

Original Research Article

PREVALENCE, PARENTAL PERCEPTION AND FACTORS ASSOCIATED WITH THE PRACTICE OF DEWORMING SCHOOL-AGED CHILDREN IN NORTH- EAST NIGERIA.

Abstract:

Aims: To assess the prevalence of de-worming among school children, assess parental perception of the practice and the factors influencing school child deworming practices among the parents/guardians in Bauchi State.

Study Design: It was a descriptive cross-sectional study carried out in Bauchi state, Northern Nigeria in March 2016 among parents/guardians of primary school pupils. A multi-stage sampling technique was used to select 12 out of 36 primary schools for the study.

Methods: There were 598 participants. A semi-structured questionnaire was used to elicit variables such as prevalence of de-worming, parental perception of de-worming and predictors of parents/guardian deworming practices.

Results: Nearly half (272 (45.5%)) of the guardians were aware of deworming, while only 119 (19.9%) of their school children had ever been dewormed but 572 (95.7%) guardians saw deworming as an important practice and 560 (93.6%) wanted their children dewormed. Using binary logistic regression showed that (being a male school child and if other siblings of the school child were previously dewormed) were significantly positive predictors for the prevalence of school children's deworming.

Conclusion: The prevalence of de-worming is low in north-east Nigeria, this was majorly due to lack of awareness. This underscores the need for scaling-up of deworming exercises alongside sensitization and health education of parents/guardian of primary school pupils.

Keywords: Prevalence, parental perception, deworming, school-aged children

Introduction

Infections with parasitic helminths are among the most common and widespread infections of humans in the world today especially among school-aged children in developing countries.¹ They are transmitted by ingestion of eggs present in human faeces which contaminate soil in areas where sanitation is poor, hence they affect the poorest and most deprived communities.²

The World Health Organization (WHO) estimates that over two billion people are infected with one or more soil-transmitted helminths and common species identified are the roundworm (*Ascaris lumbricoides*), the whipworm (*Trichuris trichiura*) and the hookworms (*Necator americanus* and *Ancylostoma duodenale*).³ WHO puts the latest estimates of children

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37 in need of treatment for these parasites at more than 880 million while over 610 million
38 children of school age stand the risk of morbidity occasioned by soil transmitted
39 helminthiasis and schistosomiasis.⁴ The organisation recommends annual treatment in areas
40 where prevalence rate of soil-transmitted helminthiasis is between 20% and 50%, and a twice
41 a year treatment in areas with prevalence rates of over 50%.⁵ Despite these recommendations
42 and scaling-up of deworming exercises targeted at increasing coverage of deworming among
43 school-aged children, soil helminthiasis is still a major public health issue.⁶

44
45 Studies in Nigeria have reported a high prevalence of worm infestation among school-aged
46 children. In riverine communities of Warri North Local Government Area of Delta State,
47 Nigeria, 77% of the school children studied were infected with intestinal helminths.⁷ Another
48 study reported the prevalence of intestinal parasitism among pupils in the rural schools (the
49 Almajiris) in Borno state of Northern Nigeria as 80.9%.⁸ A study done in Turkey in which
50 parents were interviewed on de-worming revealed that 84.7% of parents were aware of the
51 school health program. It also identified among others; community knowledge and
52 perceptions of deworming, benefits of the treatment, and willingness of the community to pay
53 as factors contributing to issues of sustainability of deworming programs.⁹ Another study on
54 community perception of school-based de-worming program in Ghana highlighted the need
55 to educate illiterate mothers, increase involvement of families in the mass treatment process,
56 reach children that are absent from school and make efforts to change the perception of the
57 community about de-worming.¹⁰ In the study carried out in Turkey, it was reported that the
58 interviewed community members saw deworming with antihelminthics as an experiment by
59 foreigners with the aim of inducing sexual sterility among the local population. Some others
60 believed that the drugs would introduce infection in their children. Most parents in the study
61 did not perceive worm infection as a major health problem for children.⁹

