

1 **FACTORS THAT INFLUENCE COMPLIANCE WITH ANNUAL**
2 **IVERMECTIN TREATMENT AND WILLINGNESS OF**
3 **INDIVIDUALS TO CONTINUE WITH THE TREATMENT IN**
4 **ABIA STATE, NIGERIA**

5
6 **Abstract**

7 This study was conducted to document the factors that influence individuals to
8 annual ivermectin treatment and peoples' willingness to continue taking
9 ivermectin, as an important predictor of sustained compliance with long-term
10 ivermectin treatment. The survey which lasted from April to September 2011,
11 captured the two Local Government Areas of Abia State that were assessed hyper-
12 endemic for onchocerciasis. A study questionnaire was designed and distributed to
13 558 individuals. Out of 558 interviewed on factors that positively influence
14 compliance to annual ivermectin treatment, 94.2% said they have heard/seen
15 benefits of treatment. 64.1% claimed that the factor that influenced them positively
16 was "to avoid blindness". However, such factors like "lack of information"
17 (86.7%) and "side reactions to drug" (53.3%) were detrimental to compliance. On
18 their willingness to continue with the drug, 483 (86.6%) claimed that most people
19 take the drug, 495 (88.7%) affirmed that most people will continue with the drug
20 while 555 (99.5%) indicated that they are personally willing to continue with the
21 drug if made available. This is confirmed by the Chi-square (χ^2) analysis at 0.05
22 level of significance that people are personally willing to continue with the drug if
23 available ($\chi^2_{cal} = 0.0159 < \chi^2_{tab} = 3.84146$). Suggestions on ways to improve

24 compliance to annual and long-term ivermectin treatment showed that health
25 education/enlightenment ranked very high (78.3%). This is followed by
26 “awareness through church/school” (77.5%). It is imperative that the existing
27 health education materials be reviewed by taking into cognizance such factors that
28 will improve annual and long-term compliance.

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Introduction

31 With the mandate of APOC to establish within a period of 12 to 15 years,
32 effective and self-sustainable community- directed treatment with ivermectin
33 throughout the endemic areas, within the geographical scope of the programme
34 (APOC/WHO, 2005), a clear understanding of the long-term compliance process is
35 required in order to guide countries towards sustainability. According to
36 projections by epidemiologists, it is believed that onchocerciasis could be
37 controlled in endemic communities if 100% of eligible populations take their
38 treatment regularly over a period of 10 to 15 years or more (Edungbola, 1991;
39 Boussinesq *et al.*, 1997). With annual dose of ivermectin, it is estimated that 70%
40 of target population would have to be treated, for the long-term project of
41 elimination of the disease to be a reality (Dadzie, 1997).

42 The current mainstay of onchocerciasis control is chemotherapy, using Ivermectin
43 alone or, in small and isolated foci, combined with vector elimination. Most tablets
44 of ivermectin are now distributed in an approach known as community – directed
45 treatment with ivermectin (CDTI), which was adopted by the African Programme
46 for Onchocerciasis Control (APOC) in 1995. Its goal was to put in place a
47 sustainable drug distribution system and maintain a maximum of 65% annual
48 population coverage with Mectizan in endemic communities for at least 15 years,

