



PUBLIC'S PERCEPTION AND KNOWLEDGE ABOUT PSYCHOSOCIAL ISSUES FACED BY VITILIGO PATIENTS

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ABSTRACT

Background: Decreased pigmentation of the skin or vitiligo is one of the common manifestations found in general population and slightly more prevalent in Asia especially India and Pakistan. Studies concerning myths regarding vitiligo; its association with other illnesses and its consequences can be found in previous literature but still an obvious gap in stats can be observed regarding some other aspects of vitiligo. Hence, the main objective of this study is to assess the general population's perceptions and knowledge regarding psychosocial effects of vitiligo on their quality of life.

Methods: A cross-sectional survey was conducted in Karachi among 300 participants for two months i.e. from August 2019 to September 2019. Participants were aged between 18 to 60 years; were randomly and equally divided into two groups on the basis of being related to Medicine field or not. Respondents were approached once informed consent was obtained and were interviewed via self-designed questionnaire. Questions related to demographics, how the disease might affect their psychological and social life and knowledge about vitiligo were inquired. Questionnaires were analyzed using the Statistical Program for Social Sciences (SPSS 22).

Results: Of the 300 respondents, females had slight upper hand in number i.e. 51.5%. The overall mean age was 22± 5.4 years with bulk of individual were aware of the term vitiligo (p-value <0.001). Friends and family members were the main source of knowledge for most. Around fifty percent of the participants considered it as generalized skin disease while remaining also agreed to it acro-facial (16%) and segmental (3%) distribution. Significant association were also noted for various aspects including involved body sites, its social impact, therapeutic measures and routine activities.

Conclusion: The findings of the study reflected a serious lack of knowledge among masses regarding Vitiligo. Psychological, psychosocial, social and personal factors in this regard need to be addressed effectively in order to overcome myths and social discriminations. Dermatologists experience should be taken into consideration in this regard. We look forward this survey as a first step in order to bring attention towards a much neglected skin condition.

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INTRODUCTION

Dyschromia or hypopigmentation or depigmentation of skin is familiar with the term Vitiligo. All of these terms mutually refer to loss of epidermal melanocytes and comparative lightening of the involved skin color with respect to surrounding. Vitiligo carries a minor prevalence in society but acquire great significance. Vitiligo involves around 2% of the population worldwide and 1% of US people are affected with this condition. Though, the highest incidence was noted among Indians i.e. 8.1% according to some literature while 4% of Pakistani population is under its prevalence umbrella. It is seen in different age groups but higher incidence among teenagers and young adults [1, 2]. It usually begins in childhood and goes on with increasing age, slightly more prevalent among adolescent girls than boys of approximately same age but some studies suggest no gender preference for this condition. There is also an adult-onset variant with a mean age of 55 years [3].

There are many types of Vitiligo with respect to its site and distributions of involved area but segmental and non-segmental are broad types and there are some other variants studied under mixed and unclassified Vitiligo. Its characteristically appears as a whitish lesion over the skin with surrounding normal or hyper-pigmented areas and these lesions may be of varying sizes ranging from a macule up to patch [4]. Vitiligo is mostly associated with autoimmune conditions of skin and other systemic autoimmune diseases. Individuals with thyroid autoimmune disease are most frequent victims of this disorders while other conditions like pernicious anemia, lupus, Addison's disease and inflammatory bowel disease present Vitiligo as a presenting feature. All these conditions reflect its genetic origin while non-genetic etiology are also reported in previous studies [5, 6]. Moreover, Vitiligo carries a significant risk for psychiatric illness with a feeling of guilt, shame, poor self-esteem, social backwardness, anxiety

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and depression cases are also reported with regards to its manifestation [7]. Considering the situation there are numerous myths regarding its treatment, distribution pattern, prediction factors and numerous other [8].

Various studies have been carried out in the past to assess the general population's perception and attitude towards this less prevalent yet sensitive condition called Vitiligo and some studies reported significant number of persons with their own negative myths and misconceptions on cultural basis and lack of knowledge. Some consider this condition same as albinism while on the other hand some data suggests a positive knowledge and attitude with modern era of available information on Internet and technology [9-11]. Yet, there is still a large gap still present where a lack can be seen for stats regarding perception and attitudes of Pakistani population towards this sensitive issue and how much a today's person is aware of this condition irrespective of their preferred daily activities. Hence the main objective of this study is to assess the knowledge, attitude and practices towards Vitiligo.

MATERIAL AND METHOD

We performed a cross-sectional survey using a self-constructed questionnaire. The sample size of 300 was calculated through openepi.com and were randomly divided equally among medical and non-medical participants. Respondents were educated residents of metropolitan city, Karachi above 18 year of age till 60 those included participants from medical and non-medical field. Data were collected from August 2019 to September 2019. Equal response was noticed from both the categories, medical being 51.2% and non-medical with 48.5%. A total of 39 questions were divided into 4 categories. The first category of questions contained demographics, including gender, age, related field, marital status, socioeconomic status. In the second category, participants were asked about their knowledge of vitiligo and their main source of information about the disease. They were also asked about their personal views on the cause and nature of the disease, as well as available treatment and rate of prevalence. The third category elicited information about participants' interaction, and their perception about effect of vitiligo on a person social life and mental health. The last category include questions regarding suicidal attempt among them, whether people with vitiligo avoid going in direct sunlight, fear to show their skin during swimming/sports, do people avoid marrying a person with such skin disease.

