

2 **Knowledge, Attitude and practices toward female genital**  
3 **schistosomiasis among community women and**  
1 4 **healthcare workers in Anambra State, Nigeria.**

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**ABSTRACT****Background**

*Schistosoma haematobium* causes urogenital schistosomiasis and is widely distributed in Nigeria. In women, the parasite can cause Female Genital Schistosomiasis (FGS), a gynecological manifestation of urogenital schistosomiasis that is highly neglected and overlooked in public health programmes and by policy makers.

**Aim of the study**

This study aims to understand the knowledge and practices towards FGS among community women and health workers in some urogenital schistosomiasis endemic areas of Anambra State Nigeria.

**Methodology**

This was a cross-sectional study carried out between October 2023 and March 2024, in the three senatorial zones of Anambra State

. Pretested structured open ended questionnaires was administered to randomly selected community women aged between 16 and 50 years and community health workers working in the PHCs of the study areas who consented, to determine their level of knowledge, attitude and perception for Female Genital Schistosomiasis. A total of 530 participants were involved (500 community women, and 30 community health workers).

**Results**

One hundred and fifty two (30.4%) of the women had knowledge of urogenital schistosomiasis but all of them 500(100%) had not heard of FGS, 500(100%) of them had no idea of what causes FGS or the symptoms of FGS. All the health workers 30(100%) had knowledge of urogenital schistosomiasis but only 5(16.7%) had knowledge of FGS. Thirty (100%) of the health workers treated all vaginal cases with antibiotics, there was no linkage to urogenital schistosomiasis. These community women come in contact with the infected water daily 361(72.2%) and weekly,96(19.2%), and engage in open defecation 86(17.7%) and urination 237(47.4%) into the water bodies. In the case of being infected with vaginal itching, vaginal sores or other symptoms majority 319(63.8%) of them ignore the symptoms, while 96(19.2%) use herbs, only 35(7.0%) seek medical attention. Health workers treat all reproductive cases with antibiotics and could not link those ailments to water contact.

### Conclusion

This study illustrates a critical need for the national health control program to integrate public health education about FGS to health workers, and community women during the implementation of school- and community-based mass drug administration (MDA) Programs.

21  
22 *Keywords: healthcare workers, knowledge, female genital schistosomiasis*

## 1. INTRODUCTION)

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26 It is estimated that FGS affects 56 million women and girls in sub-Saharan Africa.[1]. Girls and  
27 women are frequently exposed to *Schistosoma haematobium* infection through percutaneous  
28 contact with contaminated water sources.- [2]. The parasite is endemic in many communities  
29 characterized by low socio-economic status with poor or inadequate water, sanitation and  
30 hygiene (WASH) infrastructure [3]. In endemic areas, all community members, irrespective of  
31 their age and gender, are at risk of infection whenever their skin contacts with infested water  
32 [4]. However, specific gendered roles and norms may increase the risk of infection for some  
33 groups. For instance, girls and women of reproductive age perform household and other  
34 related activities—such as washing clothes and dishes, fetching water for domestic use, and  
35 paddy farming—these roles put them at high risk as they involve skin contact with water [5].  
36 Clinical manifestations of FGS include vaginal bleeding, vaginal itching, pain during sexual  
37 intercourse, and formation of sandy patches on the cervix and uterus [3]. FGS  
38 has been linked to increased susceptibility to HIV in women [6]. Untreated FGS can lead to  
39 infertility, miscarriage, ectopic pregnancies, and spontaneous abortions [6], bladder cancer,  
40 kidney diseases, mortality of mother and child [7, 8]. In addition, untreated FGS can lead to  
41 depression and social stigma in girls and women with the symptoms of this disease (because  
42 of being perceived to have a sexually transmitted infection (STI) or who are struggling with

