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Magnitude and Associated Factors of Pityriasis Versicolor Among Patients Attending Dermatologic Clinic in Ayder Teaching and Referral Hospital, Mekelle, Tigray, North Ethiopia

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Abstract
Background: Pityriasis versicolor is a chronic and recurrent superficial mycosis that is caused by yeast of *Malassezia* species genus comensal of the horny layer of the skin. The magnitude of disease is varying in the world with a rate of 5-50% and persistent hypopigmentation may remain after treatment course causing significant emotional distress, particularly in adolescents and social problem. However, less known about risk factors of a disease in Ethiopia
Objectives: To assess the magnitude and associated factors of Pityriasis versicolor among patients attending Dermatologic clinic in Ayder Referral and teaching Hospital from June to August, 2014.
Methods: Institution based cross sectional study was conducted at Ayder Referral Hospital on 406 patients, who attended dermatologic clinic from June to August, 2014. Systematic simple random sampling was used and a total of 406 participants available during data collection period were included in the study. Data, which was collected by interview and physical examination, was entered, cleaned, coded and analyzed by using SPSS version 20. Bi-variate and multivariable logistic regression was conducted to examine factors associated with occurrence of Pityriasis versicolor; Odds ratio with their 95% confidence interval and corresponding *p*-value were reported.
Result: From a total of 406 Study Participants 100 (24.6%) were diseased with pityriasis versicolor and 306 (75.4%) were not diseased. About 196(48.3%) of patients were females and 210(51.7%) were males. Among the total study subjects 302(74.4%) of them resided in urban areas while the rest 104(25.6%) live in the rural areas. Out of the total 406 study participants 32(7.9%) had habit of doing exercise regularly, 21(5.2%) had history of excessive sweating, 67(16.5%) wore occlusive dressing. Excessive sweating (AOR=10.6, 95% CI= 2.341-47.999). , practicing exercise regularly (AOR=4.52, 95%CI=1.604-12.708), wearing occlusive dressing (AOR=15.78, 95% CI=7.603-32.745), secondary level of education (AOR=4.03, 95% CI=1.18-13.747) and diploma and above level of education (AOR=3.586, 95% CI=0.948-13.565) were found to be significantly associated with PV. **Conclusion:** The magnitude of Pityriasis versicolor was 24.6% in this study which was high, so it should be noted as an important public health problem in the community.
Keywords: Pityriasis versicolor, magnitude, associated factors, Ethiopia.

Introduction

Pityriasis versicolor (PV) is a chronic superficial mycosis that is caused by several species of Malassezia, particularly M. globosa and M. Furfur are a part of the normal skin flora on the horney layer of the skin and recognized as the etiologic agents of the diseases. The occurrence of the clinical diseases by Malassezia depends on the factors permitting the conversion of saprophytic yeast phase to the mycelia phase [1]. It is one of the most common disorders of pigmentation in the world with a rate of 5-50% varying prevalence [2, 3]**.** And it is a common dermatosis in tropical regions [4]. The prevalence of PV is different among different countries South America, Egypt, and Ethiopia 50%, 11.6% and 6.1 % respectively [5, 6]. The highest prevalence of PV is observed in 20-30 years old group, suggesting that the peak of the infection is conceded with ages when the sebum production is in the highest level [7].

The clinical skin lesion of PV is present in a variety of color and shapes, as the name implies "versi means several" [8]. The most common colors are brown (hyper pigmented) and tan (hypo pigmented).Occasionally there is mild inflammation leading to a pink color. Decreased pigmentation may be secondary to the inhibitory effects of dicarboxylic acids on melanocytes (these acids result from metabolism of surface lipids by the yeast) or decreased tanning, due to the ability of the fungus to filter sunlight [9]. These lesions rarely remain limited to the lower limbs, were popliteal cavity, forearm, underarm, penis/genital, or in the area of radiotherapy. The distribution also occurs in areas normally covered by clothing, calling attention to the theory in which the occlusion of glands plays a role in this disease [10].