62 **Worm infestation** has been known to have several health and developmental consequences on
63 the child especially the school age child. The most disadvantaged groups such as the poor and
64 the female children often suffer most from ill health and malnutrition occasioned by worm
65 infestation. This same group would gain the most from deworming.¹¹

66 Chronic parasitaemia could cause disruption of both physical and mental development of the
67 child, give rise to anaemia, malabsorption, protein-energy malnutrition, growth stunting,
68 reduced physical fitness, decreased school attendance, reduced cognitive development and
69 decreased grade attainment.¹²

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70 The most cost-effective way to deliver deworming drugs regularly to school-aged children is
71 throughschool based deworming programmes. This is because, a school offers a readily
72 available,extensive and sustained infrastructure with a skilled workforce that is in close
73 contact with the community.

74 Regular deworming is very important because it contributes to good health and nutrition for
75 children of school age.In addition, it will improve their physical and mental health and
76 development with the benefit of increase in school enrolment, attendance, cognition and
77 reduced class repetition.¹¹Deworming of school children also protects other children
78 indirectly. This happens because the dewormed child does not shed the ova of the parasites
79 that couldin turn affect other non-infected children¹³

80

81 **Materials and methods**

82 **Study Area:** The study was conducted in March 2016 inBauchi Local Government Area
83 (LGA)of Bauchi state, one of the states in North Eastern region of Nigeria. The state was
84 created in 1976 and is made up of 18 Local Government Areas (LGA) with BauchiLGA as its
85 capital city. Bauchi is demarcated latitude 9⁰30" North and 12⁰30" North respectively. The
86 western and eastern boundaries are demarcated bylongitude 8⁰45" and 11⁰ 0". The state
87 covers a land mass of 49,259km.²People of BauchiState are predominantly Hausa/Fulani by
88 tribe.[There are 36 public primary schools in Bauchi LGA. All the schools studied are located
89 within the Bauchimetropolis.

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90 **Study Population:** The study was carried out among parents/guardians of pupils attending 12
91 selected public primary schools

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92 **Inclusion/Exclusion criteria:** All consenting parents of the school children were eligible for
93 the study.

94 **Study design:** This was a descriptive cross-sectional study conducted in March 2016
95 amongstparents of primary school pupils attending the 12 selected schools in Bauchi LGA.

96 **Sample size determination:** The minimum sample size was calculated using the Cochran
97 formula¹⁴

98

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$$N = Z^2 \frac{pq}{d^2}$$

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100 When N = minimum sample size, Z = Standard normal deviate corresponding to the
101 probability of type I error is 1.96, p = prevalence of deworming (50%);⁶ $q = 1-p$, d = tolerable
102 error of margin set at 0.05. The minimum sample size calculated was 502 but the researchers
103 increased the sample size to 598 participants to accommodate non-response

104 **Sampling Technique:** A multi-stage sampling technique was used to select parents of
105 children attending 12 selected primary schools used for the survey. The first stage was a
106 simple random sampling to select 12 schools from a list of 36 primary schools in Bauchi Local
107 Government area. The second stage was a systematic sampling method to select 10 pupils
108 from each class for the respective levels in the selected schools with an average of 50 pupils
109 per school (Primary 2 to 6). The parents of the selected children were invited for
110 questionnaire administration through the principals of the respective schools. Those who gave
111 consent were interviewed for the study.

112 **Data collection:** The study instrument was a pre-tested semi-structured (with reliability
113 coefficient of 8.0), self-administered questionnaire. The questionnaire was self-developed
114 and comprised of three sections on socio-demographic characteristics, perception/practice and
115 factors influencing up-take of deworming. The age and sex of the school child whose parent
116 was interviewed were also recorded. After signing an informed consent form,
117 respondents were administered the questionnaire.