Data Analysis: Data was entered by Microsoft Excel. The returned questionnaires were analyzed using the Statistical Program for Social Sciences (SPSS 22). The Chi-Square test was used to assess associations between categorical variables. The Mann-Whitney U test was used to compare numerical variables. Statistical significance was set at $p < 0.05$.

RESULTS

Out of 300 individuals who completed the questionnaire, the mainstream (n=155, 51.5%) were female. The mean age of individuals was 22 ± 5.4 years and [n=145, 48.5%] were male. A nearly equal amount of medical [n=154, 51.2%] and non-medical [n=146, 48.5%] participant filled the questionnaire, amongst them [n=34, 11.2%] were married and [n=146, 48.5%] were non-married.

A prodigious bulk individuals knew what vitiligo is ($p < 0.001$) and more than half of these individuals [$p = 0.009$] learned about vitiligo from friends and family while about one-third of

the individual [n=100, 33.3%] found it out through social media and [n=107, 35.6%] books ($p = 0.009$). We also found that approximate individual know about vitiligo through other sources [n=45, 15%].

Nearly half of the contributors [$p = 0.033$] marked vitiligo as generalized type of skin disease. A Limited members [n=49, 16%] agrees that it cover only peri-oralifical-facial area (acro-facial type disease). A trivial number of participants marked it as a localized [n=9, 3%] or segmental type of disease ($p = 0.033$). When inquired for the pervasiveness [n=41, 13%] individuals consider its prevalence up to 1-5%. A generous [n=32, 10%] amount also consider its prevalence of 5-10% ($p = 0.061$). While calculating for the sources greater part of participants chosen family history and excessive sun exposure as a major cause ($p = 0.002$), showing a significant relation. Poor medication [n=116, 38%], Alter immunity [n=81, 46%] and excessive work [n=63, 21%] are also found to be extensive causes ($p = 0.002$). Former were not notable. An appreciable number of people didn't know the first gash of vitiligo ($p = 0.009$). When queried for the body area affected an utmost response were observed for arms ($p = 0.006$). More or less equal amount of response was acquired [n=192, 64%] for genitals and face & neck ($p = 0.006$). A huge population marked trunk as well. Formerly, about two-third of population ruminate that age group 15-30 is affected most ($p = 0.061$). A perceptible [n=28, 9.3%] magnitude also consider 31-45 age group. Additionally, some percentage of people thinks that vitiligo intensify with age ($p = 0.020$) showing a statically significant link. A trifling portion of individuals [$p = 0.030$] also deem that vitiligo can be controlled. When questioned for associated disorders eczema [$p = 0.028$] and trauma turn up to be most widespread condition ($p = 0.028$). For alleviating it NBUBV [$p = 0.034$] is the topmost effective therapy. A similar size of populace consider topical corticosteroid [$p = 0.034$] and Anti-oxidants [$p = 0.034$] another succeeding regime. The response rate to therapy is found to be moderate [$p = 0.042$] among participants but foremost individuals didn't aware of it. Also substantial quantity [$p = 0.036$] didn't know the expenditures of treatment. A visible number of folks deliberate [$p = 0.005$] that the patch of vitiligo is not followed by scaring and cogitate that having a close family member increases the probability of vitiligo [$p = 0.003$]. Widely held participants didn't affected by vitiligo ($p = 0.003$) but they [$p = 0.008$] have come across somebody with vitiligo, represent in Table 1.

A numeral population [$p = 0.009$] didn't meditate vitiligo prevalence among young individuals, A vast number of partakers ($p = 0.002$) axiom anxiety and depression within vitiligo patients, also an ample amount ($p = 0.003$) reflect the deleterious influence on relationship. Likewise [$p = 0.008$] people with vitiligo are often intimidate. Moreover, they feel nasty to talk about their illness [$p = 0.002$]. Additionally, there should be more awareness program [$p = 0.009$] concerning this problem. Voluminous people found their selves unattractive ($p = 0.001$) and they [$p = 0.019$] agrees that vitiligo utterly affect their social life. In addition to that they cover up themselves [$p = 0.083$] to circumvent public. Besides [$p = 0.003$] contemplates they avoid snapping as they look ugly. An equitable population feels that vitiligo is contagious ($p = 0.008$) and people preclude marrying person affected with vitiligo ($p = 0.026$). An enormous portion agrees that they avoid swimming to evade more skin exposure ($p = 0.071$) whereas preponderance ($p < 0.001$) individuals didn't discern any role of

vitamin D in the development of vitiligo. As shown in Table1.