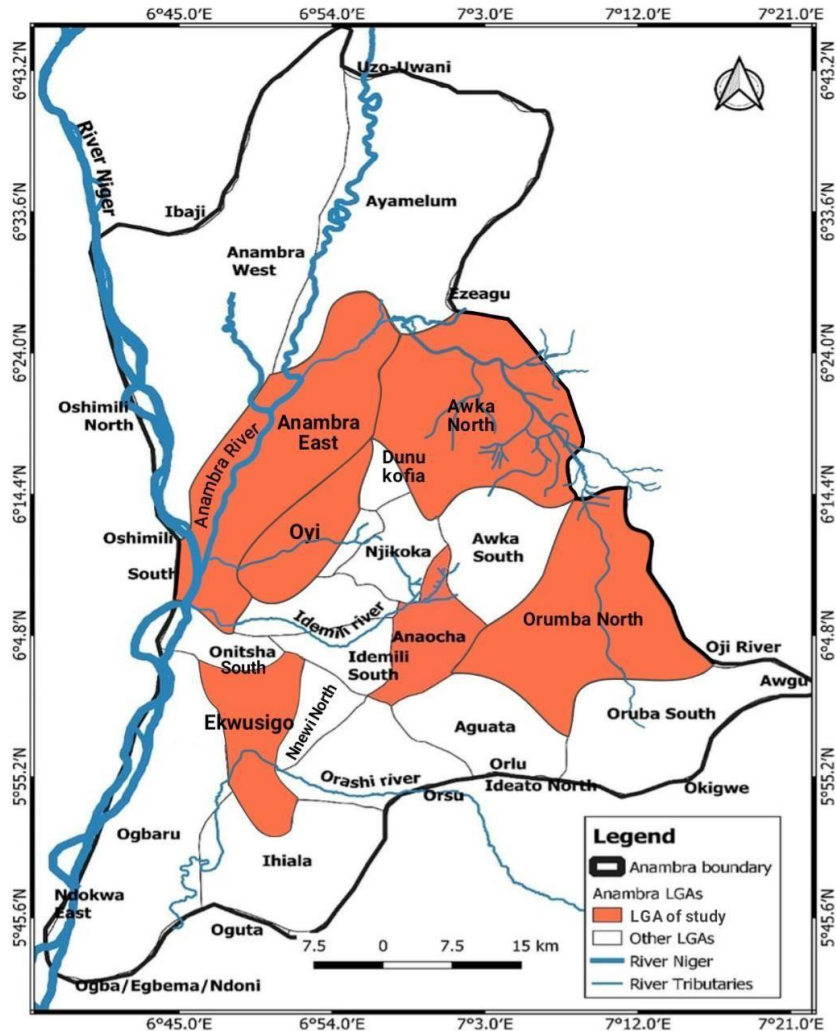
43 infertility [9]. Victims of female genital schistosomiasis (FGS) may lose their homes and  
44 relationships, as well as their health, due to false claims resulting from misdiagnosis of  
45 sexually transmitted infections. It is generally accepted that good knowledge and perception  
46 of a disease in endemic communities play a significant role in attaining sustainable disease  
47 control. FGS symptoms are similar to, STIs, thus a low level of knowledge of FGS among  
48 healthcare workers lead many FGS cases going undetected and unmanaged within  
49 primary healthcare-[10]. Girls and women are frequently overlooked in these programs thus  
50 increasing the risk for FGS over time [11,12]. It is therefore necessary to determine the  
51 knowledge and perception level as well as practices of some women and health workers  
52 towards urogenital schistosomiasis endemic areas in Anambra State. This will expose the  
53 level of the information about FGS in the studied communities and further help health  
54 stakeholders on how to re-strategise to reduce and if possible, eliminate the infection.

