

Dermatological manifestations and medico-social correlates among intellectually disabled students in Central India



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ABSTRACT

Background: People with intellectual disabilities (PwID) are particularly more vulnerable to dermatological manifestations due to their associated disabilities and hygiene negligence.

Aims and Objective: To estimate the prevalence and pattern of skin diseases considering various medico-social correlates among PwID in two districts of Central India. To apply multinomial logistic regression analysis to examine the medico-social factors associated with no, one and more than one dermatological manifestations. **Materials and Methods:** A total of 204 PwID receiving rehabilitation services under a NGO serving two districts were examined for dermatological manifestations and various medico-social factors were studied. Descriptive analysis like chi-square and multinomial logistic regression analysis (MLR) was performed. **Results:** We found that 87.25% of study participants had one or more dermatological manifestations {infectious (64.7%) and non-infectious (84.3%)}. Among the various medico-social variables studied, socio-economic status, education of parents and associated co-morbidities were independently associated with increase in frequency of skin disorders. MLR analysis showed that illiteracy of parents, lower socio-economic status and associated co-morbidities in PwID had higher odds of developing one and more than one dermatological manifestations when compared to literate and high income families and PwID with no associated co-morbidities. **Conclusion:** This study delineates the importance of additional attempts to be made by dermatologist while dealing with PwID while considering carefully their associated co-morbidities and various social factors. Strict hygiene measures, periodic skin examination and health education of persons caring for students with disabilities are recommended.

Key words: Skin disorders; Intellectual disability; Infectious skin; Health education; Dermatological manifestations

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INTRODUCTION

Dermatological manifestations accounts for 10–20% of all the consultations in general practice.¹

Growing severity of skin diseases in India is further emphasized by World Health Organization which has included skin diseases under the most common non-communicable diseases.² Skin diseases are among the most common diseases in school children globally.³ The situation

is further worsened in children with disabilities especially intellectual disabilities (ID)⁴ as health conditions of these persons is a neglected subject especially in Indian context, despite the evidence that these individuals experience poorer health (due to associated co-morbidities), shorter lifespan, and less access to professional health care than people without this condition.⁵ Intellectual disability is a generalized neuro-developmental disorder characterized by significantly impaired intellectual and adaptive functioning and an IQ score under 70 with a prevalence of 1-3%

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globally.^{6,7} Available published literature cites that Person with intellectual disability (PwID) are more likely to have various health problems including skin disorders compared with the general population due to their associated comorbidities and restricted movements.⁸ As per our review, there is a paucity of available information concerning the prevalence and pattern of skin disorders in relation to various medico-social correlates in PwID. With the rising incidence of dermatological manifestations in PwID, it is essential to understand how the disease burden is shared among PwID with increasing frequency of skin, hair and nail lesions. There is a need for modeling of risk process for increasing frequency of dermatological manifestations in PwID with respect to various medico-social factors. This is essential for better planning of comprehensive dermatological manifestations treatment services in PwID. The broad purpose of this study was to present a detailed overview of the specific skin, hair and nail problems along with its correlation to medico-social factors in children with ID.

MATERIAL AND METHODS

Study design

The present study was designed as a part of a health check up camp organized by the researcher among all children with intellectual disability receiving rehabilitation services under a NGO serving Ujjain and Shajapur districts of Madhya Pradesh. The authors have previous publication where they have studied various medico-social predictors of school performance on the same study subjects.⁹ This Study was a follow up study over one academic year (July 2011-April 2012). The study was performed at two purposively selected districts i.e. Ujjain and Shajapur districts of Madhya Pradesh, India. At the time of study there were total five prevocational rehabilitation centers for PwID in selected districts (three in Ujjain and two in Shajapur). The study was conducted at the four centers run by NGO included in the study. Two Study centers are located in Ujjain district and two are located in Shajapur district of Madhya Pradesh. The present study was designed as a part of a health check up camp organized by the researcher among all the students studying at selected centers were included in the study. Students with profound mental retardation, whose parents didn't consent and who couldn't complete one academic year after start of study were excluded from the study. A total of 204 (92.3%) students out of 221 enrolled fulfilled the inclusion criteria from all study settings.

Methodology

The principal investigator met all the school authorities and explained them the nature of this study to seek their consent. The researchers have organized camps within the school premises especially during the regular parent-teacher

meet. Verbal consent for participation in the study was taken from parents. All the study participants were assessed for their skin, hair and nail related problems in-depth by the health professional. During teacher-parent meetings, socio-demographic details were collected from parents of study subjects with the help of class teachers. Medical problems of PwID like epilepsy, hyperkinesis, associated psychiatric and behavioral manifestations along with associated handicap viz. physical disabilities due to cerebral palsy, deaf/dump or blind were interviewed from parents and school medical records of students were verified. Help of school appointed Psychologist was taken.