Table 1 Comparing Knowledge, Attiude and Practice with gender

	Male	Female	p-value
Do you know about vitiligo			<0.001
Yes	116 (80%)	139 (89.7%)	
No	29 (20%)	16 (10.3%)	
If yes, what is the source			0.009
Books	39 (26.9%)	68 (43.9%)	
Social media / TV	39 (26.9%)	43 (27.7%)	
Friends and family	77 (53.1%)	86 (55.6%)	
Others	27 (18.6%)	18 (11.6%)	
Do you know what type of disease vitiligo is			0.033
Acro-facial	21 (14.5%)	28 (18.1%)	
Generalized	68 (46.9%)	83 (53.5%)	
Localized	4 (2.8%)	6 (3.9%)	
Segmental	4 (2.8%)	6 (3.9%)	
Do you know the prevalence of vitiligo in Pakistan			0.061
<1%	9 (6.2%)	6 (3.9%)	
1-5%	30 (20.7%)	21 (13.5%)	
5-10%	15 (10.3%)	17 (11%)	
10-15%	5 (3.4%)	8 (5.2%)	
Do you know what are the causes of vitiligo			0.002
Cigarette	6 (3.9%)	9 (6.2%)	
Stress	15 (9.7%)	8 (5.5%)	
Excessive sun exposure	148 (95.5%)	133 (91.4%)	
Family history	136 (93.8%)	147 (94.8%)	
Evil eye	4 (2.6%)	2 (1.4%)	
Alter immunity	46 (29.7%)	35 (24.1%)	
Poor medication	44 (30.3%)	72 (46.5%)	
Virus	13 (9%)	6 (3.6%)	
Excessive work	37 (23.9%)	26 (17.9%)	
Fate	3 (1.9%)	3 (2.1%)	
Don't know	4 (2.6%)	10 (6.9%)	
Do you know the location of first lesion of vitiligo			0.009
Yes	22 (14.2%)	23 (15.9%)	
No	133 (85.8%)	122 (84.1%)	
Do you know what are the areas affected by vitiligo			0.006
Legs /feet	73 (47.1%)	59 (40.7%)	
Arms	105 (67.7%)	94 (64.8%)	
Genitals	93 (64.1%)	99 (63.9%)	
Face and neck	95 (65.5%)	91 (58.7%)	
Trunk	71 (49.0%)	66 (42.6%)	
Don't know	20 (13.8%)	26 (16.8%)	
Do you know at what age vitiligo is more common			0.061
<15	10 (6.9%)	14 (9%)	
15-30	41 (30.3%)	30 (19.4%)	
31-45	14 (9.7%)	14 (9%)	
46-60	4 (2.8%)	5 (3.2%)	
>60	1 (0.7%)	0	
Does age increases the risk of vitiligo			0.020
Yes	22 (15.2%)	32 (20.6%)	
No	31 (21.7%)	29 (18.7%)	
Do you think vitiligo improves with time			0.06
Yes	24 (16.6%)	17 (11%)	
No	55 (37.9%)	6 (39.4%)	
Do you think you have control on vitiligo			0.030
Yes	38 (26.2%)	36 (23.2%)	
No	49 (33.8%)	58 (37.5%)	
Do you know is it			0.028

associated with any other disorder			
Thyroid issue	17 (11.7%)	15 (9.7%)	
Eczema	35 (24.1%)	49 (31.6%)	
Trauma	34 (23.4%)	19 (12.3%)	
Anti-aging cream	19 (13.1%)	28 (18.1%)	
None	10 (6.9%)	4 (2.6%)	
Don't know	17 (11.7%)	15 (9.7%)	
Do you know what are the treatment option for vitiligo			0.034
PUVA phototherapy	59 (40.7%)	73 (47.1%)	
NBUVB phototherapy	94 (64.8%)	105 (67.7%)	
Topical corticosteroid	99 (63.9%)	93 (64.1%)	
Anti-oxidants capsule	91 (58.7%)	95 (65.5%)	
Don't know	66 (42.6%)	71 (49.0%)	
None	26 (16.8%)	20 (13.8%)	
What is the response rate of vitiligo to treatment			0.042
Poor	17 (11.7%)	27 (17.4%)	
Moderate	30 (20.7%)	43 (27.7%)	
Appropriate	14 (9.7%)	11 (7.1%)	
No treatment	6 (4.1%)	4 (2.6%)	
don't know	78 (53.8%)	70 (45.2%)	
Do you think the treatment is expensive			0.036
Yes	53 (36.6%)	55 (35.5%)	
No	17 (11.7%)	19 (12.3%)	
Don't know	75 (51.7%)	81 (52.3%)	
Is vitiligo patch followed by scaring			0.005
Yes	25 (17.2%)	21 (13.5%)	
No	41 (28.3%)	63 (40.6%)	
Do you think having an immediate family member increases the risk of vitiligo			0.009
Yes	54 (37.2%)	74 (47.7%)	
No	34 (23.4%)	33 (21.3%)	
Do you have any skin disorder			0.007
Yes	23 (15.9%)	19 (12.3%)	
No	122 (84.1%)	136 (87.7%)	
Are you affected with vitiligo			0.003
Yes	6 (4.1%)	2 (1.3%)	
No	139 (95.9%)	153 (98.7%)	
Have you ever met a person suffering from vitiligo			0.008
Yes	126 (86.9%)	131 (84.5%)	
No	19 (13.1%)	24 (15.5%)	
Do you think you are likely to suffer from vitiligo			0.009
Yes	46 (31.7%)	53 (34.2%)	
No	99 (68.3%)	102 (65.8%)	
Do you think vitiligo has become prevalent among young adults			0.002
Yes	50 (34.5%)	37 (23.9%)	
No	95 (65.5%)	118 (76.5%)	
Do you think vitiligo people are unattractive			0.001
Yes	84 (57.9%)	109 (73.3%)	
No	61 (42.6%)	46 (29.7%)	
Do you think people with vitiligo are often bullied			0.008
Yes	111 (76.6%)	123 (79.4%)	
No	34 (23.4%)	32 (20.4%)	
Do you think people with vitiligo don't like to talk regarding their condition			0.002
Yes	117 (80.7%)	137 (88.9%)	
No	28 (19.3%)	18 (11.6%)	
Do you think vitiligo lead to anxiety and			0.002

