Patterns of common skin infections among children living with HIV/AIDS in Hawassa City, Ethiopia: a cross sectional study

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Abstract

Objectives: Skin disorders are the most common health problems seen among HIV positive patients. It presents with a variety of manifestations which can cause significant morbidity. This study was aimed to assess the prevalence of common skin problems among children living with HIV/AIDS at Hawassa University Comprehensive Specialized Hospital, Hawassa, Ethiopia, 2017/2018. Hospital based cross-sectional study was conducted among 125 children living with HIV/AIDS who were recruited through simple random sampling techniques from February to April 2017. Pre-tested, structured questionnaires were used to collect the data.

Result: Among a total of 125 study participants, 72 (57.6%) of the children were males and 97 (77.6%) were in the age range of 10–14 years. 90 (72%) of participants had different kinds of skin problems. Among those who had one kind of common skin infection, 53 (42.4%) were males. Viral skin infections that accounts 48 (53.3%), were the leading cause of skin infections followed by 43 (47.8%), 33 (36.7%) and 22 (24.7%) fungal infections, inflammatory and bacterial skin infections respectively. Among all children who were taking ART, only 2.4% of the children had skin related side effects.

Keywords: Pattern, Skin infection, Children, HIV/AIDS, Ethiopia

Introduction

HIV/AIDS is the most common and serious viral disease caused by human immunodeficiency virus (HIV) that affects about 39–46 million people in the world [1, 2]. Most reside in the developing world, with approximately two-third in sub-Saharan Africa and nearly 12% of these infections occurred in children younger than 15 years of age [3]. The USA and Europe have documented transmission rates in untreated women between 12 and 30%. Transmission rates in Africa are higher that ranges from 25 to 52% [4].

Skin infections account the most common clinical manifestations in children. About 90% of patients develop at least one type of skin disease during the course of their illness and more than one-third of patients present with skin lesions as a marker of HIV infection [5]. Skin and mucocutaneous infections such as herpes simplex infection, candidiasis, impetigo, ecthyma and furuncles, molluscum contagiosum, plane warts, seborrheic eczema and Kaposi's sarco-ma etc. are common skin infections among people living with HIV/AIDS [2]. Skin disorders in children living with HIV/AIDS may have atypical presentation, be inclined to be more severe and may diagnosed wrongly [6].

Children living with HIV can develop different infectious and inflammatory diseases of the skin. These skin or mucocutaneous disorders may provide an early clue to the presence of pediatric HIV infection and often more severe and more difficult to treat than in the immune-competent child. Skin disorders are common in children in Ethiopia, where nearly four out of five (72.6–79%) children living with HIV/AIDS develop at least one skin type infection [6, 7].

Immune reconstruction induced by anti-retroviral therapy (ART) would be anticipated to decrease the prevalence of many opportunistic infections including...
skin disorders due to inhibition of viral replication [8]. Hence, skin infections are major health problems among children living with HIV presenting with a variety of dermatologic manifestations. In this study, our aim was to assess pattern of skin infections among children living with HIV/AIDS.

Main text
Study design and setting
This descriptive cross-sectional study was conducted among children living with HIV/AIDS at Hawassa University comprehensive specialized hospital, ART clinic from February to April 2017. The sample size was calculated using a single population proportion formula was used to calculate required sample size. A total of 270 children were registered in ART registry and actively taking ART drugs. Among those children who fulfilled the inclusion criteria, total of 125 children living with HIV/AIDS were recruited using simple random sampling techniques by computer generated number using the ART registry number as sampling frame.

Data collection
Interviewer administered structured and pre-tested questionnaires were used to collect the data. The questionnaire had four parts such as socio demographic data of the child, socio demographic data of the care giver, ART Treatment related factors and skin problems in children related questions. A standardized clinical history was documented and all participants undertake a comprehensive dermatologic examination by the dermatologists and expert nurse clinicians, as part of a full clinical evaluation including WHO staging. Clinical dermatological evaluation was done in daylight and majority of the diagnoses of skin infections were done clinically. Laboratory tests that are appropriate to diagnose skin infections like KOH, gram stain, culture and sensitivity were done to affirm the diagnosis, when necessary.

Data analysis
Data were checked for completeness and consistency, then entered and cleaned using Epi-Data version 3.0. Statistical analysis was done using the Statistical Package for Social Sciences (SPSS) program version 20. Results were expressed as means and standard deviations and frequencies and percentages.

Result
Socio-demographic characteristics of the children
Among a total of 125 study participants, 72 (57.6%) of the children were males and 97 (77.6%) were in the age between 10 and 14 years. 91 (75.8%) of the children's were attending primary education (grade 1–8) and majority 88 (70.4%) of the children were fully immunized their vaccination (Table 1).