PV a recurrent skin condition and persistent hypo pigmentation may remain after treatment, and that may leads to social stigma among affected patients [11] Many predisposing factors such as late teen and young adulthood age , tropical and subtropical climate (and to a lesser extent temperate climate) , immunosuppresion , malnutrition, use of oral contraceptives , hyperhidrosis, poor hygiene and a few other factors have been

proposed for this condition [12] . However Bele c et al. believe that good or poor hygiene of the clothing had no significant influence on the prevalence of PV [3]. Morbidity results primarily from the discoloration. The adverse cosmetic effect of lesions may lead to significant emotional distress, particularly in adolescents [8].

PV is one of the most common Dermatologic problems in tropical countries especially in areas where there is high humidity and temperature including Ethiopia. But to the best of our knowledge no specific study has been done on the prevalence of PV and its determinants among patients attending Dermatologic clinic in Ayder Referral Hospital and this study will provide a the magnitude and associated factors of PV, and so as to enhance quality of services provided for patients.

Method

Study area and Period

This study was conducted in dermatology Outpatient department of Ayder referral and teaching hospital at Mekelle, Ethiopia. Mekelle is the capital city of the Tigray national regional state which is located at 783 km distance north of Addis Ababa. The town had six hospitals (3 private and 3 public), one referral hospital, five health centers, two private higher dermatologic clinics and thirteen higher clinics [13]. Ayder comprehensive referral and teaching hospital is one of the hospitals which are serving at the Tigray regional state at the north part of Ethiopia since 2007. Presently, the hospital provides various clinical and referral services including dermatological services ranging from primary to specialized care and serves patients referred from different health facilities in Tigray and neighboring regions. It has 500 health professionals working in the hospital with a total of four hundred eighty beds for inpatient services [14].
The study was conducted in Ayder referral and teaching hospital from July to September, 2014.

Study design, study population and sampling

A facility based cross sectional study design was used and All patients who visited Ayder Referral and teaching Hospital; dermatology OPD; for any skin problems during the study period.
The sample size was determined by using single population proportion formula with confidence interval 95% and 5% margin of error by taking the prevalence rate of PV among patient treated at dermatology clinic 40 % from a study conducted in [8] and taking the non-respondent rate of 10% the final sample size becomes 406.

Sampling Procedure

Systematic sampling technique was used to identify the study subjects. In average a minimum of 40 patients visit on Monday, Tuesday and Thursday at the Dermatology OPD of the hospital for treatment seek. On Wednesday and Friday up to 20-25 patients visits are expected in the OPDs. In total 165 patients seek the treatment per week (within 5 working days). In this study we included every 2nd patient coming to the OPDs according to their visit.

Data collection and quality control

An interview was undertaken with patient by using structured questionnaire containing variables on socio-demographic, socio economic, clinical symptoms, personal habit and activities after providing oral instructions and written consent with a clear description of the objectives and procedures of the study.
A physical examination of the whole body (scalp, skin and nails) following brief history of symptoms was conducted by three dermatology postgraduate students. The clinical diagnosis of PV; based on the typical clinical manifestation; was confirmed by the finding of hyphae and clusters of yeasts in potassium hydroxide microscopic mounts (KOH) of scrapings and woods lamp examination. Finally the clinical and laboratory finding was recorded properly and those who have PV treated accordingly.