Socio-demographic variables quantification

Age of student's ranged from 4 to 34 years with mean age 13.02, where 69.1% were males. Each adolescent was assigned to one of the two types of family arrangements: first were intact families or both natural parents. Second being non intact families or one natural parent only, one natural parent and a stepparent or neither of parent or the child is staying with some relative as caretaker. Parents' education levels: Measures of both mother's and father's levels of education had three categories: (a) elementary level and a few years at the high school level (b) high school completed, and (c) college or university graduated. These measures were averaged to create a single parental education measure that had five categories: (1) both parents who are college or university graduated. (2) one of the parents with high school completed and the other one who is college or university graduated; (3) both parents with high school completed; (4) one parents with elementary level or few years at the high school; the other parent with high school completed and (5) both parents with elementary level or few years at high school; About the socio-economic status, Kuppuswamy classification was followed and families were divided into five categories. Associated co-morbidities are included where co-morbidity is either absent or present and is counted as one or more than one disability.

Ethical considerations

Protocol of the study was approved by Ethics committee of the institute. Information sheet was undersigned by NGO Head. Written informed consent was taken from parents. Analysis was done using SPSS 20.

Analysis

Analysis was done using SPSS 20. Statistical test were used where ever applicable.

RESULT

The study observed that 87.25% of mentally retarded students had 1 or more skin diseases (both infectious

and non-infectious). The most common of which were Pediculosis capitis (31.37), Pitiriasis sicca (23.52), Impetigo (15.68), Acne vulgaris and acne excories (14.21) and so on (Table 1).

Table 2 shows the distribution of frequency of skin disorders according to medico-social characteristics of study participants. Results indicate that among all the medico-social variables, socio-economic status, education of parents and associated co-morbidities were significantly associated with increase in number of skin disorders.

Table 1: Distribution of study participants according to etiology and pattern of skin disorder

Skin disorder	Number (n=204)	%
No	26	12.74
Yes	178	87.25
Infectious		
No	72	35.29
Yes	132*	64.71
Bacterial	42*	20.58
Impetigo	32	15.68
Boils & folliculitis	10	4.9
Furuncle	2	0.98
Parasitic	67*	32.84
Pediculosis capitis	64	31.37
Scabies	8	3.92
Fungal	16*	7.84
Tinea capitis	6	2.9
Tinea versicolor	6	2.9
Tinea pedis	4	1.96
Onychomycosis	4	1.96
Pityriasis versicolor	8	3.92
Viral	5*	2.45
Wart	3	1.47
Herpes simplex	2	0.98
Mixed	11*	5.39
Intertrigo	11	5.39
Non-infectious		
No	32	15.68
Yes	172*	84.31
Acne vulgaris and acne excories	29	14.21
Eczema	15	7.35
Lichen simplex chronicus	11	5.39
Pigmentary disorder (hyper hypo)	24	11.76
Alopecia areata	9	4.41
Androgenic alopecia	8	3.92
Dermatitis artifacta and neglecta	6	2.94
Pitiriasis sicca	48	23.52
History suggestive of urticaria	4	1.96
Ichthyosis vulgaris	1	0.49
Phrynodema	8	3.92
Psoriasis	2	0.98
Vitiligo	3	1.47
Seborrhic dermatitis	10	4.90
Miliaria	12	5.88
Atopic dermatitis	4	1.96
Nail biting disorder (onychophagia)	24	11.76
Tic deformity	2	0.98
Onychotillomania	8	3.92

*Sum total is not exact as overlapping of infections was found

Table 3 showed Multinomial logistic regression analysis for frequency of skin lesions (one, more than one) controlled for various medico-social factors. First half of the table describes the medico social factors associated with occurrence of one dermatological manifestation in PwID. When compared to Upper SES, PwID belonging to Lower middle SES had an Odds Ratio (OR=21.12; p=0.021), Middle lower middle SES had an Odds Ratio (OR=62.495; p=0.003) and in PwID from Upper middle SES had an Odds Ratio (OR=14.84; p=0.012). PwID with one associated disability had an Odds Ratio (OR =11.78; p=0.011) when compared with no associated disability for occurrence of one dermatological manifestation.

While second half of the table describes the medico social factors associated with occurrence of more than one dermatological manifestation in PwID. When compared to Upper SES, PwID belonging to Middle lower middle SES had an Odds Ratio (OR=47.63; p=0.003) and in PwID from Upper middle SES had an Odds Ratio (OR=8.71; p=0.023). More over parents with cat 5 education had an Odds Ratio (OR=12.07; p=0.042) when compared to cat 4 parent education of PwID. Also when compared with PwID having no associated lesion, PwID with one associated disability had an Odds Ratio (OR =11.78; p=0.011) and with more than one associated disability had an Odds Ratio (OR =11.78; p=0.011) for occurrence of more than one dermatological manifestation.