118 **Statistical Analysis:** The data was analysed using Statistical Software Packages for Social
119 Sciences (IBM - SPSS version 21), for Windows. Frequencies and proportions were
120 calculated for categorical variables, while the means and standard deviations were calculated
121 for numeric/quantitative variables. Comparison between categorical variables was done using
122 a chi-square test. Fisher's Exact Test was done for outputs where one or two of the cells had
123 numbers less than 5. A 'P' value less than 0.05 was considered statistically significant, using a
124 two-tailed distribution. Bivariate analysis was done to assess the relationship between socio-
125 demographic characteristics, awareness, perception of deworming and deworming status of
126 school children. Variables that were significant on bivariate analysis were fed into a
127 multivariate binary logistic regression model to assess the association and interactions among
128 factors influencing guardians deworming practice.

129 **ETHICAL CONSIDERATIONS:**

130 The study was approved by Bauchi State Ministry of Health ethics committee and written
131 informed consent was taken from each parent or guardian.

132

133 **RESULTS**

134 Parents/guardians of 598 primary school children from 12 selected schools in Bauchi State
 135 were interviewed mainly on the deworming status of their wards in primary school. They
 136 were also interviewed on their historical practices of deworming and some socio-economic
 137 features of the guardians that may affect the practice of school child deworming. Also
 138 evaluated was their perception of child deworming practices.

139 **Socio – demographic characteristics of school children and the guardians**

140 Table 1 shows that 598 school children included 302 (50.5%) males and 296 (49.5%),
 141 females whose combined average age was 10.6 years, ranging between 5 and 20 years with
 142 those aged 10 – 14 years being greatest in proportion 410 (68.6%). Their interviewed
 143 guardians were between the ages of 18 and 82 years with an average age of 44.3 ± 10.7 years.
 144 Those aged 40 – 49 years constituted the greatest proportion 211 (35.3%). The proportion of
 145 males 511 (86.5%) was more than that of the females.

146 **Table 1: Socio – demographic characteristics of school children and the guardians**

Variables	Description/Frequency (%)	
	School children	Guardians N = 598
Mean age (years)	10.6 ± 2.3 (C.I = 10.4 – 10.8)	44.3 ± 10.7 (C. I = 43.4 – 45.1)
Age group	N = 595	
5 – 9	183 (30.6)	< 19 1 (0.2)
10 – 14	410 (68.6)	19 – 29 46 (7.7)
15 – 20	2 (0.3)	30 – 39 132 (22.1)
		40 – 49 211 (35.3)
		50 – 59 153 (25.6)
		≥ 60 55 (9.2)
Gender N = 598		
School children		Guardians
Male	302 (50.5)	Male 511 (85.5)
Females	296 (49.5)	Females 87 (14.5)

Five hundred and forty-eight (91.6%), parents/guardians were literate and majority of them
 282 (47.2%) were educated up to tertiary institution level, while those who had vocational

education were least in number 10 (1.7%). The commonest occupation among the guardians 148 (24.7%), was business ventures followed by the civil service, 130 (21.7%). Students were the least in number 13 (2.2%). These are shown on table 2 below.

Table 2: Parents/guardians occupational and educational status

Occupational groups	N (%)	Educational level completed	N (%)
Business	148 (24.7)	Vocational education	10 (1.7)
Civil servants	130 (21.7)	No formal education	50 (8.4)
Professional	99 (16.6)	Primary school	72 (12.0)
Artisan/Non professional	82 (13.8)	Secondary school	184 (30.8)
Retired	50 (8.4)	Tertiary	282 (47.2)
Defence/Public servants	40 (6.7)		
Agriculture	21 (3.5)		
Manufacturing	18 (3.0)		
Student	13 (2.2)		

147 Less than half 272 (45.5%) of the guardians were aware of deworming while 119 (19.9%) of
 148 the school children had ever been dewormed by these guardians. Out of this number, 29
 149 (24.4%) were dewormed 6 months prior to the study and 90 (75.6%), dewormed over 6
 150 months before the commencement of the study. One hundred and seventy (28.4%), guardians
 151 had ever dewormed their other children apart from those in school. The commonest reason
 152 why minority of the school children were dewormed was because majority of the guardian
 153 326 (54.5%) never knew about deworming. One hundred and eighteen (19.7%) said that they
 154 had never given deworming a thought while the cultural practices and religious belief of one
 155 guardians respectively, did not permit deworming of children. However, 572 (95.7%)
 156 guardians saw deworming as a worthwhile practice and 560 (93.6%) would want their
 157 children dewormed. These are shown on table 3.