depression			
Yes	90 (62.1%)	113 (72.9%)	
No	55 (37.9%)	42 (27.1%)	
Do you think there should be more awareness program regarding vitiligo in Pakistan			0.009
Yes	111 (76.4%)	115 (74.2%)	
No	34 (23.4%)	40 (25.4%)	
Do you think vitiligo has negative affect on relationship			0.003
Yes	127 (87.6%)	144 (92.9%)	
No	18 (12.4%)	11 (7.1%)	
Do you think early diagnosis of vitiligo can result in effective management			0.009
Yes	133 (91.7%)	143 (92.3%)	
No	12 (8.3%)	12 (7.7%)	
Would you consider going to doctor if you see visible sign of vitiligo			0.009
Yes	99 (68.3%)	107 (69%)	
No	46 (31.7%)	48 (31%)	
Do people with vitiligo avoid clicking pictures due to fear of not coming good in them			0.003
Yes	94 (64.8%)	86 (55.5%)	
No	51 (35.2%)	69 (44.5%)	
Do vitiligo effect social life of affected person			0.019
Strongly agree	43 (29.7%)	51 (32.9%)	
Agree	68 (46.9%)	76 (49%)	
Disagree	20 (13.8%)	12 (7.7%)	
Strongly disagree	3 (2.1%)	0	
Don't know	11 (7.6%)	16 (10.3%)	
Do people with vitiligo hide themselves due to fear of not coming good in pictures			0.083
Strongly agree	33 (22.8%)	33 (21.2%)	
Agree	60 (41.8%)	76 (49%)	
Disagree	22 (15.2%)	15 (9.7%)	
Strongly disagree	1 (0.7%)	2 (1.3%)	
Don't know	29 (20%)	29 (18.7%)	
Do you agree that vitiligo is contagious			0.008
Strongly agree	8 (5.5%)	1 (0.6%)	
Agree	23 (15.9%)	13 (12.3%)	
Disagree	33 (22.8%)	40 (25.5%)	
Strongly disagree	29 (20%)	45 (29%)	
Don't know	52 (35.9%)	50 (32.3%)	
Do you agree people avoid marrying vitiligo person			0.026
Strongly agree	18 (12.4%)	27 (17.4%)	
Agree	72 (49.7%)	83 (53.5%)	
Disagree	25 (17.2%)	13 (8.4%)	
Strongly disagree	4 (2.8%)	7 (4.5%)	
Don't know	26 (17.9%)	25 (16.1%)	
Do you agree people with vitiligo avoid swimming and other sports to avoid excessive skin exposure			0.071
Strongly agree	16 (11%)	16 (10.3%)	
Agree	54 (37.2%)	62 (40%)	
Disagree	29 (20%)	19 (12.3%)	
Strongly disagree	2 (1.4%)	3 (1.9%)	
Don't know	44 (30.3%)	55 (35.5%)	
Do you agree that most people with			<0.001

vitiligo attempt suicide		
Strongly agree	2 (1.4%)	3 (1.9%)
Agree	15 (10.3%)	25 (16.1%)
Disagree	52 (35.9%)	52(33.5%)
Strongly disagree	35 (24.1%)	9 (5.8%)
Don't know	41 (28.3%)	66 (42.6%)
Do you agree that vitamin D play any role in development of vitiligo		0.091
Strongly agree	7 (4.8%)	6 (3.9%)
Agree	34 (23.4%)	40 (25.8%)
Disagree	17 (11.7%)	21 (13.5%)
Strongly disagree	6 (4.1%)	2 (1.3%)
Don't know	81 (55.9%)	86 (55.5%)