Laboratory Procedure

Scales from involved skin was scraped onto a glass slide and treated with 10% KOH to identify the *Malassezia* yeast forms. The microscopic appearance of the yeast is classically described as “spaghetti and meatballs”.
A Wood's lamp examination was used to see yellowish fluorescence of involved skin

Data analysis

A descriptive analysis using Proportion and frequency, mean, standard deviation, were used. Bivariate logistic regression was applied to see the association between each independent variable with dependent variable and multiple logistic regression model was used to identify independent predictors. Variable found to be significant at *P value <0.05*in the bivariate analysis were entered to multiple logistic regression. We used the enter approach in for inclusion into the multivariate model while the *Hosmer-Lemeshow* statistic was used for model diagnostics. Statistical significance was declared at *P value < 0.05*and the entered and analysis of the data was performed using SPSS version 20 statistical software package

Ethical Consideration

Ethical clearance was obtained from the Ethics Review Committee of the College of Health Sciences of Mekelle University. Accordingly, permission letter was secured from medical director at Ayder referral and teaching hospital. Information obtained from the patient and cards were not disclosed to any third person. Patient's identification variables such as name, house number, telephone, were not used in the study. Informed and written consent was provided by the patients with a clear description of objectives and procedures.This study was not inflict harm on or expose patients to unnecessary risk as a result of interview and physical examination.

Results

Socio demographic Characteristics

The study result summarized in (Table 1) reveals that from the total 0f 406 study participants100 (24.6%) were diseased with Pityriasis versicolor and 306 (75.4%) were not diseased. About 196 (48.3%) of patients were females and 210 (51.7%) were males. Among the total study subjects 302 (74.4%) of them resided in urban areas while the rest 104 (25.6%) live in the rural areas. Accordingly the frequency of individuals with age group were < 20 years 184 (45.3%), 21-30 years 156(38.4%), 31-40 years 37(9.1%), and > 41years were 29 (7.2%)

Among the total study subjects, 53 (13.1%) were illiterate, 126(31.0%) primary school, 124(30.5%) secondary school and 103(25.4%) were College and above by their educational level. Most of the respondents were students which account 166(40.9%) followed by Employed 164(40.4%), Farmer 38(9.3%), Unemployed 26(6.4%) and others which account 12(3.0%) by occupation.

Out of 406 patients included, 11(2.7%) of individuals in the study report that there was the same problem in their family. From the total study participants 6(1.5%) of the study subjects had history of oral contraceptive use continuously and 10 (2.5 %) of them had history of systemic corticosteroids use continuously. The rest 390 subjects didn't have use any of this drugs continuously.

Out of the total 406 study participants 32(7.9%) had habit of doing exercise regularly, 21(5.2%) had history of excessive sweating, 67(16.5%) wore occlusive dressing and 62(15.3%) of them had history of oil application on their body (Table 1)

Table 1. Sociodemographic characteristics of study participants in Ayder teaching and referral Hospital, Dermatology OPD, Mekelle, Tigray region, July, 2014

Characteristics	Frequency	Percentage (%)
Age		
≤20	184	45.3%
21-30	156	38.4%
31-40	37	9.1%
≥41	29	7.2%
Sex		
Male	210	51.7%
Female	196	48.3%
Residence		
Rural	104	25.6%
Urban	302	74.4%
Occupation		
Student	166	40.9%
Employed	164	40.4%
Farmer	38	9.3%
Unemployed	26	6.4%
Others	12	3.0%
Level of education		
Can't read and write(illiterate)	53	13.1%
Primary	126	31.0%
Secondary	124	30.5%
Diploma and above	103	25.4%
Similar problem in the family		
Yes	11	2.7%
No	395	97.3%
Drug used continuously		
Oral contraceptives	6	1.5%
Corticosteroids	10	2.5%
None	390	96.1%
Practice exercise regularly		
Yes	32	7.9%
No	374	92.1%
Sweat excessively		
Yes	21	5.2%
No	385	94.8%
Wear occlusive dressing		
Yes	67	16.5%
No	339	83.5%
Apply oil on the body		
Yes	62	15.3%
No	344	84.7%

Clinical Characteristics

Out of 406 study participants 100(24.6%) (Fig. 1) of them were diagnosed with PV in this study. Concerning color of the lesion, Hypopigmented lesions predominate and it accounted 70(70%). The next was Hyperpigmented lesion which was seen in 22(22%) of individuals with PV and the rest 8 (8%) had both hyperpigmented and hypopigmented lesions. Regarding the clinical form of the lesion 92(92%) was macular with scales and 8(8%) were confluent lesions. On this study follicular and circinate form of the lesions

presentation were not identified. Seventy six of the lesions found on multiple anatomic regions which describes the involvement of two and more regions. Trunk involvement account 14(14%), neck 5(5%), abdomen3 (3%) and 2(2%) on the head.

