

Factors Associated With The Prevalence Of Vulvar Myiasis Infection In Rural Nursing Mothers Of The Niger Delta, Nigeria.

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Abstract: *The study is the first report on vulva myiasis and sources of its infection in Nigeria. It investigated factors that are associated with vulva myiasis in different groups of rural women in the Niger Delta area of Nigeria. About 3.8% of 1000 rural women examined showed the symptoms and disease occurrences. About 2.7% of rural women of child-bearing age also were infected. Flies of the family Calliphoridae and Sarcophagidae were associated with vulvar myiasis in the Niger Delta of Nigeria and they include Cordylobia anthropophaga, Sarcophaga vilosa and Lucilia sericata. Sources of vulvar infection were from types of sanitary options used by the three categories of rural women identified in the study; the nursing mothers [NM]; women of child-bearing age [CBW]; women in menopause [MPW, the group did not use any sanitary options] and teenage girls [TNG]. The larvae of the aforementioned flies deposited their eggs on recycled pieces of cloths, sanitary pads on which the rural women used during their menses. Types of sanitary options available to the women affected their susceptibility to female myiasis agents. Details of percentage infection and parts infected are presented.*

Keywords: *Vulva myiasis, rural nursing mothers, Nigeria, sources of infection.*

I. Introduction

Incidence/Prevalence

Myiasis infections are widespread in most humid parts of Nigeria [1, 2] and vulva myiasis along with its sources of infection in Niger Delta of Nigeria is being reported for the first time. It is most frequently seen in some rural women. Some rural women in their child-bearing age develop lesions at menses and at post-menstrual period. In a survey conducted among some rural women, incidence of vulva myiasis was found in some rural nursing mothers; women of child-bearing age and in few teenage girls.

Epidemiology

The disease is spread among humans through untreated and un-ironed wears, second-hand clothes contaminated with eggs of myiasis-causing dipterous flies

Transfer of eggs from one host to another increases its spread. Dirty and unhygienic habits and lifestyles are factors responsible for its epidemiology. Previous epidemiological studies covered the incidences of neonatal and infant myiasis in the Niger Delta wetlands and south-east zones of Nigeria [2].

Myiasis is commonly reported in most parts of Nigeria especially in the rural areas of the Niger Delta wetlands and South-east [2]. Vulvar and penile myiasis had been reported in some infants in the rural settings of the Niger Delta due to the use of recycled diapers [2]. Other reports on vulvar myiasis are available [3]; furthermore other reports did not state sources of infection except on clothing and wears, other studies have not reported the sources of infection in the rural settings. Also most reports available in Nigeria on the incidences of myiasis did not cover the insects involved in vulvar myiasis disease and their involvement in sanitary practices at menses.

Flies of different families are associated with cases of human and animal myiasis in the Niger Delta region of Nigeria and they include Calliphoridae, Sarcophagidae, Oestridae, Fanniidae, Muscidae, Stratiomyidae and Phoridae [2]. Infection of the skin and subcutaneous is caused by the larvae of obligatory dipterous insects. It had been reported earlier that human myiasis is characterized by larval infestation of dipterous flies into the body tissues or cavities of living vertebrate hosts [2]. The larvae otherwise referred to as maggots of the myiasis-causing agents infect the cutaneous layer after emerging as first instar larvae. Already known sources of infection include the wearing of un-ironed clothes, [4], second-hand clothes [5], soiled napkins, brassieres, soiled mats, clothes and mattresses [1]. Although most frequently observed in underdeveloped and tropical countries, reports of human myiasis have been encountered throughout the world [6]. Cases of human myiasis in Nigeria and most African countries are most probably underreported because many remain undiagnosed,