49 required for effective control of onchocerciasis (Plaisier *et al.*, 1997; Borsboom *et*
50 *al.*, 2003; Tielsch and Beeche, 2004; Amazigo and Boatin, 2006). Currently, CDTI
51 is on-going in over 95,000 communities where over 98 million ivermectin tablets
52 are distributed annually to treat over 33 million people (Amazigo *et al.*, 2007). In
53 CDTI, community ownership of the Ivermectin – treatment programme is
54 emphasized, with endemic communities themselves involved in the planning,
55 implementation, coordination and monitoring of all treatment activities (Etya' ale,
56 2001). As an annual dose of ivermectin does not interrupt transmission of the
57 parasite that cause onchocerciasis, distribution of the drug will probably have to be
58 repeated for many years, even if high treatment coverage are achieved and
59 sustained (Hopkins *et al.*, 2005). Compliance with annual ivermectin treatment has
60 become a major challenge for APOC as the original 25 projects which started in
61 1997/1998 have been operating for over a decade. Annual compliance studies have
62 become possible and extremely desirable, since researchers are now pushing back
63 the timeframe for annual ivermectin dosing from 15 to 25 or more years (Winnen
64 *et al.*, 2002), and the coverage rate from 65% to 80% (RSISCI, 2007;
65 APOC/WHO, 2009). To date, published reports of CDTI intervention have
66 focused on coverage. While reports of population coverage are encouraging
67 (Amazigo *et al.*, 2007), only few studies have centered on compliance to annual
68 ivermectin treatment. Coverage rates in a community may not give the full picture
69 of the programme success because there may be individuals or groups who
70 systematically do not comply over the years and thus provide a continued focus for
71 the disease transmission. Such low compliance group needs to be properly
72 informed on the need to comply with annual ivermectic treatment necessary for
73 total elimination of the disease. This study highlights the factors that necessitate
74 high compliance and suggests ways to improve annual and long-term ivermectin
75 treatment

Materials and Methods

78 **Study Area:** Abia State is located in the south eastern part of Nigeria. The State
79 lies between latitude $4^{\circ} 45^1$ and $6^{\circ} 15^1$ North and longitude $6^{\circ} 30^1$ and $8^{\circ} 9^1$ East.
80 The State is made up of 17 Local Government Areas (LGAs), eight of which are
81 endemic for onchocerciasis (Ukairo, 2008). The study area captured the two LGAs
82 which were assessed by REMO (Rapid Epidemiological Mapping of
83 Onchocerciasis) as being hyper-endemic (Braide et al., 2003; Ukairo, 2008).

84 Onchocerciasis control efforts began in the state in 1991 in Mbala-Isuochi as pilot
85 area, with the assistance and support of River Blindness Foundation in
86 collaboration with the State ministry of Health. By 1994/1995, the control
87 programme has spread to other LGAs of the State. Currently, the project has lasted
88 for over fourteen years.

89 **Preliminary Survey and Advocacy:** Approval for the survey was obtained from
90 Abia State Ministry of Health. The pre-disease survey logistics included visits to
91 the Local Government Chairmen of the two LGAs, the traditional rulers of the
92 autonomous communities and the village heads to explain the purpose of the study
93 and to solicit for their co-operation. The pre-disease survey logistics also involved
94 mobilization of the community-directed distributors (CDDs) and other village-
95 based field assistants who were involved in the distribution of the drug. The
96 communities selected on the basis of their hyper-endemic status are currently
97 receiving treatment with ivermectin.

98 **Data collection:** Four instruments were employed in this study, each targeting
99 different sources of information to investigate the research questions. 558 properly

100 filled individual questionnaires were returned for assessment. The instruments
101 employed were:

- 102 • Annual Treatment Form to obtain information on individual
103 compliance.
- 104 • In-depth Interview Guide with community leaders and CDDs to
105 obtain information on duration of treatment, their willingness to
106 continue the treatment and ways to improve annual and long-term
107 ivermectin treatment
- 108 • Individual Questionnaire to collect information on willingness to
109 continue treatment and ways to improve compliance of community
110 members to annual and long-term ivermectin treatment.
- 111 • Focus Group Discussion Guide to probe the more sensitive issues on
112 disease treatment.

113 **Statistical Analysis:** The data on factors affecting compliance to annual
114 ivermectin treatment was determined using percentages. Chi-square (χ^2) analytical
115 technique was employed to ascertain the level of willingness of community
116 members to continue ivermectin treatment while the Bar Chart was used to allow
117 for quick appreciation of suggestions to improve annual and long-term ivermectin
118 compliance.

