greatest energy cost. (Atreya, 2017; Górna et al., 2022) posited that school bags worn on one side or poorly positioned by learners could deteriorate or damage their posture. This study focused on the perception of parents of primary school learners (Sezer et al., 2019; Mohammadi et al., 2017; Angarita-Fonseca et al., 2019; Pant et al., 2016; de Oliveira et al., 2017; Liller, 2003) and the weight of their schoolbags.

The study is structured as follows: The next section provides the research methods, followed by the analysis of results section. The next is the discussion section and the penultimate section presents the conclusion. The last section makes some recommendations.

2. Research Methods

2.1 Data

A self-administered questionnaire was designed and randomly conducted among 66 parents who accompany their primary school learners to the school bus in the mornings in the greater Kumasi city area. Amongst them, 59 were females and 7 were males. A questionnaire was administered to obtain information on the primary school learner's age, the type of school bag used, and the parent's intent on whether the parent considers the weight of his/her primary school learner's school bag as being heavy or not, is the research data realized from a cross-sectional sample survey. The parents read and signed the approved informed consent document before volunteering to participate in this study.

2.2 Study design

The descriptions and definitions of the model variables used are presented in Table I.

Table I: Definitions and Descriptions of Model Variables used

Name of variable	Definition and descriptions
gender	Dummy equal to 1 if the parent is male, 0 if the parent



	is female.
ageprimaryschoollearner1	Dummy if the primary school learner is aged ≤ 6 years, 0 otherwise.
ageprimaryschoollearner2	Dummy if the primary school learner is 6 years $<$ age ≤ 7 years, 0 otherwise.
ageprimaryschoollearner3	Dummy if the primary school learner is 7 years $<$ age ≤ 8 years, 0 otherwise.
ageprimaryschoollearner4	Dummy if the primary school learner is 8 years $<$ age ≤ 9 years, 0 otherwise.
heavia	Dummy equal to 1 if the parent considers primary school learner schoolbag as being heavy in weight, 0 otherwise.
sbaggi	Type of school bag used by the learner: Backpack = 1, Shoulder bag =2, Front pack =3, Double pack = 4.

2.3 Estimation procedure

The estimated value of the dependent variable in this specified function is 1 or 0, depending on whether the parent considers her/his primary school learner’s schoolbag as being heavy in weight or not. Taking into account the finite dichotomous nature of the dependent variable, a probit model was employed in the estimation. The dichotomous probit is modeled on a latent dependent variable (sb_i^*), and If $sb_i^* \geq 0$ then $sb_i = 1$, and the actual is realized. This is expressed broadly as a linear function of a set of covariates as:

$sb_i^* = x_i'sb + \omega_i$, where $\omega_i \sim N(0, \sigma^2)$. Giving a STATA statistical estimation procedure of the form: Prob [heavia_i=1] = $\Phi(\beta_0 + \beta_1gender_i + \beta_2ageprimaryschool learner1_i + \beta_3ageprimary schoollearner2_i + \beta_4ageprimaryschoollearner3_i + \beta_5ageprimary schoollearner4_i + \omega_i)$, where $i = 1, \dots, 66$ and $\Phi(\cdot)$ represents the standard normal cumulative distribution operator. Learners aged over nine years of age are the omitted age-category in the estimation process. The presence of heteroskedasticity in the probit model, is bound to generate inconsistent parameter estimates, although its presence, in a probit model may be more “superficial than actual” (Johnston & DiNardo 1999, pp. 426–427; Castaldo et al., 2007). However, the robust variance–covariance matrix (Huber, 1967) is applied using STATA to rectify the presence of heteroskedasticity in the probit model.

3. Analysis Results

3.1 Descriptive findings

The marginal effects of the probit estimates are presented in Table II.

Table II: Marginal effects of the Probit Regression Model.

Variable probit marginal effects	
gender	0.3658693 (1.83)
ageprimaryschoollearner1	0.3634334 (1.21)
ageprimaryschoollearner2	0.2452007 (1.08)
ageprimaryschoollearner3	0.5987302 (2.33) *
ageprimaryschoollearner4	0.3368995 (1.22)
McFadden pseudo-R ²	12%
Model correctly classified	71.21%

Asymptotic t values in brackets. *Significant at 0.05% significance level.

The estimated effect for gender implies that a female parent, on average and ceteris paribus, is 36 percentage points more likely to consider the schoolbag weight of her primary school learner as being heavy than a male parent. The estimated marginal effect for gender is not well determined with an asymptotic t-value of 1.83.