## 55 **3 2.0 MATERIALS AND METHODS**

### 56 **3 2.1 Study area**

57 This study was carried out in Anambra state. The state is located in latitude 6.2758 N and  
58 longitude 7.0068E, it has a population of 4182,032 according to the 2006 Nigeria census (NPC  
59 2006). It has an area of 1774 square meters. Anambra state has a tropical wet and dry or  
60 savanna climate with yearly temperature of 28.99c(84.18F. It has about 212.36mm of rain and  
61 243.38 rainy days annually.(weather and climate. Com),(FIG. 1, Map of Anambra State)  
62 showing the study areas. The study sites were bounded by streams and rivers were indigenes  
63 carry out their daily chores like bathing and washing. These fresh water bodies provide

64 suitable habitats to snails which are intermediate hosts of *Schistosomes*.



66 Fig1: Map of Anambra State showing the selected local government area for the study  
67 (Source: Geography Information System Laboratory, Department of Estate Survey and  
68 Geo informatics, Nnamdi Azikiwe University, 2023)

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71 **2.2 Study Design**

72 The study was carried out at the 3 senatorial zones of Anambra State. In Anambra North  
73 Senatorial Zone, 2 Local government areas were selected, (Oyi and Anambra East). In  
74 Anambra South senatorial zone, Orumba North and Ekwusigo LGAs were selected. In  
75 Anambra central senatorial zone, Anaocha and Awka North LGAs were selected. Previous  
76 studies implicated these communities as endemic areas for urogenital schistosomiasis  
77 [13-15]. The study was a cross-sectional study conducted from October 2023 to March  
78 2024 and the study participants were randomly selected. The perspectives and practices of  
79 community women and community health workers at the PHCs regarding FGS were  
80 investigated through questionnaires.

81 **2.3 Study Population**

82 The study population consisted of 500 women aged between 16 and 50 years who consented  
83 and were residents of the study areas and 30 community health workers working in these  
84 communities.

85 **2.4 Inclusion Criteria**

86 Inclusion criteria include consented women, women that have lived in these communities for  
87 at least 10 years, women aged 16- 50 years

88 **2.5 Exclusion Criteria**

89 Women that did not give consent, health workers that do not work in the study communities  
90 and women who have not lived at least 10 years in those communities.

91 **2.6 Sample Size Estimation**

92 The sample size for this study was calculated in accordance with Yamanes formula [16]. The  
93 formula used for the calculation is  $n = \frac{N}{1 + N(e^2)}$

94 where n =sample size

95 N=total population:

96 From 1991 population census , number of females in the studied areas was as follows:

97 Omogho 1664:

98 Nsugbe 8,314

99 Achalla 7017

100 Agulu 25737

101 Oraifite 13,552

102 Awkuzu 14431

103 Total population =70715

104 e=error term at 95% confidence interval which is 0.05

105 n=70715/1 +70715(e2) n= 398 approximately the sample size for the study was 500 women  
 106 plus

107 30 community health workers attached to the primary health centers of the study communities  
 108 making a grand total of 530.

109 **2.7 Data collection**

110 Structured questionnaires were administered to participants through one-on-one interviews  
 111 conducted in Igbo language only, adhering to the guidelines set by the COUNTDOWN  
 112 consortium for neglected tropical diseases (FMOH 2021). The questionnaire was used to  
 113 collect data on knowledge and perception on FGS among the community and  
 114 health workers .

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 115 **4.3. RESULTS**

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 117 **Community women knowledge on FGS**

118 Few 152(30.4%) of the community had knowledge of urogenital schistosomiasis but all of them  
 119 a total of 500(100.0%) had not heard about FGS. 500(100.0%) have no idea of what causes  
 120 FGS. 346(69.2%) believed that FGS is transmitted through sexual intercourse. See table 1.