Table 2 Comparing Knowledge, Attitude and Practice with occupation

	Medical related occupation	Non-medical related occupation	P-value
Do you know about vitiligo			<0.001
Yes	140 (90.9%)	115 (78.8%)	
No	14 (9.1%)	31 (21.2%)	
If yes, what is the source			0.007
Books	67 (43.5%)	96 (65.9%)	
Social media / TV	45 (29.2%)	37 (25.3%)	
Friends and family	91 (59.1%)	16 (11%)	
Others	14 (9.1%)	31 (21.2%)	
Do you know what type of disease vitiligo is			0.01
Acro-facial	35 (22.7%)	14 (9.6%)	
Generalized	83 (53.9%)	68 (46.6%)	
Localized	7 (4.5%)	3 (2.1%)	
Segmental	4 (2.6%)	6 (4.1%)	
Don't know	25 (16.2%)	55 (37.5%)	
Do you know the prevalence of vitiligo in Pakistan			0.075
<1%	8 (5.2%)	7 (4.8%)	
1-5%	26 (16.9%)	25 (17.1%)	
5-10%	14 (9.1%)	18 (12.3%)	
10-15%	4 (2.6%)	9 (6.2%)	
Do you know what are the causes of vitiligo			0.004
Cigarette	6 (3.9%)	9 (6.2%)	
Stress	16 (10.4%)	7 (4.8%)	
Excessive sun exposure	47 (30.5%)	16 (11%)	
Family history	74 (48.1%)	42 (28.8%)	
Evil eye	3 (1.9%)	3 (2.1%)	
Alter immunity	58 (37.7%)	23 (15.8%)	
Poor medication	9 (5.2%)	9 (6.2%)	
Virus	7 (4.5%)	12 (8.2%)	
Excessive work	2 (1.3%)	4 (2.7%)	
Fate	7 (4.5%)	12 (8.2%)	
Don't know	3 (1.9%)	11 (7.5%)	
Do you know the location of first lesion of vitiligo			0.001
Yes	30 (19.5%)	15 (10.3%)	
No	124 (80.5%)	131 (89.7%)	
Do you know what are the areas affected by vitiligo			0.009
Legs /feet	80 (51.9%)	52 (35.6%)	
Arms	108 (70.8%)	91 (62.3%)	
Genitals	88 (57.1%)	98 (67.1%)	
Face and neck	70 (45.5%)	67 (45.9%)	
Trunk	102 (66.2%)	90 (61.6%)	
Don't know	22 (14.3%)	24 (16.4%)	
Do you know at what age vitiligo is more common			0.149
<15	15 (9.7%)	9 (6.2%)	
15-30	35 (22.7%)	39 (26.7%)	
31-45	16 (10.4%)	12 (8.2%)	
46-60	5 (3.2%)	4 (2.7%)	
>60			
Does age increases the risk of vitiligo			0.035
Yes	29 (18.8%)	25 (17.1%)	
No	30 (19.5%)	30 (20.5%)	
Do you think vitiligo			0.001