DISCUSSION

The focus of the study on children with ID is justified by the fact that they are a vulnerable sector of the community with associated co-morbidities and high prevalence of dermatological manifestations.^{3,5,6} Majority of the published studies are focusing on prevalence and pattern of skin disorders in intellectually disabled without considering the unique medical, social and behavioral disorders common to this population. This study was thus planned owing to the relative scarcity of data specific to this group with reference to pattern of skin disorders while considering various medico-social correlates especially in a developing country. In the present study, influence of associated co-morbidities and the family demographics of PwID on the increasing frequency of dermatological manifestations were also studied.

The preliminary descriptive analysis has observed that proportion of study subjects who had 1 or more skin diseases (both infectious and non-infectious) were found to be 87.25% (178 out of 204) in comparison to 24.2%² and 31.3%¹⁰ of the prevalence of skin condition in students from regular schools as mentioned in various

Table 2: Distribution of frequency of skin disorders according to socio-demographic characteristics of study participants

Variables	Associated skin disorders			Total (n=204)	Chi-square	p-value
	No (n=26)	One (n=42)	> one (n=136)			
Age						
0-5	3	7	9	19	8.488	0.387
6-10	9	10	57	76		
11-15	8	16	39	63		
16-20	5	7	28	40		
>20	1	2	3	6		
Gender					0.153	0.926
Male	18	28	95	141		
Female	8	14	41	63		
Type of family					5.96	0.202
Nuclear family	11	27	77	115		
Third generation family	9	6	23	38		
Joint family	6	9	36	51		
Socio-economic status					20.83	0.008*
Upper	9	3	8	19		
Upper middle	7	16	40	63		
Middle lower middle	3	11	40	54		
Lower upper lower	6	11	44	61		
Lower	2	1	4	7		
Education of parents					19.38	0.013*
Category 1	9	8	12	29		
Category 2	3	10	19	32		
Category 3	4	10	36	50		
Category 4	8	10	39	57		
Category 5	2	4	30	36		
Family structure					4.49	0.106
Intact families	25	34	123	182		
Non intact families	1	8	13	22		
Severity of retardation					3.34	0.503
Mild	10	18	49	77		
Moderate	13	19	57	89		
Severe	3	5	30	38		
Associated disability					26.27	0.00
No association	22	23	51	96		
One disability	3	16	46	65		
More than one disability	1	3	39	43		
Epilepsy					4.477	0.107
Present	1	3	22	26		
Absent	25	39	114	178		
Hyperkinesia					9.143	0.010
Present	0	2	24	26		
Absent	26	40	112	178		
Psychiatric manifestations					4.396	0.111
Present	0	5	20	25		
Absent	26	37	116	179		
Associated handicap					6.927	0.031
Present	1	2	24	27		
Absent	25	40	112	117		
Clinical syndromes					4.782	0.092
Present	0	1	13	14		
Absent	26	41	123	190		
Associated behavioral disorders					0.426	0.808
Present	4	9	28	41		
Absent	22	33	108	16		

other studies.^{8,11} Similarly, a study by Fathy et.al reported high proportions of skin diseases in PwID.³ The reason for higher dermatological manifestations in PwID might attribute to facts that skin lesions that could annoy a person without ID often goes unnoticed for PwID. Additionally, lifelong dependence of these children on caretaker is observed which is even more in PwID with associated

motor disabilities. This attributes to poor personal hygiene of PwID which is indirectly dependent on caretaker's attitude towards hygiene and standard of living.

In the present study prevalence of infectious skin diseases was found to be higher in PwID than the prevalence in children from general population reported in other studies.¹¹ The habit

Table 3: Multinomial logistic regression analysis for frequency of dermatological lesions (one, more than one) controlled for various medico-social factors

Dermatological manifestations (ref: no manifestation)	B	One manifestation		B	More than one manifestation	
		Exp (B)	p-value		Exp (B)	p value
Intercept	2.573		0.083	3.741		0.008
Age >20	1.571	4.813	0.395	1.040	2.829	0.570
Age 16-20	0.827	2.287	0.471	2.101	8.175	0.057
Age 11-15	1.089	2.971	0.302	1.933	6.910	0.063
Age 6-10	0.106	1.112	0.919	1.873	6.510	0.063
Age <5	0			0		
Male gender	-0.461	0.631	0.514	-0.205	0.814	0.227
Female gender	0			0		
Joint family	-0.743	0.476	0.365	-0.360	0.698	0.638
Third generation family	-1.871	0.154	0.017	-1.876	0.153	0.008
Nuclear family	0			0		
Lower SES	1.069	2.912	0.574	-0.227	0.797	0.887
Lower middle SES	3.050	21.118	0.021	2.302	9.998	0.051
Middle lower middle SES	4.135	62.495	0.003	3.863	47.628	0.003
Upper middle SES	2.697	14.836	0.012	2.164	8.709	0.023
Upper SES	0			0		
Non-intact family	1.826	6.208	0.160	1.120	3.066	0.388
Intact family	0			0		
Severe MR	-0.880	0.415	0.370	0.125	1.134	0.886
Moderate MR	-0.238	0.789	0.746	0.082	1.086	0.903
Mild MR	0			0		
Parent education Cat 5	0.628-0	1.874	0.648	2.490	12.067	0.042
Parent education Cat 4	0.462	0.630	0.685	0.463	1.590	0.646
Parent education Cat 3	0.756	2.130	0.500	1.742	5.709	0.089
Parent education Cat 2	1.879	6.548	0.097	1.917	6.799	0.078
Parent education Cat 1	0			0		
More than one disability	1.421	4.142	0.266	3.262	26.092	0.004
One associated disability	2.466	11.779	0.011	3.063	21.392	0.001
Without associated disability	0			0		