unidentified or unpublished especially as most people infected attended to themselves by indulging in local methods of treatment and refused to obtain medical attention. In the Middle east a recent case of Ophthalmomyiasis was reported of a US soldier in Iraq that was infested by 18 larvae of *Oestrus ovis* [7]. There have been numerous reports of ophthalmomyiasis in other parts of Nigeria caused by various flies, including the sheep nasal bot fly, *Oestrus ovis*, the latrine fly, *Fannia* spp., the house fly, *Musca domestica*, and the cattle bot fly, *Hypoderma* spp. *Oestrus ovis* is said to be the most common cause of ophthalmic myiasis in humans in other regions [8, 9]. Diagnosis and treatment of different forms of myiasis have been reported [1, 2, 5]. The location of this present infestation is at the vulvar area including the clitoris due to lack of hygiene of some rural nursing mothers. Although this infestation is a rare condition but it is gradually becoming noticed as women confided in interviewers of their fear in reporting their cases to medical personnel. Most cases of vulvar myiasis are not reported for the fear of the infected patients losing their marriages. Earlier workers listed different types of myiasis and also listed that the flies that produce furuncular myiasis include *Dermatobia hominis*, *Cordylobia anthropophaga*, *Wohlfahrtia vigil*, and the *Cuterebra* species [10]. *Gasterophilus* and *Hypoderma* are two flies that produce a creeping myiasis. Flies that cause wound myiasis include screwworm flies such as *Cochliomyia hominivorax* and *Chrysomya bezziana*, and *Wohlfahrtia magnifica*. In Nigeria, the most prominent of myiasis-causing agents include notably *Cordylobia anthropophaga*, *Lucilia sericata*, *Chrysomya* spp. It has been reported that cutaneous myiasis presentations in some patients include furuncular, migratory, and wound myiasis, depending on the species of infesting fly [11, 12]. Most reports of furuncular myiasis in the United States involved infestation by *Dermatobia hominis* (Linnaeus Jr.) in travelers returning from Mexico and Central and South America [13; 14, 15].

The African tumbu fly, *Cordylobia anthropophaga* (Blanchard), causes cutaneous infestation with furuncular lesions in sub-Saharan Africa [16, 17]. Often when the physician has a high index of suspicion, that the patient has a history of recent travel to an area of endemicity, and classic furuncular lesions are present, a times with the posterior end of the larva protruding from one of the lesions, there is little diagnostic difficulty [18, 19, 20]. However, cases of furuncular myiasis in the United States acquired by patients without a history of recent travel are distinctly unusual; most reported cases have been caused by larvae of flies of the genus *Cuterebra*, a group of species that parasitize rabbits and rodents and cause myiasis [21, 22, 23]. Other authors described Cutaneous myiasis as a temporary parasitic infestation of the skin of human and other vertebrates by fly larvae, primarily species of the flies *Dermatobia* and *Cordylobia* [24]. In Central and South America cutaneous myiasis is mainly caused by the larvae of *Dermatobia hominis*; in most parts of Nigeria it is mostly due to the larvae of *Cordylobia* and *Lucilia* species. Other cases of vulvar myiasis caused by *Wohlfahrtia magnifica* had been reported in a 31-year old married female who was described as one with a history of dropping fly larvae from vulva, [25] also reported a different case report on oral myiasis in a child. However in this study our focus was to investigate whether some rural women in their child-bearing age are predisposed to myiasis agents and the sources of infection. Our interest also bordered on whether female flies were attracted to the menstruating females based on the types of sanitary hygiene they uphold.

II. MATERIALS AND METHODS

We carried out purposive stratified sampling and we took our samples from a total of ten villages from Rivers, Bayelsa and Abia states namely Kpite, Obiozimini, Oyigbo, Odi, Tombia, Abua, Asa, Emekalakala, K'Dere and Nembe where we examined 100 women from each of the ten villages listed above. Only twenty female samplers were used per village for this study to identify women with vulva pains and itching or any other forms of discomfort. Prior to the commencement of the study we sought and obtained an ethic permit from the Ethics Committee of the Department of Medical Laboratory Sciences of the Rivers State University of Science and Technology, Port Harcourt. A copy of the ethic permit was given to each village head and consent of the patients was sought. The categories of women interviewed and examined for the study included nursing mothers [NM]; Child-bearing women [CBW], another category covered patients that were already into menopause [MW] and teenage girls that were in their early-menstruating age. Interviews were organized for the nursing mothers and those in their child-bearing age [18-35 years of age] and the teenage girls, the women in menopause were used as control. In each of the four categories of females listed, at least 100 women were randomly selected after the interview [in most cases we did not have up to 100 women to be examined]. The patients' population consisted of women and girls. They were 1000 patients in all with 100 drawn from ten villages [eight from Rivers state, one from Abia and one from Bayelsa states]. Out of this number those that presented clinical symptoms of itching and lesions were examined for maggots. The villages were selected based on the fact that there were health issues on the presence of lesions and maggots in the inner thighs of some women.

CLINICAL SYMPTOMS: Based on preliminary reports of those women that complained of itching of different degrees at their vulva areas, research studies were conducted for each of the villages listed. Patients who complained of vulva pains, itching sensation and discomfort within their inner thighs were separated for clinical examinations.

TREATMENT: Treatment consisted of manual larval removal followed by systemic therapy with antimicrobials. The lesions were washed with Detol [a liquid disinfectant] for over a period of five days after the method of 27de Souza-Babosa et al,[2008].