121 **Table1: Community women knowledge on FGS (n=500)**

Variables	Knowledge ratio					
General information	Yes	%	No	%	Don't know	%
Have you heard of urogenital schistosomiasis?	152	30.4	54	10.8	294	58.8
Have you heard of female genital schistosomiasis?	0	0	102	20.4	398	79.6
Is FGS a disease?	98	19.6	51	10.2	351	70.2
Do you know what causes FGS?	0	0	233	46.6	267	53.4
Do you pass or have you passed bloody urine?	198	39.6	203	40.6	99	19.8
2-How is FGS transmitted?						
By drinking contaminated water	43	8.6	159	31.8	298	59.6
Through sexual intercourse	346	69.2	53	10.6	101	20.2

3-What causes bloody urine?						
<b>Schistosomiasis</b>	<b>98</b>	<b>19.6</b>	<b>46</b>	<b>9.2</b>	<b>356</b>	<b>71.2</b>
<b>STI</b>	<b>41</b>	<b>8.2</b>	<b>258</b>	<b>51.6</b>	<b>201</b>	<b>40.2</b>

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**123 Women's attitude towards FGS**

124 These women perform their washing activities and fetch water for home use from the water  
 125 bodies, only 35(7.0%) of the respondents seek medical attention at the PHC when they have  
 126 vaginal sores, vaginal itching, coital bleeding or any other ailments, others 319(63.8%) ignore  
 127 their symptoms or resort to herbal medications 96(19.2%). See table 2.

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**129 Table 2: Women attitude towards FGS**

<b>Attitude</b>	<b>Yes</b>	<b>%</b>	<b>No</b>	<b>%</b>
1-When last did you take praziquantel?				
3 months ago	<b>48</b>	<b>9.6</b>	<b>452</b>	<b>90.4</b>
6 months ago	<b>75</b>	<b>15.0</b>	<b>425</b>	<b>85.0</b>
Have not received at all	<b>363</b>	<b>72.6</b>	<b>137</b>	<b>27.4</b>
2-How often do you come in contact with the water body?				
Daily	<b>361</b>	<b>72.2</b>	<b>139</b>	<b>27.8</b>
Weekly	<b>96</b>	<b>19.2</b>	<b>404</b>	<b>80.8</b>
Monthly	<b>18</b>	<b>3.6</b>	<b>482</b>	<b>96.4</b>
<b>Yearly</b>	<b>149</b>	<b>29.8</b>	<b>351</b>	<b>70.2</b>
Have you had a vaginal sore?	<b>95</b>	<b>19.0</b>	<b>405</b>	<b>81.0</b>
3-What do you do about the symptom you experienced?				
Bought drugs	<b>56</b>	<b>11.2</b>	<b>444</b>	<b>8.8</b>
Use herbal drugs	<b>96</b>	<b>19.2</b>	<b>404</b>	<b>80.8</b>
Visited the health center to see a doctor or nurse	<b>35</b>	<b>7.0</b>	<b>465</b>	<b>93.0</b>
Ignore the symptoms	<b>319</b>	<b>63.8</b>	<b>181</b>	<b>36.2</b>
Do you go to the hospital for routine reproductive checkup?	<b>65</b>	<b>13.0</b>	<b>435</b>	<b>87.0</b>

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**137 Practices that lead to FGS**

138 **Based on practices that enhance transmission process**, most of the  
 139 respondents 316(63.2) do their recreational activities like swimming in these  
 140 waters and also 325(65.0%) fetch water for domestic use from the water  
 141 bodies. See table 3.

**142 Table 3: Practices that lead to FGS**

Practice	Yes	%	No	%
Do you come in contact with water body in your community?	412	82.4	88	17.6
What activities do you carry out in the water body?				
Swimming/bathing/washing	316	63.2	184	36.8
Fishing in the water	257	51.4	243	48.6
Using water for agricultural purposes	136	27.2	364	72.8
Fetching water for domestic use	325	65.0	175	35.0
What kind of indiscriminate act do you carry out in your community water body?				
Defecation	86	17.2	414	82.8
Urination	237	47.4	263	52.6

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**144 Health workers knowledge on FGS (n=30)**

145 Almost all the health workers 25(83.3%) had knowledge of urogenital schistosomiasis  
 146 but only 5(16.7%) had heard of female genital schistosomiasis. All of  
 147 them30(100.0%) did not know the cause of FGS and said FGS is contracted through  
 148 sexual intercourse. The health workers neither know the symptoms of FGS nor other  
 149 causes of vaginal sores, itching and discharge. See table 4