158

159 **Table 3. Child's deworming status/guardians awareness and perception of deworming**
 160 **practices**

Variables	Frequencies	N =	Percentage
	598		
Guardians who were aware of deworming	272		45.5
School children who were dewormed	118		19.7

Last time school child was dewormed

≤ 6 months ago	28	4.7
7months – 1 year ago	29	4.8
> 1 year ago	61	10.2

Guardians who have dewormed other children 170 28.4

Reasons why child was not dewormed

My culture does not encourage it	1	0.2
My religion does not permit it	1	0.2
No money	11	1.8
It is not necessary	22	3.7
I never thought about it	118	19.7
I do not know about it	326	54.5

Guardians who feel that deworming is good 572 95.7

Guardian who want child dewormed 560 93.6

Table 4 revealed that the proportion of dewormed school children was greatest among those aged 5 – 9 years 44 (24.0%), compared to other age groups. Males were also favoured (23.5%) in terms of deworming compared to their female counterpart 48 (16.2%). Guardians aged 30 – 39 years practiced deworming of the school child 34 (25.8%), more than other age groups. However, the females marginally practiced child deworming for the school child, 18 (20.7%) more than the males 101 (19.8%). Statistical significant relationships existed only between the sex of the school child and child's deworming status ($P = .02$), but not with child's age nor with guardians' sex and age group.

Table 4: Association between age and gender of child/guardian and deworming practices

Variables	Deworming status of school children			$\chi^2(P\text{-value})$
	N (%)			
	Yes	No	Total	
Age group of school child				
5 – 9 yrs	44 (24.0)	139 (76.0)	183	3.1 (.12)
10 – 14 yrs	75 (18.5)	335 (81.7)	410	
15 – 20yrs	0 (0.0)	2 (100)	2	
Child's gender				

Male	71 (23.5)	211 (78.5)	302	4.9 (.02)
Female	48 (16.2)	248 (83.8)	248	
Age group of guardian				
< 19 yrs	0 (0.0)	1 (100)	1	7.1 (.23)
19 – 29 yrs	4 (8.7)	42 (9.3)	46	
30 – 39 yrs	34 (25.8)	98 (74.2)	132	
40 – 49 yrs	43 (20.4)	168 (79.6)	211	
50 – 59 yrs	28 (18.3)	125 (81.7)	153	
≥ 60 yrs	10 (18.2)	45 (81.8)	55	
Sex of guardian				
Male	101 (19.8)	410 (80.2)	511	0.04 (.89)
Female	18 (20.7)	69 (79.3)	87	

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174 Findings on table 5 revealed that higher proportion of guardian who had heard about
 175 deworming practiced it on the selected primary school children 119 (43.9%), compared to
 176 those who were not aware (0.0%). Out of 170 guardians who dewormed their other children,
 177 117 (68.8%), dewormed their wards in primary school as against 53 (31.2%), who did not.
 178 Similarly, 117 (20.5%), guardian who saw deworming as a worthwhile practice dewormed
 179 their primary school children, in contrast to 2 (7.7%) among those who had negative
 180 perception about deworming. Guardians who had more than 20 children 6 (23.1%),
 181 dewormed greater proportion of wards in primary school that those who had less number.
 182 Significant statistical relationship was seen between awareness/deworming of other children
 183 and deworming practices ($P < .001$).
 184 Also, shown on table 5 is that the proportion of guardians who practiced deworming was
 185 greatest among those who completed tertiary education 75 (26.6%) whereas, those who had
 186 vocational education never dewormed their wards attending primary school. Among the
 187 occupational groups, the proportion of guardians in the manufacturing industry who
 188 dewormed their children in school 5 (33.3%), was more than those dewormed by persons
 189 engaged in other occupations, followed by the civil servants 39 (30.0%). Guardians who were
 190 students and those in the agricultural sector never dewormed their children who were in
 191 primary school. Occupation and educational status had highly statistical significant
 192 relationship with deworming practices for school children ($P < 0.001$).