From those patients who had PV 24(24%) of them had only one site involvement, 69(69%) had two to three regions involved and 7(7%) had four or more body region involvement. Regarding the frequency of region involved 24(24%) of the individuals with Pityriasis versicolor had one region involvement, 48(48%) of them had two region involvement, 20(20%) had three region involvement, 6(6%) had four region involvement and 2(2%) of them had five region involvement. For those individuals with Pityriasis versicolor KOH and woods lamp examination were done and 75(75%) of the patients show fungal elements with microscopic appearance of the yeast classically described as "spaghetti and meatballs" appearance. All of the patients with Pityriasis versicolor show yellowish fluorescence under woods lamp Examination. (Table 2)

Table 2.Physical Examination and Laboratory Findings of Patients with Suggestive Clinical Manifestation of PV In Ayder teaching and Referral Hospital, Dermatology OPD, Mekelle, Tigray Region, July 2014.

Characteristics	Frequency	Percentage (%)
Color of lesion		
Hypopigmented	70	70.0%
Hyperpigmented	22	22.0%
Hypopigmented and Hyperpigmented	8	8.0%
Clinical form of the lesion		
Macular with scales	92	92.0%
Confluent	8	8.0%
Anatomic region involved		
Head	2	2.0%
Neck	5	5.0%
Trunk	14	14.0%
Abdomen	3	3.0%
*Multiple region	76	76.0%
Number of region categories		
Only one region	24	24.0%
2 – 3 regions	69	69.0%
≥ 4 regions	7	7.0%
Result of KOH		
Fungal elements seen	85	85.0%
Fungal elements Not seen	15	15.0%
Result of woods lamp		
Yellowish fluorescence seen	100	100.0%
Yellowish fluorescence Not seen	-	-

*Multiple region = Two or more region involvement

Recurrence of the disease were reported in 34(34%) of the subjects with PV, while 66 (66%) of the subjects reported first Episode (occurrence) of the disease during the interview. From 34 individuals who report recurrence of the disease 16 (47.1%) had recurrence of the disease two to three times per year and 18 (52.9 %) had four and above recurrence annually.

Regarding the treatment history of the patients with recurrent lesion 20(58.8%) of them were treated or had treatment history for their disease and 14(41.2%) of them never had treatment history.

Pruritis/itching on the lesions were reported in 41(41%) of individuals with PV and 59(59%) had asymptomatic lesion. The mean duration of the disease in month was 13.71 with standard deviation of 28.615.

Regarding their thought towards the disease, 60(60%) of the study subjects who had PV in this study believe that they got the disease by sharing clothes with others and 28(28%) of the patients said that they don't know how they got the disease .In addition 11(11%) said it is not transmitted from person to person and the rest 1 (1%) said that they got the disease by contact with someone (Table. 3).

Table. 3 Pityriasis Versicolor in Relation to the occurrence, Treatment History, Thought On Disease Transmission and Duration of the Disease in Ayder teaching and Referral Hospital, Dermatology OPD, Mekelle, Tigray Region, July 2014.