**150 Table 4: Health workers knowledge on FGS (n=30)**

Knowledge	Yes	%	No	%
Have you heard of urogenital schistosomiasis?	25	83.3	5	16.7
Have you heard of FGS?	5	16.7	25	83.3
What is FGS?				
A disease	5	16.7	25	83.3
An infection	3	10.0	27	90.0
No idea	17		8	
Do you know what causes FGS?				
Drinking contaminated water	0	0	30	100.0
Sexual intercourse	30	100.0	0	0
What causes bloody urine?				

Swimming in contaminated water	25	83.3	5	16.7
What are the signs and symptoms of FGS?				
Vagina. itching	0	0	30	100.0
Vagina. discharge	0	0	30	100.0
Painful urination	0	0	30	100.0
Do you know the risk of urinating or defaecating into the water body or near it?	3	10.0	27	90.0
What causes vagina itching/vagina discharge/painful urination?				
STI	30	100.0	0	0
Infection	26	86.7	4	13.3
FGS	0	0	30	100.0

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**153 Health care worker Attitude towards FGS**

154 On attitude, 24(80.0%) of the health workers advised women with vaginal itching or discharge to take antibiotics, and do not relate vaginal problems to water contact. 29(96.7%) of health workers give antibiotics to patients for vaginal sores instead of praziquantel. see table 5.

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**160 Table 5: Health care worker Attitude towards FGS**

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Attitude	Yes	%	No	%
What do you advice a patient with vagina. discharge?				
To take antibiotic	24	80.0	6	20.0
To avoid contact with contaminated water	0	0	30	100.0
To avoid indiscriminate sex	30	100.0	0	0
Do you administer praziquantel to a female with abdominal or pelvic pain?	0	0	30	100.0
Do you relate vagina. sore to contact to infested water?	0	0	30	100.0
Do you link FGS to schistosomiasis?	0	0	30	100.0
When a virgin girl has vagina itch/ vagina sore/vagina discharge, what do you advice?				
drugs for STI	29	96.7	1	3.33
Praziquantel	0	0	30	100.0

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164 **Health workers practice towards FGS**

165 Most of the health workers 30(100.0%) had attended workshops on Schistosomiasis  
 166 but none 0(0%) had attended workshops on FGS. For treatment of coital bleeding  
 167 24(80.0%) of the health workers use antibiotic instead of praziquantel. The health  
 168 workers stigmatize women with vaginal problems noting that they are promiscuous.  
 169 see table 6.

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171 **Table 6: Health workers practice towards FGS**

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Practice	YES	%	NO	%
What do you use to treat vaginal sore?				
Antibiotic	22	73.3	8	26.7
Praziquantel	0	0	30	100.0
Have you attended any seminar on schistosomiasis?	30	100.0	0	0
Have you attended seminars or teaching on FGS?	0	0	30	100.0
Can you link vaginal discharge to water contact?	0	0	30	100.0
When do you administer praziquantel to your patients?				
When they have bloody urine	30	100.0	0	0
When they have vaginal discharge or sore	0	0	30	100.0
Do you educate women on FGS infection	0	0	30	100
Do you refer patients for FGS diagnosis when they have vaginal discharge with water contact history	0	0	30	100.0
Do you stigmatize patients with all reproductive problems as promiscuous	25	83.3	5	16.7

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174 **4. DISCUSSION**

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176 Few 152(30.4%) of the community had knowledge of urogenital schistosomiasis but all of them  
 177 a total of 500(100.0%) had not heard about FGS. 500(100.0%) have no idea of what causes  
 178 FGS. 346(69.2%) believed that FGS is transmitted through sexual intercourse  
 179 The findings from this study indicate that the majority of the women 152(30.4%) knew about  
 180 urogenital schistosomiasis but none of them had heard of FGS or what causes it and were not  
 181 aware that urogenital schistosomiasis may affect a woman's reproductive system. Also, the  
 182 health workers had knowledge of urogenital schistosomiasis but very low knowledge of FGS.  
 183 This finding is in line with a study done in Egypt, were women from urogenital schistosomiasis  
 184 endemic areas and health workers had knowledge of urogenital schistosomiasis as a disease  
 185 but did not believe that it could have any reproductive health effects [17]. Similarly, in a previous  
 186 study in Ghana, none of the community members who participated in this type of study was