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193 Table 5: Association between other guardians' factors and deworming practices

Variables	Deworming status of school children			χ^2 (P-value)
	N (%)			
	Yes	No	Total	
Guardians who were aware of deworming	119 (43.9)	153 (56.2)	272	111.1 (< .001)
Guardian had ever dewormed other children	117 (68.8)	53 (31.2)	170	356.7 ((<.001)
Guardian who see deworming as good practice	117 (20.5)	455 (79.5)	572	2.5 (.08)
Number of guardian’s children				
< 6 children	46 (19.8)	186 (80.2)	232	2.1 (.56)
5 – 10 children	48 (21.9)	171 (78.1)	219	
11 – 20 children	19 (15.7)	102 (84.3)	121	
>20 children	6 (23.1)	20 (76.9)	26	
Educational status of guardian				
Vocational education	0 (0.0)	10 (100.0)	10	20.4 (.001)
Primary school	5 (6.9)	67 (93.1)	72	
No formal education	6 (12.0)	44 (88.0)	50	
Secondary school	33 (18.6)	151 ((82/1)	184	
Tertiary education	75 (26.6)	207 (73.4)	282	
Occupation of guardian				
Manufacturing	5 (33.3)	10 (66.7)	15	18.9 (< .001)
Civil servant	39 (30.0)	91 (70.0)	130	
Public servant/defence	11 (27.5)	29 (72.5)	40	
Professional	24 (24.2)	75 (75.8)	99	
Retired	12 (24.0)	38 (76.0)	50	
Artisan/non professional	12 (14.6)	70 (85.4)	82	
Business	16 (10.81)	132 (89.2)	148	
Student	0 (0.0)	13 (100.0)	13	
Farming	0 (0.0)	21 (100)	21	

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A multi - variate analysis of the factors driving guardians to deworm their primary school wards using binary logistic regression, showed that the sex of the school child mattered to them. The guardians are about 3 times more likely to deworm their male primary school children than the females. Similarly, having practiced deworming on other sibling of the school child was a very strong factor for the school children's deworming. A guardian who had dewormed any of his/her other children was 530 times more likely to deworming the one in primary school.

Table 6: Predictors of parents/guardians deworming practice

Variable	Wald (χ^2)	P-value	Exp(B) (Odds Ratio)	95% C. I of Exp (B)
Gender of school child (Male)	7.8	.01	2.5	1.3 – 4.8
Ever dewormed any child (Yes)	72.9	<.001	530.2	125.5 – 2238. 9

DISCUSSION

Generally, findings from this study revealed that nearly half (45.5%) of the parents/guardians of the school children were aware of deworming with a consequent very low prevalence of child - deworming practices in the study population. This level of awareness was much lower than that of parents in a study conducted in another state of northern Nigeria where 70.9% had heard about deworming.¹⁵ A study in Turkey revealed much less level of awareness (15.3%).¹⁰ However, out of their 598 school children, only 119 (19.9%), were ever dewormed by the parents/guardians. Of this number, 28 (23.7%), received antihelminthics 6 months before the study, while 61 (51.7%) children who were ever dewormed received the medication more than a year prior to the survey. A study of deworming status of children population in River State of Nigeria was more encouraging as 50% of the children were periodically dewormed.¹⁶ The finding was also at variance with that of a study conducted in Brazil in which as much as 51.0% of children were dewormed 6 months prior to involving them in the study. In this study, there was a highly statistical significant association between