The estimated marginal effect of means that a parent having a primary school learner aged less than 6 years is, on average and *ceteris paribus*, 36 percentage points more likely to consider the weight of her/his primary school learner's school bag as heavy than a parent whose primary school learner is over nine years of age. The estimate is not well determined with an asymptotic t-value of 1.21. The estimated marginal effect implies that a parent with a primary school learner aged between 6 and 7 years, is, on average and *ceteris paribus*, 24 percentage points more likely to consider the weight of her/his primary school learner's school bag as heavy than a parent whose primary school learner is over nine years of age. The estimate is not well determined with an asymptotic t-value of over 1.08. A parent with a primary school learner aged between 7 and 8 years, is, on average and *ceteris paribus*, 60 percentage points more likely to consider the weight of her/his primary school learner's school bag as heavy than a parent whose primary school learner is over nine years of age. The estimated marginal effect is well determined with an asymptotic t-value of 2.33. The estimated marginal effect means that, *ceteris paribus*, a parent of primary a school learner between the age of 8 and 9 is 34 percentage points more likely consider her/his primary school learner's school bag as heavy than a parent whose primary school learner is over nine years of age. The estimate is not well determined with an asymptotic t-value of 1.22.

Specifications test in terms of the functional form and omitted variables, homoskedastic errors, and a symmetric and mesokurtic distribution of the probit model shows that 71.21 percentage points of the model are correctly classified and predicted using the estat classification test in STATA. Although the McFadden pseudo-R² reported a 12-percentage point fit. The data also showed that 89.39 percent of primary school learners used backpacks. This confirms (Atreya, 2017) report that most commonly reported type of schoolbag was a backpack (89.3%). 3.03 percentage points of the school bag used by the primary school learners are shoulder pack, 6.06 percentage points of the school bag used by the primary school learners are front pack, and 1.52 percentage points of the school bag used by the primary school learners are double pack. The results are presented in Table III.

Table III: Types of Schoolbags used by Primary School Learners in Kumasi

Type of school bag	Frequency	Percentage
Backpack	59	89.39
Shoulder bag	2	3.03
Front pack	4	6.06
Double pack	1	1.52

4. Discussion

Empirical evidence from this study suggests that Ghanaian parents perceive schoolbags carried by their primary school learners as being heavy in weight. To overcome these concerns and fears of parents of primary school learners in Ghana, the Government of Ghana must develop policy guidelines to ensure the reduction of the continued weight gain of school bags for primary school learners. The Ghana Digital Agenda (2018) policy must be refocused on the primary education sector through the use and promotion of e-Schoolbags. The impact of Information and Communication Technology (ICT) on education is astonishing and revolutionary. Many education policymakers and governments are improving educational reforms through the use of ICTs, a departure from the classical model of teaching and education delivery handed over from the era of the Industrial Revolution (Yang *et al.*, 2019). Tablets equipped with subject learning materials for primary school learners, called e-Schoolbag, provide primary school learners with mobility and multiple interactive learning opportunities, (Gu *et al.*, 2017; Ren, 2017) and enhance interaction among primary school learners by promoting access to learning materials through digital means. The e-Schoolbag has the capacity of promoting independent learning, collaborative learning, and problem-solving (Ni *et al.*, 2015). The weight of the e-Schoolbag is not as heavy as the weight of the current school bags of primary school learners in Ghana.

The study has affirmed that stated data rather than revealed preferences data can generate results consistent with economic theory and facilitate the estimation of statistical models that are of equal value from those that use revealed preference data, (Hu, 2020).

5. Conclusions



There is a need to determine the weight of primary school learners school bags in Ghana on the basis of the existing body of knowledge. As a result of the lack of existence of legal framework regulating the use of school bags by primary school learners in Ghana, concerted investment in large-scale prospective longitudinal studies remains a challenge and empirical evidence from more rigorous short-term localized case studies must be encouraged and would possibly help to secure support for future national longitudinal studies.

6. Recommendations

By pushing for strict timetables for primary school learners, providing classroom lockers could provide a mid-term solution to help primary school learners in Ghana reduce the weight of their schoolbags. The scope of the study was limited because it focused only on parents of primary learners enrolled in private institutions. Hence, parents from public (taxpayer-funded) and private institutions of learners of similar age groups will be part of a future research agenda, from which more useful empirical evidence can be expected.

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