improves with time							
Yes	13 (8.4%)	28 (19.2%)			awareness program regarding vitiligo in Pakistan		
No	77 (50%)	55 (37.7%)			Yes	114 (74%)	89 (61%)
Do you think you have control on vitiligo			0.005		No	40 (26%)	57 (39%)
Yes	36 (23.4%)	38 (26%)			Do you think vitiligo has negative affect on relationship		0.009
No	64 (41.6%)	65 (44.5%)			Yes	116 (75.3%)	110 (75.3%)
Do you know is it associated with any other disorder			0.016		No	38 (24.7%)	36 (24.7%)
Thyroid issue	11 (7.1%)	21 (14.4%)			Do you think early diagnosis of vitiligo can result in effective management		0.001
Eczema	41 (26.6%)	43 (29.5%)			Yes	147 (95.5%)	124 (84.9%)
Trauma	29 (18.8%)	24 (16.4%)			No	7 (4.5%)	22 (15.1%)
Anti-aging cream	25 (16.2%)	22 (15.1%)			Would you consider going to doctor if you see visible sign of vitiligo		0.004
None	4 (2.6%)	10 (6.8%)			Yes	145 (94.2%)	131 (89.5%)
Don't know	21 (13.6%)	18 (12.3%)			No	9 (5.8%)	15 (10.3%)
Do you know what are the treatment option for vitiligo			0.007		Do people with vitiligo avoid clicking pictures due to fear of not coming good in them		0.001
PUVA phototherapy	52 (35.6%)	80 (51.9%)			Yes	114 (74%)	92 (63%)
NBUBV phototherapy	91 (62.3%)	108 (70.8%)			No	40 (26%)	54 (37%)
Topical corticosteroid	98 (67.1%)	88 (57.1%)			Do vitiligo effect social life of affected person		0.014
Anti-oxidants capsule	67 (45.9%)	70 (45.5%)			Strongly agree	56 (34.4%)	38 (26%)
Don't know	90 (61.6%)	102 (66.2%)			Agree	73 (47.4%)	71 (48.6%)
None	24 (16.4%)	22 (14.3%)			Disagree	14 (9.1%)	18 (12.3%)
What is the response rate of vitiligo to treatment			0.005		Strongly disagree	0	3 (2.1%)
Poor	19 (12.3%)	25 (17.1%)			Don't know	11 (7.1%)	16 (11%)
Moderate	48 (31.2%)	25 (17.1%)			Do people with vitiligo hide themselves due to fear of not coming good in pictures		0.029
Appropriate	8 (5.3%)	17 (11.6%)			Strongly agree	37 (24%)	29 (19.9%)
No treatment	6 (3.9%)	4 (2.7%)			Agree	77 (50%)	59 (40.4%)
don't know	73 (47.9%)	75 (51.4%)			Disagree	16 (10.4%)	21 (14.4%)
Do you think the treatment is expensive			0.030		Strongly disagree	1 (0.6%)	2 (1.4%)
Yes	57 (37%)	51 (34.9%)			Don't know	23 (14.9%)	35 (24%)
No	20 (13%)	16 (11%)			Do you agree that vitiligo is contagious		<0.001
Is vitiligo patch followed by scaring			<0.001		Strongly agree	1 (0.6%)	8 (5.5%)
Yes	19 (12.3%)	27 (18.5%)			Agree	9 (5.8%)	33 (22.6%)
No	69 (44.8%)	35 (24%)			Disagree	48 (31.2%)	35 (17.1%)
Do you think having an immediate family member increases the risk of vitiligo			0.001		Strongly disagree	59 (38.3%)	15 (10.3%)
Yes	84 (54.5%)	44 (30.1%)			Don't know	37 (24%)	65 (44.5%)
No	28 (18.2%)	39 (26.7%)			Do you agree people avoid marrying vitiligo person		0.047
Do you have any skin disorder			0.001		Strongly agree	18 (11.7%)	27 (18.5%)
Yes	1 (0.6%)	7 (4.8%)			Agree	84 (54.5%)	71 (48.6%)
No	153 (99.4%)	139 (95.2%)			Disagree	19 (12.3%)	19 (13%)
Are you affected with vitiligo			0.009		Strongly disagree	8 (5.2%)	3 (2.1%)
Yes	21 (13.6%)	21 (14.4%)			Don't know	25 (16.2%)	26 (17.8%)
No	133 (86.4%)	125 (85.6%)			Do you agree people with vitiligo avoid swimming and other sports to avoid excessive skin exposure		0.036
Have you ever met a person suffering from vitiligo			0.002		Strongly agree	13 (8.4%)	19 (13%)
Yes	85 (55.2%)	95 (65.1%)			Agree	68 (44.2%)	48 (32.9%)
No	69 (44.8%)	51 (34.9%)			Disagree	20 (13%)	28 (19.2%)
Do you think you are likely to suffer from vitiligo			0.006		Strongly disagree	3 (1.9%)	2 (1.4%)
Yes	8 (5.2%)	12 (8.2%)			Don't know	50 (32.5%)	49 (33.6%)
No	146 (94.8%)	134 (91.8%)			Do you agree that most people with vitiligo attempt suicide		<0.001
Do you think vitiligo has become prevalent among young adults			0.008		Strongly agree	0	5 (3.4%)
Yes	53 (34.4%)	46 (31.5%)			Agree	26 (6.9%)	14 (9.6%)
No	101 (65.6%)	100 (68.5%)			Disagree	57 (37%)	47 (32.2%)
Do you think vitiligo people are unattractive			0.007		Strongly disagree	12 (7.8%)	32 (21.9%)
Yes	48 (31.2%)	39 (26.7%)			Don't know	59 (38.3%)	48 (32.9%)
No	106 (68.8%)	107 (73.3%)			Do you agree that vitamin D play any role in development of vitiligo		0.004
Do you think people with vitiligo are often bullied			0.001		Strongly agree	3 (1.9%)	10 (6.8%)
Yes	109 (70.8%)	84 (57.5%)			Agree	45 (29.2%)	29 (19.9%)
No	45 (29.2%)	62 (42.5%)			Disagree	24 (15.6%)	14 (9.6%)
Do you think people with vitiligo don't like to talk regarding their condition			0.007		Strongly disagree	2 (1.3%)	6 (4.1%)
Yes	123 (79.9%)	111 (76%)			Don't know	80 (51.9%)	87 (59.6%)
No	31 (20.1%)	35 (24%)					
Do you think vitiligo lead to anxiety and depression			0.001				
Yes	138 (89.6%)	116 (79.5%)					
No	16 (10.4%)	30 (20.5%)					
Do you think there should be more			0.001				

When knowledge about vitiligo was equated with occupation a substantial correlation was reputed ($p < 0.001$). Correspondingly, source of information ($p = 0.007$) plus type of disease when likened ($p = 0.01$) inaugurate a statistically foremost bond. Despite the fact the incidence amongst individuals significantly allied to each other ($p = 0.075$). While a momentous fraternity was recognized when compared with causes of vitiligo ($p = 0.004$) and bodily affected areas ($p = 0.009$). Age group doesn't bring into being a noteworthy link ($p = 0.149$). However, possibility of vitiligo with advancing age ($p = 0.035$) as well progression in vitiligo overtime consistent of cumbersome relation. Control on vitiligo symptoms ($p = 0.005$) and its connotation with other ailment ($p = 0.016$) exhibit a plentiful connection. Treatment regime ($p = 0.007$) sideways with its litigant ratio ($p = 0.005$) are ominously associated. When evaluate the information of its expenditures ($p = 0.030$) revealed a substantial nexus. Having an immediate family member escalate the peril for vitiligo ($p = 0.001$) plus vitiligo's patch is not followed by scaring ($p < 0.001$) as shown in Table 2. An abundant amount of participant have met affected patients ($p = 0.002$) and they don't ponder their selves to be underwent vitiligo in future ($p = 0.008$). Individuals found vitiligo person unattractive ($p = 0.007$) similarly they feels bad when talk about their condition ($p = 0.007$). Conversely, further awareness ($p = 0.001$) platforms are compulsory to establish. It recruit a negative effect on relationship ($p = 0.009$). Mainstream of people will cogitate to doctor if they notice sign of vitiligo ($p = 0.004$). People with vitiligo shroud themselves ($p = 0.029$) when asked for a photo. In addition to this they circumvent swimming ($p = 0.036$) to stamp out skin contact. Likewise, individuals eschew marrying to a vitiligo person recognized a substantial relation ($p = 0.047$). Bulk of individuals disagree concerning suicidal attempt in vitiligo patients and it exhibit a considerable connotation ($p < 0.001$). A good-sized of people favors the role of vitamin D in development of vitiligo ($p = 0.004$), represent in Table 2.