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Results

126 Of the 558 individual interviewed on the factors that positively influence
127 individual compliance to annual ivermectin treatment (Figure 1), in order of
128 priority were “have heard/ seen benefits” (93.2%), “to avoid blindness” (64.1%),
129 “awareness has been created” (35.0%), “to be healthy” (22.2%). However the
130 factors that were detrimental to compliance were “lack of information” (86.7%),
131 “side reactions” (53.3%), “non-availability of drug” (33.3%) and “late arrival of
132 drug” (26.7%).

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134 **Table 1:** Factors influencing Compliance

Factors influencing compliance	Percentage (N=487)	Factors detrimental to compliance	Percentage (N=71)
Have heard/seen benefits	94.2	Lack of information	86.7
To avoid itching	19.4	Late arrival of drug	26.7
Awareness has been created	35.0	Non -availability of drug	33.3
To avoid blindness	64.1	Side reactions	53.3
To be healthy	28.2		
It gives energy	22.3		

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138 On the willingness to continue with ivermectin treatment by most individuals, 483
 139 (86.6%) out of 558 indicated that most people take the drug; 495 (88.7%) affirmed
 140 that most people will continue with the drug while 555 (99.5%) said that they are
 141 personally willing to continue with the drug if made available. This is confirmed
 142 by Chi-square (χ^2) analysis at 0.05 level of significance that people are personally
 143 willing to continue with the drug ($\chi^2_{cal} = 0.0159 < \chi^2_{tab} = 3.84146$).

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145 **Table 2:** Willingness to Continue Ivermectin Treatment among Individuals

WILLINGNESS TO TAKE	RESPONSES	NUMBER (N=558)	PERCENTAGE RESPONSE	YATES CORR. X² VALUE
Most people take	Yes	483	86.6	0.00228 < 5.99147
	No	49	8.8	
	Don't know	26	4.7	
Most people will continue	Yes	495	88.7	0.00005189 < 3.84146
	No	-	-	
	Don't know	63	11.3	
Personally willing to continue	Yes	555	99.5	0.0159 < 3.84146
	No	-	-	
	Don't know	03	0.5	

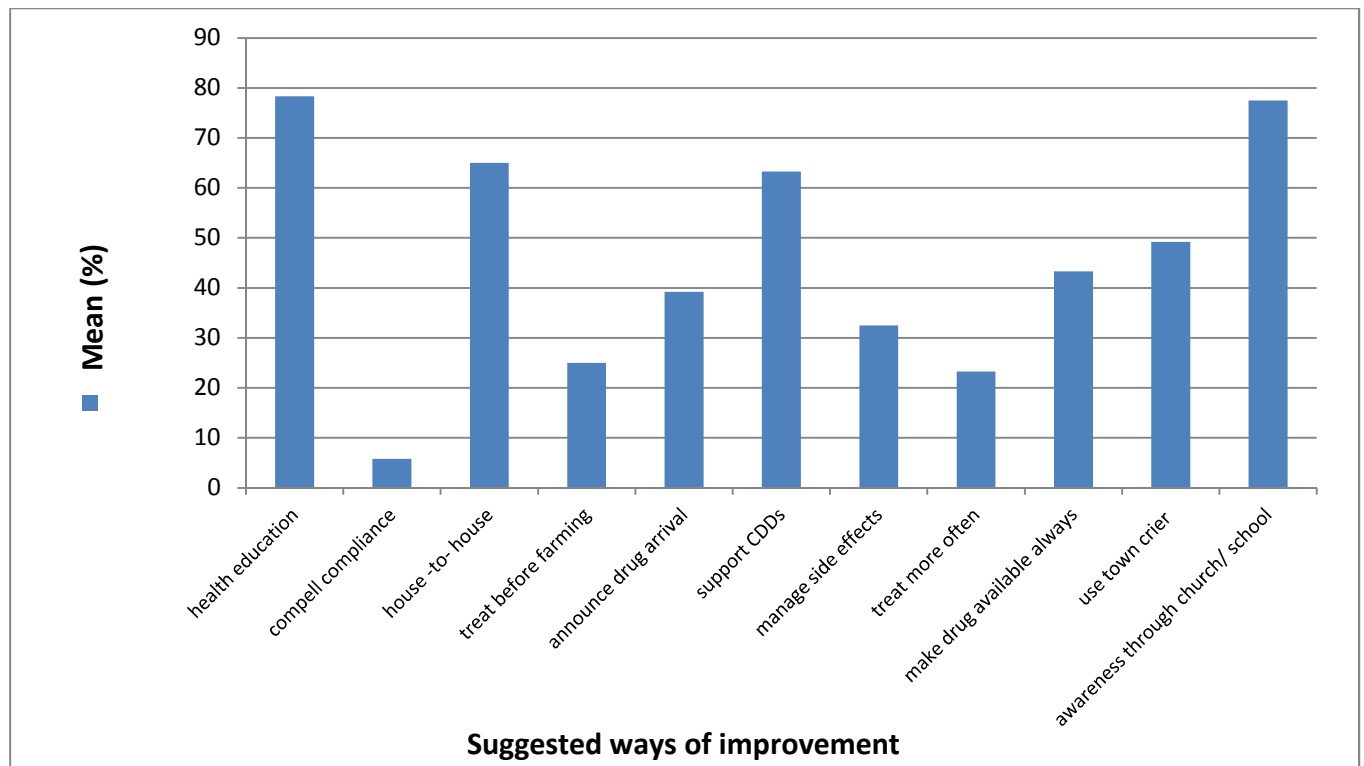
146 Testing at 95% significant level; $\alpha = 0.05$