The terrains of the selected villages were relatively similar but data on their humidity, temperature, rainfall and vegetation are close but not similar. On sampling dates, we were at the sampling locations in the morning [7.00 h] to meet up with women who are predominantly farmers, traders and wives to fishermen, fish and seafood sellers. Sampling dates covered from September 2011 to August 2012. In all contacts with the patients, only female medical personnel conducted interviews and examinations for obvious reasons.

Examination of the vulva proper: Examination of the vulva was granted by the patients in some cases [n=100], however snapping of photographs was not permitted by the patients. All clinical observations were made by the medical personnel and the vulva area including the clitoris were wiped several times with cotton wools absorbed in disinfectant solution to expose the lesions containing the maggots within. Extraction of maggots followed after the method of [2] Ogbalu et al., 2011 except that oil was not applied but all clinical procedures were observed and maggots were extracted using a pair of forceps. In some cases, incisions were made in order to extract the maggots depending on the parts of the vulva. Oral interviews yielded a lot of useful information on site of injury, number of larvae extracted, time of infection [whether prior to menses or post menses], types of materials used: whether recycled clothes or sanitary pads].

Fifty pieces of cloths cut in rectangular shapes, recycled sanitary pads [RSP], and Toilet rolls were collected from 50 women of CBW and NM categories and exposed for 48h under shades and the eggs and larvae isolated from them were taken to the Post Graduate Laboratory of the Rivers State University of Science and Technology, Port Harcourt, Nigeria identification of eggs and larvae of myiasis- causing agents. Number of the aforementioned developmental stages isolated from different parts of the vulva was also recorded.

Data Analysis : Data were subjected to analysis of variance and the Students t-test using the software XLSTAT 2011. All data in figures and tables are presented as the means \pm SE and the significance level was set at $p < 0.05$.

III. RESULTS

Figure 1 showed the categories of rural women and the types of sanitary options they used at menses; many of the rural women used recycled pieces of cloths during their periods, those who had access to sanitary pads recycled them. **Figure 1** showed that infestation by the myiasis-causing flies was highest in nursing mothers especially those from Abua, Rivers State. A total of 8 maggots were extracted from the vulvar of a 33-year-old single nursing mother Abua. Myiasis agents include *Lucilia sericata*, *C. anthropophaga* [5] and *Sarcophaga vilosa* [3]. In all the four categories of women interviewed and examined, infection level was highest in the nursing mothers in all the ten locations followed by the Child-bearing women [CBW] and the teenage girls [TNG] in that order. Women in their menopause did not attract maggots except in one case outside our sampled locations. There were age variations in the larvae of myiasis-causing agents encountered.

Maggots of flies were isolated from vulva of some rural women in different locations studied [**Figure 2**]. In all, the women categorized as nursing mothers showed the highest records of vulvar myiasis, followed by the child-bearing women [CBW]. Infection was lowest in the teenage girls and there was no infection in women in their menopause. Total number of maggots extracted from the vulvar of women was eight and that was highest in rural nursing mothers from Abua. In the child-bearing women, the highest number of larvae extracted was 4, followed by 2 maggots extracted from the vulvar of teenage girls [**Figure 2**]. The infection rate showed that *C. anthropophaga* infected 22.5% of rural nursing mothers, 13.5% of rural women in their child-bearing age and 0.8% of teenage girls [**Figure 3**]. A higher infection rate occurred in the child-bearing aged women; 12.5% of them were infected by *L. sericata* maggots, followed by 10.5% of the rural nursing mothers [**Figure 4**]. Percentage infection by *S. vilosa* in rural nursing mothers was significantly higher in women of child-bearing age [**Figure 5**]. The general trend was that infection was higher in rural nursing mothers than other women. Larvae were extracted from different parts of the vulvar areas and a significantly higher number of larvae was extracted from the groin followed by the number from the labium majus, urethral orifice, labium minor and clitoris in that order [SNK, $P < 0.05$] [**Figure 6**].

IV. Discussion

Nursing mothers are associated with postnatal bleeding up to a period of 3 months or more and in the rural areas of Nigeria as a result of poverty some of them resort to the use of pieces of clothes which they fold and use during their menstrual periods. Myiasis-causing flies are generally attracted to oviposit on soiled clothes, mats, mattresses, brassieres and on wounds [1, 2] but a new source is being reported in this paper involving vulvar myiasis which occurs in the rural settings where prevailing unhygienic conditions and dirty habits promote myiasis-causing agents' infection. In some cases, promiscuous lifestyles have contributed to vulvar myiasis. Earlier works reported that the woman with vulvar myiasis had several sexual partners [24] and other reports [25] corroborated the findings of other authors where an 18 year-old girl living a promiscuous

lifestyle was inflicted. Other cases involved a 23-year-old woman that presented a large exophytic genital wart arising from perineum, vulva, introitus of the vagina and inner aspects of her thigh.