DISCUSSION

Vitiligo i.e. hypo pigmented skin lesions, responsible for psychological stresses such as anxiety, depression and challenging social relationships affects a person's standard of living inimically [12]. Several studies have focused on psychiatric issues in vitiligo patients, especially when the lesion is located over the face leading to appearance related social stigmas [13, 14]. The impact of the disease highly depends on the people's acceptance and their perception. This then influences the patient's quality of life, sense of denouncement, their wellbeing as well as the efficacy of the treatment [15, 16]. This study showed that 255 of 300 (85.0%) participants were able to identify vitiligo after seeing the provided illustrations and Urdu translation.

When inquired about the source of information, the response of partakers was diverse. The commonest source was family and friends (53.4%) followed by books (35.6%) and social media (27.3%). These results are consistent with the study by AI Ghamdi *et al.* which identified friends or family (42.9%), media (21.7%) and the Internet (13.6%) as a source of information [17]. Moreover, a study conducted by Firooz *et al.* underscored that 62.5% of the patients said that stress played a major role in their disease, while 31.3% voted for genetic background [18]. In our research, 9.7% males and 5.5% females supported stress while 93.8% males and 94.8% females believed that their family history might be a

contributing factor. The aforementioned study also revealed that most patients believed fate to be the most common cause of vitiligo followed by stress, altered immunity, and genetic makeup. Also 28% of their participants assumed that evil eye is responsible for this condition [18]. Participants of this study deemed that the major cause of the disease is excessive sun exposure (93.6%). Only 2.6% of people marked evil eye and 0.13% participants marked fate as a cause of vitiligo, which shows that Asian population had a comparatively better understanding of this condition. This study also compares and contrasts the knowledge of medical and non-medical population. The medical participants considered heredity (48.1%), altered immunity (37.7%) and sun exposure (30.5%) as etiological factors, reflecting their better understanding. Vitiligo Vulgaris was identified as the commonest clinical type in a study by Dogra *et al.* followed by focal, segmental and acro-facial [19]. On the other hand, Esfandiarpour *et al.* reported acro-facial subtype as the second most common appearance followed by focal vitiligo [20]. Most of the participants of this study considered vitiligo as a generalized disease (50.3%) while few voted for vitiligo as acro facial (16.3%), localized (3.3%) and segmental (3.3%). A research paper specified head and neck as the usual location of early involvement [8], while other studies uncovered upper extremities as the most common location [9,21,22]. Their results are consistent with our findings. Several studies show a discrepancy when pointing at the age of onset of vitiligo. Although many have reported that most cases are acquired early in life, between 4 and 12 years of age [23, 24]. However, this study showed that among Pakistani population, the majority considered 15-30 years as the usual age of onset.

Certain studies show that people suffering from vitiligo associate several precipitating precursors such as, sunburn, pregnancy, physical injury, emotional trauma and illnesses [25, 26]. However, the commonness of these events makes it challenging to gather enough evidence to establish a consequential relation with vitiligo. A report by Song *et al.* unveiled that vitiligo is triggered by multiple incidents, physical injury being the most common one followed by emotional tension, sunburn and pregnancy in order [27]. Modern epidemiological studies have proved associations of several autoimmune diseases with vitiligo. A 10 years follow up study on the US population proved that almost 20% of patients who had vitiligo also had at least one comorbid autoimmune disease. Among them autoimmune thyroiditis and alopecia areata were most prevalent [28]. Our study demonstrated that the general population assumed eczema (males: 24.1% and females: 31.6%), trauma (males: 23.4% and females: 12.3%) and thyroid disease (males: 11.7% and females: 9.7%) may have a significant association with this disorder.

This research also queried about possible treatment options from the general population. To which, they responded with NBUVB phototherapy (male: 64.8% and female: 67.7%) and topical corticosteroid (male: 63.9% and female: 64.1%) as being the most effective ones. A few participants also responded with PUVA phototherapy and antioxidant capsules as probable treatment modalities. Previous studies on this topic have explored that the mainstay of treatments include topical corticosteroids, calcineurin inhibitors and phototherapy [29]. The results of our study are consistent with a trial conducted by Kohet *al.* on young Asian patients, where 74% and 67%

responded to narrow band UVB and combined UVA1 and UVB phototherapy respectively [30].

Limited researchers have evaluated serum vitamin D levels in vitiligo patients [31, 32]. In a study by Ustun *et al.* majority had inadequate or very low levels of vitamin D but the difference wasn't significant enough to merit discussion [31]. In contrast to this study, substantially lower serum vitamin D levels were seen in patients relative to controls, in a study by Saleh *et al.* Authors of a research thus hypothesize that vitamin D supplementation may be a probable treatment for vitiligo patients in future [32]. However, in our survey majority of the participants felt confused in analyzing any possible role of vitamin D supplementation as a cure for vitiligo.