220 parents' deworming awareness and deworming of their school children ($P < 0.001$) as shown
221 on table 4. In contrast, a study in Rivers State Nigeria reported that beyond awareness,
222 knowledge of deworming did not connote practice.¹⁶

223 A combination of poor awareness of deworming and high intestinal parasitic burden of over
224 50% prevalence reported in several studies in some states of northern Nigeria and other parts
225 of the country complicated by poor parental deworming practices of school children is a
226 cause for concern. For instance, in Borno and Kaduna states in the north and Delta states in
227 southern Nigeria, prevalence of helminthiasis among primary school children were 80.9%,
228 67.1% and 77% respectively.^{8,7,17} Going by the WHO recommendation for control of
229 helminthiasis, therefore, twice yearly mass deworming of the school children is needed in
230 order to effectively combat intestinal parasitic infestation in states of the region.^{17,18}

231 It is evident in this study that a very low proportion of parents practiced child deworming in
232 general as only 28.4%, ever dewormed other children apart from those in primary school.
233 Various reasons for the abysmal deworming practices were advanced by the parents. More
234 than half of them (54.5%), did not deworm because they never heard about the intervention.
235 Among those who were aware (19.7%), said they never gave it thought and 3.7%, never
236 considered deworming their children a necessary venture.

237 It may be extrapolated that parents/guardians who had ever dewormed their other children
238 may be more likely to administer prophylactic antihelminthics on their children in primary
239 school. This calls for more awareness creation in the form of health education and social
240 marketing on the importance of deworming. Such an exercise would emphasize the benefits
241 of deworming in the physical and mental development as well as academic progress of the
242 school child and the spillover benefit to their peers.^{13,19} A study in Bangladesh revealed that
243 socio cultural factors could influence parents' (women's), tendencies to seek treatment of

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respectively ^{7, 8, 17}.

244 child's intestinal parasite as well as their knowledge of helminths and exposure to health
245 education.²⁰ Same could apply to school child deworming practices. Therefore, there is a need
246 to involve stakeholders in religious and cultural milieu in re-orientating the parents and the
247 community on the importance of school child deworming.

248 Despite the low level of awareness, a high proportion (95.7%), of the parents/guardians had a
249 good perception of deworming to the extent that 93.6% of them subscribed to the deworming
250 of their children. Such acceptance and willingness to deworm children were seen in studies
251 carried out jointly in Ghana and Tanzania and another in Brazil.^{9,21} In the Ghana/Tanzania
252 studies, 90% of the parents were even willing to pay for the sustenance of a school based
253 deworming program. This was contrary to the finding in Jos Plateau State, a neighbouring
254 state to the study population, in which there was poor attitude towards deworming.¹⁵ With this
255 level of acceptance, it likely that what was really lacking in the schools and the communities
256 was a program designed for periodic deworming of the school children. These underscores
257 the need for a school health and community based program that incorporates periodic mass
258 deworming of school-age children both in and out of school in the region. The study in
259 Kaduna State also had similar recommendation.¹⁷ School based deworming exercise has been
260 shown to minimize cost of delivery of the medications per child while maximizing the reach
261 of the exercise.¹³

262 Though studies have identified child's age as a significant risk factor for helminthic
263 infestation,²²⁻²⁴ in this study there was no significant statistical relationship between the age
264 of neither the school children nor the parents and deworming practices. Two of these studies
265 conducted in Nigeria revealed variously that the age group 8 – 12 and 12 -17 years were most
266 at risk.^{23,24} The studies attributed the relationship to the fact that increasing age increases the
267 risk of exposure to worm infestation such as contact with soil contaminated with faeces
268 especially as the school child starts developing the capacity to personal care with less

269 assistance from parents in addition to increased outdoor activities. From the foregoing, it is
270 obvious that the age bracket at which worm infestation is commonest, falls within the school
271 age, hence necessitating the need for an efficient and effective implementation of periodic
272 deworming of the group as well as integration of the practice into school health program in
273 the region.