Socio-demographic characteristics of the care takers
Out of 125 caretakers of children, 96 (76.8%) were female, 65 (52%) were in age group 25–34 years, 114 (91.2%) were from urban residence, 42 (33.6%) and 38 (30.4%) of caretakers were Amhara and Oromo by ethnicity, respectively (Table 2).

Prevalence of common skin infections
Out of all study participants, 90 (72%) had different kinds of skin problems. Of those patients who had at least one kinds of common skin infection, where 53 (42.4%) were males and 37 (29.6%) were females (Fig. 1). Among all study participants, majority 107 (85.6%) of the study participants were currently on WHO clinical stage I and, 114 (91.2%) of the children's had been taken ART drugs for greater than or equal to 6 months. 70 (56%) of the study

Table 1 Socio-demographic characteristics of the children living with HIV/AIDS in Hawassa Comprehensive Specialized Hospital, Hawassa, Ethiopia, 2018 (N = 125)

| Variables                  | Categories               | Number | Percent (%) |
|----------------------------|--------------------------|--------|-------------|
| Age                        | 0–4 years                | 4      | 3.2         |
|                            | 5–9 years                | 24     | 19.2        |
|                            | 10–14 years              | 97     | 77.6        |
| Sex                        | Male                     | 72     | 57.6        |
|                            | Female                   | 53     | 42.4        |
| Level of education (N = 121) | Kindergarten education   | 4      | 3.3         |
|                            | Primary education        | 91     | 75.2        |
|                            | Secondary education      | 26     | 21.5        |
| Immunization status        | Fully immunized          | 88     | 70.4        |
|                            | Immunized some           | 33     | 26.4        |
|                            | Non-immunized            | 4      | 3.2         |
subjects were taken first line ART drug. Regarding drug adherence, 115 (92.0%) and 113 (90.4%) of the study participants had drug dose and schedule adherence respectively. Among all children who were taking ART, only 2.4% of the children had skin related side effects. Viral skin infections which accounts 48 (53.3%) were the leading cause of skin infections followed by 43 (47.8%), 33 (36.7%) and 22 (24.7%) fungal infections, inflammatory and bacterial skin infections, respectively (See Additional files 1, 2 and 3).

Table 2 Socio-demographic characteristics of caretaker of children living with HIV/AIDS in Hawassa University Comprehensive Specialized Hospital, Hawassa, Ethiopia, 2018 (N = 125)

| Variables                             | Categories         | Number | Percent (%) |
|---------------------------------------|--------------------|--------|-------------|
| Age                                   | 15–24 years        | 13     | 10.4        |
|                                       | 25–34 years        | 65     | 52.0        |
|                                       | 35–44 years        | 34     | 27.2        |
|                                       | ≥ 45 years         | 13     | 10.4        |
| Sex                                   | Male               | 29     | 23.2        |
|                                       | Female             | 96     | 76.8        |
| Residence                             | Urban              | 114    | 91.2        |
|                                       | Rural              | 11     | 8.8         |
| Marital status                        | Single             | 10     | 8.0         |
|                                       | Married            | 104    | 83.2        |
|                                       | Divorced           | 5      | 4.0         |
|                                       | Widowed            | 6      | 4.8         |
| Religion                              | Orthodox           | 60     | 48.0        |
|                                       | Muslim             | 19     | 15.2        |
|                                       | Protestant         | 43     | 34.4        |
|                                       | Catholic           | 3      | 2.4         |
| Ethnicity                             | Amhara             | 42     | 33.6        |
|                                       | Oromo              | 38     | 30.4        |
|                                       | Sidama             | 22     | 17.6        |
|                                       | Wolayita           | 17     | 13.6        |
|                                       | Others             | 6      | 4.8         |
| Family size                           | 2–4                | 88     | 70.4        |
|                                       | 5–7                | 33     | 26.4        |
|                                       | ≥ 8                | 4      | 3.2         |
| Level of education                    | Illiterate         | 11     | 8.8         |
|                                       | Read and write     | 27     | 21.6        |
|                                       | Primary education completed | 37 | 29.6 |
|                                       | Secondary education completed | 29 | 23.2 |
|                                       | College/University completed | 21 | 16.8 |
| Occupation                            | Merchant           | 22     | 17.6        |
|                                       | Gov’t employee     | 28     | 22.4        |
|                                       | Self-employee      | 39     | 31.2        |
|                                       | Daily laborer      | 20     | 17.6        |
|                                       | Farmer             | 6      | 4.8         |
|                                       | Student            | 5      | 4.0         |
|                                       | Other              | 5      | 4.0         |
| Average monthly income                | > 1500 EBR         | 32     | 25.6        |
|                                       | 700–1499 EBR       | 60     | 48.0        |
|                                       | < 700 EBR          | 27     | 21.6        |
|                                       | Non specified      | 6      | 4.8         |
| Family history of skin infection      | Yes                | 19     | 15.2        |
|                                       | No                 | 106    | 84.8        |
Discussion
The aim of this study was to assess the pattern of skin problems among children living with HIV/AIDS attending in Hawassa University comprehensive specialized hospital, Hawassa, Ethiopia. Thus, skin and mucocutaneous infections can be the early indication of HIV-associated compromised immune system [2, 9]. Therefore, identification of these HIV-related skin problems may possibly lead to early diagnosis of HIV infection and endowing with timely initiation of appropriate ART [2]. This study showed that 72% of children had at least one type of skin disorders. Similar to our study, high prevalence of skin and mucocutaneous infections has been reported in Addis Ababa, 72.6% and 79% [6, 7], in Cameroon (68.8%) [10], in Nigeria (72%) [11], and India (67.06%) [9]. Nevertheless, the finding lower than studies from Tanzania (85%) [12], Zimbabwe 88% [13] and, India 93.7% [14] and (88.3%) [15] and higher than a study conducted in Guinea (54.62%) [16]. The variations might be due to the occurrence and pattern of skin infections vary from region to region since specific skin manifestation are common in certain regions of the world [17]. In addition, differences in climatic and environmental circumstances [14], self-care and sanitation, and variation in sample size in the different studies may affect the varied results observed.