Vitiligo, though considered as only a cosmetic problem, has in fact grave effects on a person's mental well-being and social comfort. Recent study on British vitiligo patients by Thompson and colleagues analyzed that they undergo avoidance and concealment [33]. In the course of our study, upon open discussion with the participants, the majority of them thought their social life gets affected. In addition, they also believe that their feelings of self-consciousness, embarrassment and discrimination hinder in performing activities like taking pictures and swimming, which involve greater skin exposure. The findings of Hill-Beuf *et al* also report the same problem [34].

It was apparent in a study by Porter *et al.* that young individuals, belonging to the working class were more self-conscious and unsettled by their skin condition leading to feelings of possible discernment by the general population. 40% of patients failed in adjusting with their disease, evidenced by their extra efforts to conceal their skin lesions. Their embarrassment leads to depression and ultimately, refraining from social gathering [35]. Certain studies show that vitiligo patients tend to face taunts and comments, whispered by normal people, owing to feelings of social rejection in them. Vitiligo types with lesions localized especially on face, arms and legs contribute to more stress, mocking and hounding by people, especially among teenagers [35-38]. 76.6% males and 79.4% females, in our survey also had similar thoughts. When questioned about whether they find people with vitiligo unattractive, 57.9% males and 73.3% females replied in affirmative. Greater percentage of females reflects their higher concern and insecurities about their physical appearance. Porter JR *et al.* concluded that less than 23% of patients had disturbed relationships with their spouses, owing to their embarrassment. However, the problem was more highlighted among people with low self-esteem in contradistinction to men and single people, who are more concerned with appearance. Hence, boosting one's self-esteem may prove to be advantageous [39].

Vitiligo patients may face rejections in their marriage proposals as evidenced by a number of studies where 82.7% people in a study by Shaffrali *et al.* [40], 73.8% people in Fawwaz *et al.* [41] and 56.1% in Khalid M *et al.* [9] said that they would not consider marrying a vitiligo patient.

In certain skin disorders such as psoriasis and acne, the psychiatric comorbidity can be associated with depression and suicide. Consideration of psychiatric and psychosocial factors is mandatory for better management and prevention of dermatological disorders. One of the questions in this survey

related to the public's perception on the risk of having depression and anxiety was answered affirmatively by the majority. Further, when enquired about the associated risk of suicide, majority of males disagreed while females were not aware about it. A skin disorder impacts adversely on a person's quality of life, thus being a powerful prognosticator of psychiatric morbidity [42, 43]. The prevalence of psychiatric morbidity was found to be 35% and 25% in studies conducted in the UK and Italy respectively [15, 43]. In several researches, the psychiatric symptoms uncovered include anxiety (3.3%), depression (10%), dysthymia (7-9%), perturbed sleep (20%), suicidal thoughts (10%) and suicidal attempts (3.3%) [13,44, 45]. Picardi *et al.* established that female patients with vitiligo on visible body parts had a higher incidence of psychiatric morbidity [46]. Our research also shows that 79.4% females agreed when asked about the association of vitiligo with depression and anxiety. Based on the facts stated above, some authors propose that a meticulous psychiatric evaluation is essential in stigmatizing skin conditions like vitiligo [38].

Limitations and Future Recommendations

To the best of our knowledge, this is the first study conducted in Pakistan which has attempted to explore vitiligo through the eyes of the general public. For a long time this topic has been avoided in our perilous setup, may be due to cultural norms but the authors of this research have tried to address this in a very comprehensive manner. The pivotal strength of this study lies in elucidating the psychosocial aspects and lack of knowledge of our population concerning vitiligo. However, there were some limitations too. We randomly recruited participants with an age limit from 18 to 60 years of age. However, the collected data had no participant above the age of 40. So this study reflects the psychosocial aspects of the young and middle aged population and not the older population. Secondly, the data was collected from the general public and not the vitiligo patients themselves, which can be considered as a limitation too.

The authors of this research recommend that further researchers should consider vitiligo and its psychosocial aspects in detail, while recruiting partakers from every age group including young, middle and old age population equally. Moreover, we also suggest that future research on this topic should include vitiligo patients in addition to the general public as the sample population for an enhanced estimation of the perilous psychosocial issues related to this condition. In addition to this, 75.3% of the participants felt the need for awareness sessions about this skin condition and hence the government should consider working with health professionals from the field of dermatology with an aim of carrying out such sessions for educating masses. In depth cognizance of this condition among the general population will hopefully lead to social acceptance and ultimately reduced insecurities and psychosocial issues faced by the affected population.

CONCLUSION

The findings of this study propose that there's a dire need to educate general masses in order to clarify some false and fabricated perceptions regarding vitiligo, which might be the reason behind the discrimination faced by the affected population. There's also a need for dermatology staff to evaluate cultural associations of this condition and more crucially, consider its psychosocial impact in relation to social

support, intimacy and personal relationships. Improved patient-physician communication will influence fruitfully on the disease course. Lastly, the results also suggest that there's also a need for community interventions intended at dispelling myths and raising awareness of sources of support and possible treatment options. We hope that this study will pave the way for many follow-up studies about this essential but much neglected topic.

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