187 reported having heard of FGS [10] and only 18.9% of participants agreed that urogenital  
188 schistosomiasis could cause reproductive health diseases [18]. It was found in this study that  
189 healthcare workers' lack of knowledge of and misconceptions about FGS lead to  
190 misdiagnosis and referring patients to a wrong specialist or other treatment services. The  
191 intersection of all these situations can lead to serious consequences on women and girls'  
192 reproductive health, this is similar to a study conducted in Ghana which reported that  
193 healthcare workers with limited or no knowledge of FGS were more likely to refer women and  
194 girls—presenting with symptoms of FGS—to the STI clinic [10],[19].  
195 From this study it was observed that because FGS is misdiagnosed as an STI women with  
196 symptoms of FGS were reluctant to seek treatment from the healthcare facilities because they  
197 feared being stigmatized and regarded as prostitutes, this was also reported in a study in  
198 Tanzania [20],[19].

199 This study showed that these women engage in practices, such as paddy farming in the  
200 wetlands, domestic chores such as washing clothes in contaminated rivers and ponds. These  
201 gendered roles require women to regularly come into contact with cercariae-contaminated  
202 water, also swimming in the rivers as a popular recreational activity increase their risk of being  
203 infected with these parasitic worms that can cause urogenital schistosomiasis, and FGS, this  
204 findings were observed in other studies [3]. From this study 30(100.0%) of the healthcare  
205 workers could not link FGS with urinating in the water, many community women 86(17.7%)  
206 practice open defecation and urination 237(47.4%) and do not consider avoiding contact with  
207 contaminated water sources important, this is in line with the work of Wangari et al 2023 in  
208 Congo. From this study done in schistosomiasis-endemic communities in Anambra State, lack  
209 of alternative sources of water forces them to use contaminated water sources for domestic  
210 and agricultural purposes, this was also reported by [21][3]. In this study it was observed that  
211 girls with genital symptoms of FGS were accused of promiscuity and in health facilities they  
212 were likely to be referred for STI treatment as observed in other studies [3]. Our findings and  
213 those from Ghana [3] clearly indicate that there is a need to implement public health  
214 interventions at the community and health facility levels to, first, create awareness of FGS, its  
215 symptoms/clinical signs, diagnosis, management, and prevention and, second, encourage  
216 women and girls to seek for treatment at health facilities or that it. To achieve sustainable  
217 control of urogenital schistosomiasis, specifically FGS, integrating MDA with WASH and public  
218 health education for both community members and health workers should be part of the  
219 development agenda and improvement in water supply in endemic communities.

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## 221 5. CONCLUSION

222 . Seminars and trainings on FGS for health workers should be held frequently to effectively address this underdiagnosed infection which has a  
223 devastating effect on women.

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**6. CONSENT AND ETHICAL APPROVAL**

This study received ethical approvals from Nnamdi Azikiwe University Teaching hospital ethical committee with certificate number (NAUTH/CS/66/VOL.16/VER.3/231/2022/138). Directors of health where the study was conducted granted permission to enable the study to be conducted in their jurisdiction. Adult participants aged 18 years and above gave a written informed consent. Participants below the age of 18 years and their parents or guardians gave a written informed consent for them to participate in the study. For participants who could neither read nor write, the consent form was read and interpreted for them. Prior to data collection, awareness and sensitization meetings were held with responsible authorities in every study site to create awareness of the study and its data collection procedures. Anonymity of the study participants and confidentiality of the information provided was maintained. All participants were identified using code numbers.

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**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

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