Characteristics	Frequency	Percentage (%)
Episode (occurrence) of Pityriasis versicolor		
First time	66	66.0%
Recurrent	34	34.0%
Recurrence per year		
2 – 3	16	47.1%
≥4	18	52.9%
Previous treatment for the same problem		
Yes	20	58.8%
No	14	41.2%
Itchy /pruritic lesion		
Yes	41	41.0%
No	59	59.0%
Disease transmitted from person to person		
Contact	1	1.0%
Sharing clothes	60	60.0%
Not transmitted	11	11.0%
I don't know	28	28.0%
Duration of the disease in month		
Mean ±*SD	13.71±28.615	
Median	2.00	

*SD= **standard deviation**

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Result of Bivariate Logistic Regression Analysis

The crude (bi-variate) analysis showed that level of education, practicing exercise regularly, excessive sweating and wearing occlusive dressing as predictors of infection by Pityriasis versicolor. Those patients who had secondary level of education were 3.36 times (COR=3.366 95% CI=1.399-8.097) and college diploma and above were 3.23 times (COR=3.238, 95% CI=1.323-7.924) more likely to be infected with PV than those patients who were illiterate. Those who practice exercise regularly are 11.76 times (COR= 11.763, 95% CI=5.084-27.217) more likely to present with PV than who don't exercise regularly. Patients with excessive sweating were 22.17 times (OR=22.171, 95%CI=6.375-77.103) more likely to be infected than those who have no excessive sweating. Patients who have wear occlusive closing were 13.943 times more likely to be infected with PV (OR=13.943, 95%CI= 7.592-25.606) than those who don't wear occlusive dressing.

Result of Multi Variable Logistic Regression Analysis

From crude analysis, level of education, regular exercise, sweating excessively, wearing occlusive dressing and occupation were included to the final multivariable model. At this model, after controlling for other covariates, those who had secondary level of education were 4.02 times more likely (AOR=4.026, 95% CI=1.179-13.747) to be infected than illiterate ones and subjects with diploma and above level of education were 3.586 times more likely to be infected by PV than illiterate ones (AOR=3.586, 95% CI=0.948-13.565).

On the other hand, having practicing regular exercise, excessive sweating and wearing occlusive dressing are positively associated with being infected with PV in this study. Those subjects who practice regular exercise were 4.515 times more likely to be infected with PV than their counter parts who had no practicing regular exercise (AOR=4.515, 95% CI=1.604-12.708). Those subjects with excessive sweating were 10.601 times more likely to be infected than those who have no excessive sweating history (AOR=10.601, 95% CI= 2.341-47.999). People with history of wearing occlusive dressing were 15.779 times more likely to be infected with PV than their counterparts (with no history of wearing occlusive dressing) (AOR=15.779, 95% CI=7.603-32.745) (Table 4).

Table 4. Multivariable Logistic Regression of factors Associated with PV, in Ayder referral Hospital, Dermatology OPD, Mekelle, Tigray region, July2014.

Variables	Pityriasis versicolor		Adjusted OR (95% CI)
	Yes (%)	No (%)	
Occupation			
Student	33(19.9%)	133(80.1%)	1
Employed	45(27.4%)	119(72.6%)	0.834(0.406-1.712)
Farmer	8(21.1%)	30(78.9%)	1.074(0.313-3.682)
Unemployed	13(50.0%)	13(50.0%)	5.277(1.905-14.616)**
Others	1(8.3%)	11(91.7%)	1.217(0.133-11.086)
Level of education			
Can't read and write(illiterate)	7(13.2%)	46(86.8%)	1
Primary	17(13.5%)	109(86.5%)	0.771(0.220-2.696)
Secondary	42(33.9%)	82(66.1%)	4.026(1.179-13.747) **
Diploma and above	34(33.0%)	69(67.0%)	3.586(0.948-13.565)**
Practice exercise regularly			
Yes	24(75.0%)	8(25.0%)	4.515(1.604-12.708)**
No	76(20.3%)	298(79.7%)	1
Sweat excessively			
Yes	18(85.7%)	31(4.3%)	10.601(2.341-47.999)**
No	82(21.3%)	303(78.7%)	1
Wear occlusive dressing			
Yes	48(71.6%)	19(28.4%)	15.779(7.603-32.745)**
No	52(15.3%)	287(84.7%)	1

NB: ** = Significant

Discussion

The magnitude of Pityriasis versicolor in this study was 24.6 %. By applying logistic regression occupation, level of education, practicing exercise regularly, excessive sweating and wearing of occlusive dressing were found significant.