274 Being a male school child, favours the probability of receiving deworming therapy ($P = .01$).
275 This practice of preferentially deworming the male child, though may be inadvertent, is
276 justified by the finding of some studies.^{21,23} A multivariate analysis of factors predicting
277 helminthic infestation in a study conducted in Brazil identified being a male child as a highly
278 significant risk factor ($p < .001$).²¹ The study in Jos report the contrary whereby more females
279 ran a greater risk than males ($p < 0.95$).¹⁵

280 Though family size had no significant statistical association with parents/guardians' child-
281 deworming practices in this study ($P = 0.56$), there was inverse relationship between the
282 practice and the number of children in the family. As shown on table 4 parents/guardian with
283 more children dewormed smaller proportions of them. This may be the explanation to the
284 finding in a study conducted in the western region of Nigeria in which the prevalence of
285 worms increased with increasing family size.²⁵ Similar finding was reported by a study carried
286 out in Rural China.¹⁸ These poor deworming practices may be attributable to the reduced
287 capacity of the parent/guardian to meet up with family needs including deworming,
288 considering the large size of the family.

289 Socioeconomic characteristics of the parents/guardians such as their occupation and
290 educational attainment revealed a highly statistically significant relationship ($p <$
291 $.001$), with child deworming practices (table 4). The proportion of parents with higher level of
292 (formal) education who practiced child deworming was more than that of their counterparts

293 with lower levels to the extent that parents with vocational education never dewormed any of
294 their school children. Several studies identified low level of parental/caregiver education as a
295 risk factor for worm infestation to which non-deworming of children may be a one of the
296 reasons.^{18,26,27} For instance, the study which involved mothers in rural setting in China and
297 Mexico highlighted the fact that the likelihood of intestinal parasitic infestation was less in
298 mothers with more education than the less educated one.^{18,26}

299 Parents/guardians whose occupation entailed some sort of professionalism dewormed their
300 children in school more their counterparts who are non-professionals. This finding may be
301 explained by what was seen among the more educated ones. Thus, professionals are probably
302 more educated than the artisans, farmers and students and by extension, as seen above, are
303 more likely disposed to deworming their children compared to the non-professionals.

304 The result of the multivariate analysis (table 5), showed that the likelihood of a
305 parent/guardian deworming a school child is higher when the child is a male. The likelihood
306 is even greater if the parent/guardian is used to deworming other sibling of the school child.
307 In the first instance, the male school children are preferentially dewormed because they are
308 more infested by the worms in the region. As a result, there is the tendency for parents to
309 deworm the male children who always come down with worm infestation. Such perceptions
310 may be common among the less educated and non-professional which explains their less
311 likelihood to deworm their school children. It is also understandable that once a parent
312 practiced child deworming and experienced the benefits therein for the child, such a parent is
313 encouraged to deworm other children.

314 **Conclusion**

315 Deworming practices is low among parents of the school children studied. This study has
316 shown that there was lack of awareness of deworming of school children and the benefit

317 thereof among the parents/guardians. Also revealed was a parental preference of male child
318 deworming also affected the overall deworming profile of the study population. Educational
319 status and occupation of guardians also play prominent part singly in determining their child-
320 deworming practices. Therefore, education of parents, planning and implementation of school
321 health programmes that would incorporate deworming and community based deworming
322 program are all very vital in enhancing deworming status of school children and the control
323 of helminthic infestation among the children in school and those not in schools.

324

325 **Recommendations:**

- 326 1. School children in Bauchi State should be dewormed as a matter of urgency
- 327 2. Periodic deworming exercise should be carried out among school children in the state
- 328 3. Health education and community sensitization of all parents should be embarked upon
329 to create more awareness on deworming of all children irrespective of gender.

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