*Reference category is: PwID with no skin manifestation

of repetitive scratching of skin and self-injurious behavior observed in PwID might facilitate the spread of bacterial infections. Similar relation was depicted in a study by Cotterill et al who suggested that low resistance might be responsible for pyogenic skin infection among mentally retarded people.¹² Pediculosis capitis was identified with high prevalence in PwID. Similar findings were reported by Ismail et al in their study.¹³ Similarly, fungal infections like Tinea capitis, Tinea versicolor and viral infections like Warts were reported with high prevalence in PwID. These results of higher infectious skin condition in study population are in agreement to findings of a study by Fathy et al³ who did a comparative study of PwID with a control from general population and found a higher prevalence in PwID. In this study, the prevalence of noninfectious skin conditions was 84.31% and is not dissimilar with results of previous studies.^{3,12} Similarly, Fathy et al. in their studies reported lower prevalence in children without ID.³ The reasons which explain these high rates are both the nature of the disability and the associated day-to-day problems. The repeated habit of scratching, frequent susceptibility to trauma and observed dry skin was the other observed reasons. Moreover, such disease may reflect nutritional deficiency and negligence on the part of caretakers of PwID or it may reflect their low socioeconomic standards.

Prevalence of hair changes like alopecia areata and cicatricial alopecia are also high in this group. This may attribute to medications for associated epilepsy, stressful life event and more susceptibility to trauma. Leukonychia and onychophagia were found more prevalent in PwID. Frequent trauma explains prevalence of leukonychia while the nature of disease itself explains higher prevalence of onychophagia in PwID. The above evidence of high prevalence of skin diseases in PwID suggests that the quality of health services they receive is often inadequate and not frequently enough. Also these evidences suggest that PwID do not have a good health care access.¹⁴

The medico-social variables independently associated with increase in frequency of skin disorders in this study are socio-economic status, education of parents and associated co-morbidities. We observed that students with a poorer socio-economic environment especially regarding infectious diseases, skin morbidities are higher. Students with more educated parents in this study had lesser frequency of skin manifestations. The explanations can be partly because educated parents support them to get timely management of these conditions and their belief in importance of maintaining hygiene especially in PwID. Study subjects with associated co-morbidities like physical and mental (other

psychiatric manifestations) also found to have increased dermatological manifestations. This finding is in conformity with the findings from the previous systematic review which documented that prevalence of skin diseases are more in patient with psychiatric manifestations.¹⁵ It is important from community health's point of view to assess not only the prevalence of skin disease, but also to identify associated medico-social factors and consider it while treating PwID.

It is essential to identify high risk population and to target their associated co-morbidities to improve the treatment approach towards them. Therefore multinomial regression analysis was used to assess the significant independent factors associated with increasing frequency of dermatological manifestations in PwID. Factors like illiteracy of parents, lower socio-economic status and associated co-morbidities in PwID had higher odds of developing one and more than one dermatological manifestations when compared to literate and high income families and PwID with no associated co-morbidities.

CONCLUSION

Primary medical care of PwID should involve continuity of care, maintenance of comprehensive treatment documentation, routine periodic health screening and understanding of the unique medical and behavioral disorders common to this population. For the dermatologist the first approach would be treatment of the skin lesions but they often lack therapeutic strategies to deal with PwID. This study delineates the importance of additional attempts to be made by dermatologist while dealing with PwID and also to explain simple and efficacious preventive actions to their parents like self care and hygiene improvement. This study can potentially support in identifying the lacunae pertaining to treatment initiation by a dermatologist in PwID, where medico-social factors needs to be considered. Strict hygiene measures, periodic skin examination and health education of persons caring for students with disabilities are recommended.

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Authors Contribution:

HG - Concept and design of the study, reviewed the literature, manuscript preparation, statistically analyzed and interpreted and critical revision of the manuscript; VA - Concept, collected data and helped in diagnosing skin diseases.

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