The mean age of the patients who had PV was 24.87 with standard deviation of 10.3. The minimum age of the patient who had PV was 2 years old female child with head involvement only and the maximum age was a 75 years old male patient with multiple region involvement by the lesion.

The current magnitude 24.6% of the disease was lower than studies done like in Brazil Re de Janeiro 40 % [15] , Egypt , Cairo 44% [5], Maharashtra , India 40% [4] , and Ahvaz , Iran 20-50% [3] , But on the other hand this study had higher magnitude than studies done like in Bangladesh 12.8% [16], and Malawi 17.9% [35].

The higher magnitude of Pityriasis versicolor in the tropics than in temperate areas highlights the importance of environmental humidity and warmth as predisposing exogenous factors. [17]. Pityriasis versicolor is a chronic fungal disease that is more prevalent in warm and humid condition. Differences in the magnitude rates of Pityriasis versicolor among different surveys have been devoted. In addition, Environmental factors may play a role with higher prevalence rates in tropical climates than in temperate ones. [18]

The magnitude of disease is varying in the world with a rate of 5-50% [3]. Generally the current magnitude of PV in this study was high. This study was conducted in cold season of Ethiopia were the disease is not common. The disease shows significant variation during summer and winter period [19]. The disease was seen mostly in warmer season [20]. A statistical significant relationship was obtained between skin infection and

seasonal variation (p value of 0.017). Highest percentage of infections (79%) was observed to be most common in summer season. Summer season correlated with the occurrence of skin infections, hereby showing that seasonal variation has an effect on skin infection. Climate has the greatest impact on appearance, spread and relapse of PV [21]

With regard to educational status, it was found that secondary school students had odds of having PV 4.026 (AOR (95% CI):4.026(1.179-13.747) and diploma and above had odds of having Pitryasis versicolor 3.586 (AOR= (95% CI): 3.586(0.948-13.565) than illiterate (can't read or write) were found in the study. This may be due to that most of study participants were from urban 302(74.4%) in this study and majority of individuals with secondary level of education and those with diploma and above were from urban. There are a total of 42 individuals with secondary level of education who had PV and out of this 33 (78.6%) were from urban and 9 (21.4%) were from rural areas. on the other hand there are a total of 34 individuals who had PV with diploma and above level of education and out of this 31(91.2%) were from urban and 3(8.8%) were from rural in this study. so these study participants they may face many predisposing environmental factors that helps for the occurrence of the disease as compared to those live in rural areas. The life style in rural and urban was also different and those who live in urban areas mostly had over care of their skin by applying different cosmetics in their body which enhances occlusion and occurrence of the disease. Study done in Brazil report that other exogenous factor may be skin occlusion by clothing or cosmetics can lead to the occurrence of the disease [15]. In addition in urban areas mostly there was overcrowded environment with warm air condition that can influence disease occurrence than those who live in rural areas who mostly sparsely settled. A survey on PV in the university students in south east Iran confirmed that the high magnitude of Pityriasis versicolor in the students living in the university Dormitories. This infection were considered an important public health problem in the study area, particularly, where students live together. Additionally the study also reported that PV is common in different communities, in particular the crowded places like Dormitories [22]. On the other hand most of individuals with secondary level of education in this study were from younger age. The disease is more common in the post pubertal age where sebaceous glands are active [23]