Viral skin infections which accounts for 53.3% were the leading cause of skin infections followed by fungal infections which accounts for 47.8% and inflammatory related skin infections (36.7%). This finding is in line with a study from India where viral, fungal and bacterial skin infections took the highest prevalence [18]. The higher prevalence of these infectious dermatosis is due to the weakening of the Langerhan's cells responsible for the mucocutaneous immunological system [19]. There has been a remarkable reduction in the opportunistic infections such as skin infections like oral candidiasis and seborrheic dermatosis with the introduction of Highly Activated Antiretroviral Therapy (HAART) [20]. However, some skin problems have paradoxically exacerbated after beginning of HAART like herpes zoster, mycobacterium infections and drug reactions [21].

Infectious dermatosis is the most common cause of skin infections. Hence, in our study the most common infectious dermatosis was candidiasis (32.2%) and among non infectious dermatosis, pruritic papular eruption (PPE) (20%) accounts highest prevalence.

Conclusion
This study revealed that high prevalence of mucocutaneous disorder in HIV infected children. Most of the mucocutaneous disorders were secondary to infectious causes and drug related inflammatory condition. Children with advanced immune-suppression are suffering from a wide spectrum of mucocutaneous disorders. Thus, thorough evaluations of children are recommended in HIV care and treatment centers to address these problems.

Limitations of the study
The study conducted only descriptive part. Lacking detailed analysis on associated factors is the limitation of the study.

Additional files

Additional file 1. Distribution of specific skin infection as per common skin infection category of children's living with HIV/AIDS at Hawassa University Comprehensive Specialized Hospital, Hawassa, Ethiopia, 2018.

Additional file 2. HIV/AIDS clinical staging and ART related characteristics of the children living with HIV/AIDS in Hawassa University Comprehensive Specialized Hospital, Hawassa, Ethiopia, 2018 (N = 125).

Additional file 3. Association of common skin infections category, Specific CSIs and their determinant factors of the children living with HIV/AIDS in Hawassa University Comprehensive Specialized Hospital, Hawassa, Ethiopia, 2018 (N = 125).

Additional file 4. Written informed consent form for the study.

Authors' contributions
BD, MG and BDe were conceived the study and were involved in the study design, reviewed the article, analysis, report writing. AB and MA were involved analysis, report writing and, BD and MA drafted the manuscript. All authors read and approved the final manuscript.

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Competing interests
The authors declare that they have no competing interests.
Availability of data and materials
All relevant data are within the paper.

Consent for publication
Not applicable.

Ethical approval and consent to participate
Ethical clearance was obtained from the institutional Review Board (IRB) of the College of Medicine and Health Sciences at Hawassa University. Permissions to undertake the study were also obtained from relevant authority of the hospital and the study subjects that were involved in the study. Both oral and written consent from the guardian or parent was obtained and confidentiality has been assured. The nature of the study was explained to the study participants about the research to the respondents prior to data collection. In addition, confidentiality of all information was ensured. No resistance was made if a respondent wants to withdraw from the research at any time (see Additional file 4).

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