The reason for vulva myiasis in some rural women was a case of poverty apart from unhygienic situations. The hydrologic conditions of the sampled locations, coupled with indiscriminate dumping of refuse promoted dirty environments for the breeding of the flies. Patients expressed the discomfort they experienced in vulvar myiasis as worm-like movement in the lesions under the skin. Appropriate diagnosis of different forms of myiasis in the region and elsewhere in Nigeria is becoming easier as many medical practitioners have clues to their symptoms as the incidences are common and are aware of the availability of the fly species in the endemic regions of the country. Extraction of larvae via the central punctum may not be feasible in all cases, so a time, the occlusion of the skin pore and subsequent application of an incision is allowed in order to extract the larvae.

In some cases due to infections at the inner thighs and the labial areas of the vulva, warty deposits were observed. Initial signs include the presence of lesions, some degree of abrasion and maceration which occurred as a result of larval infections which further resulted in scratching with subsequent abrasion and macerations. Also in conditions where the epidermal barrier is lost, abrasion and lesions facilitated infection rates especially with contaminations from larval feeding, their excreta and exuviae. Prevalence of vulvar myiasis was found in 3.8% rural nursing mothers and 2.7% rural women of child-bearing age. Many women in the rural circle are facing extreme poverty and this affects their health; some do not have access to sanitary pads hence they recycle cloths and use pieces of old wrappers at menses. Their lifestyles as fish and meat sellers predisposed them to infections coupled with unhygienic practices. We have advised for the use of local irons with hot charcoals to press cloths used at menses after washing in order to kill the eggs and larvae of myiasis-causing flies. Some rural areas lack power supply so they do not have facilities for drying cloths indoors. We also advertised for non-governmental organizations to supply and distribute sanitary pads to the women in the rural settings. We have educated them on how to ensure personal hygiene and the need for frequent bathing for women, especially those in menses.

In some parts of Nigeria some female farmers that had experienced some nodular inflammatory lesions concluded that they were poisoned even in cases of vulva myiasis, some of the rural women interviewed had the superstitious belief that their pants were infested by wicked forces. It had earlier been reported that larvae were found on diapers of babies in the Niger Delta and south-east zones of Nigeria. Reports had also been made of larvae of flies on septic umbilical cords in some neonates in Nigeria [2]. In some instances, we encountered vulva lesions with sepsis which corroborated with the findings of other authors [2, 26] that reported of neonatal myiasis and umbilical cord with sepsis. Regular acts of soap/water bathing will prevent future infections. We are focusing on our next study that will cover awareness on personal hygiene, use of sanitary pads and general cleanliness of the environments.

Localization at the genital area is rare, with few reports in the literature. This finding is usually associated with promiscuous sexual behavior in some other parts of the world. In the present study, we did not encounter patients with promiscuous sexual lifestyles. Our patients had vulva myiasis because of poverty and lack of hygiene. Other cases of vulva myiasis involved two diabetics [73 and 81 years] outside our study area but they were referred to our team. Those cases were cases of neglect that had stroke and they were neglected; no medical care and hygiene and flies had access to their inner thighs.

In wetter regions of Nigeria where we have carried out our studies, many rural women wear waist slips and as they go about their chores they are exposed to the flies which are attracted to foul odours of their bodies especially at menses. Other life styles; as farmers they are exposed to fermenting plants and manures in poultry and animal farms that harbor the myiasis-causing flies.

V. Conclusion:

Some rural nursing mothers in the Niger Delta of Nigeria were predisposed to vulva myiasis. Flies of the family Calliphoridae and Sarcophagidae were associated with vulvar myiasis in the Niger Delta of Nigeria and they include *Cordylobia anthropophaga*, *Sarcophaga vilosa* and *Lucilia sericata*. Sources of vulvar infection were from types of sanitary options used by three categories of rural women identified in the study; the nursing mothers [NM]; women of child-bearing age [CBW] and some teenage girls [TNG].

The prevention of vulva myiasis should involve the control of fly populations, proper disposal of sanitary pads, general body cleanliness, such as avoiding the use of recycled pads and pieces of clothes. Bathing with disinfectant should also be encouraged. In addition, the public should be informed that individuals living in locations without basic sanitation are more predisposed to infestation. Non-governmental organizations should regularly carry out campaigns on hygiene for rural women.

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