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150 Suggestions on the ways to improve compliance to annual ivermectin treatment in
151 order of priority is shown in Figure 1. They are “health education/ enlightenment”
152 (78.3%), “awareness through church/school” (77.5%), “house-to-house
153 distribution” (65%) and supp distribution” (65%) and support CDDs (63.3%).



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155 Fig. 1: Suggested Ways to Improve Compliance to Annual and Long Term
156 Ivermectin Treatment

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Discussion

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From the result, the factors that influence compliance include “have heard or seen benefits” (94.2%), “to avoid blindness” (63.1%) and “awareness had been created” (35.0%) while “lack of information” (86.7%) and “side reactions to drug” (53.3%) were detrimental to annual compliance. Lack of information resulting from poor mobilization and ignorance is a major factor contributing to low treatment compliance. Lack of information on the availability of Mectizan to the community members was also cited as a major reason for low compliance by Miri (1998) and Mutabazi and Duke (1998). Acceptance of Mectizan by individuals depends on the awareness of the individual on the availability of the drug, its effectiveness and benefits accruable to the individual. Therefore, there is the need for people to be aware, get involve and participate in the control programmes. Compliance rate is high in communities where members have reasonable knowledge about *Onchocerciasis* control (The Carter Center, 2002).

The study also revealed that most people have the knowledge of the drug, hence most of the respondents indicated that “most people take the drug” and are willing to continue. More people are willing to take the tablet than before because the community distributors are part of the community and understand their people better. It is important that government ensures that the drug is available and procured early for distribution. Almost every person interviewed (99.5% of the respondents) said that they are personally willing to continue with the drug as long as the drug is available. It is important that these individuals who are personally willing to take the drug maintain the annual treatment if they desire complete eradication of the disease.

184 Suggestions were made on how to improve annual and long-term compliance by
185 respondents. From the findings, “health education/enlightenment” ranked very
186 high (78.3%). This is followed by “awareness through church/school” (77.5%),
187 “house-to-house distribution” (65%) and “support CDDs” (63.3%). Nuwaha *et al*
188 (2004) also recommended health education as one of the main strategies towards
189 improving treatment. It becomes imperative that the existing health education
190 materials should be reviewed by taking into cognizance those factors associated
191 with low compliance as well as perceptual factors like benefits of treatments and
192 seriousness of the problem of *Onchocerciasis*. Efforts should also be made to
193 address the issue of CDD attrition by providing some motivational incentives. It is
194 believed that the implementation of these suggestions will not only improve annual
195 compliance to ivermectin treatment but also boost the long-term compliance that
196 will eventually eradicate onchocerciasis in Abia State.

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