Those subjects who practice regular exercise were 4.515 times more likely to be infected with PV than their counter parts who had no practicing regular exercise (AOR=4.515, 95% CI=1.604-12.708). Study done in brazil it is showed that 39.7% (46/116) of patients who had PV had history of doing exercise regularly [11] which in line with current study that individuals who practice exercise regularly had more likely to develop PV. The reason behind this finding may be due to that if somebody did regular physical exercise and different sports for his/her good physical appearance or good posture and then after doing regular exercise if they don't take shower this may create a favorable environment for the normal flora of yeast to change in to disease form with visible lesions which results from the occlusion of the body by unhygienic condition [8]

Those subjects with excessive sweating were 10.601 times more likely to be infected than those who have no excessive sweating history (AOR=10.601, 95% CI= 2.341-47.999).Study done in India report that Increased sweating during summer probably makes the person more susceptible for infection [20]. The other study done in Tehran, Iran, showed significant association of Excessive sweating with PV (58.5%)($p<0.001$) . Study done in USA states that Excessive sweating was one factor that predisposes to PV [24]. These studies were in line with the current study that individuals who had history of excessive sweating were more likely to develop the disease

With regard to occlusive dressing, people with history of wearing occlusive dressing were 15.779 times more likely to be infected with PV than their counterparts (with no history of wearing occlusive dressing) (AOR=15.779, 95% CI=7.603-32.745).Occlusion from talcum powder and synthetic clothing result in increased carbon dioxide concentration, altered micro flora and altered PH, which could be one factor individuals to develop the disease [20, 25]. Study done in USA states that occlusive dressing was one factor that predisposes to PV [24]. These statements are in line with current study that individuals with habit of wearing occlusive dressing were more likely to develop the disease than those who don't have this habit.

Limitation of the study

Cross- sectional study design was used in the present study. The cross sectional nature of study can lead to inability to see which comes first the outcome or the risk-factor. Additionally Recall bias can occur due to forgetfulness to exposure to risk-factors.

Conclusions and Recommendations

Conclusions

- This study found that the magnitude of Pityriasis versicolor was 24.6 %.
- Individuals with secondary level of education and those with diploma and above were more likely to develop the disease than illiterates.
- Having practicing regular exercise was found one risk factor that makes some one more likely to develop the disease than those who don't practice exercise regularly.

- Occlusive dressing were found one of an important factor for the occurrence of the disease. Those who wore occlusive dressing were more likely to develop Pityriasis versicolor than those who don't wore occlusive dressing.
- Additionally it was found that individuals who had history of excessive sweating are more likely to develop Pityriasis versicolor.
- Some of the variables including sex, age, residence and application of oil have not been found to be significant predictors of Pityriasis Versicolor in this study.

Recommendations

- Close follow up and appropriate intervention in high risk patients is recommended to decrease the recurrence of the disease, to reduce the impact of the disease on affected individual's quality of life and to prevent social stigma which comes from the clinical aspects of lesions and the residual Hypopigmentation or Hyperpigmentation of the lesions which the disease causes.
- Regarding knowledge towards Pityryasis versicolor and its associated risk factors were low and there is a gap even in health care professionals except dermatology professionals, so to manage the disease it Is better to train and upgrade heath care professionals from Hospitals, health centers up to lower level with basic knowledge on pityryasis versicolor and its associated factors.
- It should be noted as an important public health problem in the community. So different measures are recommended in the community, schools and different institutions by creating awareness about pitryasis versicolor and the risk factors. In addition governmental and nongovernmental organizations to play their role by supporting different activities for the prevention of the disease.
- To know the exact magnitude of pityryasis versicolor in the study area it is better to do further studies or furthermore studies that investigate on PV and its associated factors on the community level was highly recommended.

Authors' Contribution

Author 1: LW: Initiated the research, wrote the research proposal, conducted the research, did data entry and analysis and wrote the manuscript.

Author 2: AG: Involved in the write up of the proposal, write up of the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

Data is not available for online access but interested readers can communicate with the first author Lantesil Wondewosen at lantesil@gmail.com

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Competing Interests

Author(s) disclose no potential conflicts of interest.

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