

Psychosocial Effects of Vitiligo: A Systematic Literature Review

Am J Clin Dermatol

Khaled Ezzedine, MD, PhD,¹ Viktoria Eleftheriadou, MD, PhD,² Heather Jones, RN,³ Kristen Bibeau, PhD, MSPH,³ Fiona I. Kuo, PhD,³ Daniel Sturm, PharmD,³ Amit G. Pandya, MD^{4,5}

¹Department of Dermatology, Henri Mondor University Hospital and Université Paris-Est Créteil Val de Marne, Paris, France, khaled.ezzedine@aphp.fr; ²Department of Dermatology, Queen Elizabeth Hospital, Birmingham, UK; ³Incyte Corporation, Wilmington, DE, USA; ⁴Palo Alto Foundation Medical Group, Mountain View, CA, USA; ⁵University of Texas Southwestern Medical Center, Dallas, TX, USA

Supplementary Material

Table of Contents

Supplementary Appendix 1. Search Strategy	2
Supplementary Table 1. Characteristics of Studies Reporting Prevalence of Psychosocial Comorbidity	4
References	18

Supplementary Appendix 1. Search Strategy

1. PubMed

vitiligo[TITLE/ABSTRACT/KEYWORD]

AND

("quality of life"[TITLE/ABSTRACT/KEYWORD] OR

burden[TITLE/ABSTRACT/KEYWORD] OR

psychosocial[TITLE/ABSTRACT/KEYWORD] OR

depress*[TITLE/ABSTRACT/KEYWORD] OR

anxiety[TITLE/ABSTRACT/KEYWORD] OR stigma*[TITLE/ABSTRACT/KEYWORD]

OR psycholog*[TITLE/ABSTRACT/KEYWORD] OR

psychiatr*[TITLE/ABSTRACT/KEYWORD])

AND

English[LANGUAGE]

2. EMBASE

'vitiligo':ti,ab,kw

AND

('quality of life':ti,ab,kw OR 'burden':ti,ab,kw OR 'psychosocial':ti,ab,kw OR

'depress*':ti,ab,kw OR 'anxiety':ti,ab,kw OR 'stigma*':ti,ab,kw OR

'psycholog*':ti,ab,kw OR 'psychiatr*':ti,ab,kw)

AND

'english':la

NOT

('conference abstract':it OR 'conference paper':it OR 'conference review':it)

3. Scopus

TITLE-ABS-KEY(vitiligo)

AND

TITLE-ABS-KEY("quality of life" OR burden OR psychosocial OR depress* OR anxiety OR stigma* OR psycholog* OR psychiatr*)

AND

(LIMIT-TO(LANGUAGE, "English"))

AND

(LIMIT-TO(SRCTYPE, "j"))

AND

(LIMIT-TO(DOCTYPE, "ar") OR LIMIT-TO(DOCTYPE, "re") OR LIMIT-TO(DOCTYPE, "le"))

4. Cochrane Database

Title/abstract/keyword (vitiligo)

AND

Title/abstract/keyword ("quality of life" OR burden OR psychosocial OR depress* OR anxiety OR stigma* OR psycholog* OR psychiatr*)

Supplementary Table 1. Characteristics of Studies Reporting Prevalence of Psychosocial Comorbidity

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
Depression or depressive disorders Depression	Agarwal 1998 [1]	United Kingdom	154	42 (18)	20–25	Self-report	NR
	Ajose 2014 [2]	Nigeria	102	35.9 (13.7)	Yes, 7.8; borderline, 21.6	HADS	NR
	AlGhamdi 2010 [3]	Saudi Arabia	164	27 (13)	54	Self-report	NR
	Al-Harbi 2013 [4]	Saudi Arabia	308	27 (14.5)	54.5	BDI	NR
	Alharbi 2020 [5]	Saudi Arabia	308	27 (14.5)	overall, 54.5; mild, 52.4; moderate, 33.3; severe, 14.4	BDI	NR
	AlShahwan 2015 [6]	Saudi Arabia	64	NR (adults)	14.1	HADS	NR
	Arýcan 2008 [7]	Turkey	113	Female, 29.2 (NR); male, 33.4 (NR)	32.7	Diagnosed during screening	NR
	Chan 2013 [8]	Singapore	222	48.4 (14.9)	16.2	CES-D	NR
	Chan 2012 [9]	Singapore	145	47.4 (15.0)	17.2	CES-D	NR
	Choi 2010 [10]	South Korea	57	15.4 (1.8)	22.8	CES-D	NR
	Dabas 2020 [11]	India	95	NR (adults)	14.7 ^b	PRIME-MD PHQ	NR
	Hamidizadeh 2020 [12]	Iran	100	34.5 (12.2)	47.0	BDI	0.16

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
	Henning 2020 [13]	United States	102	NR	9.2	Diagnosis on file	NR
	Karelson 2013 [14]	Estonia	54	36.6 (NR)	20.4	ES-Q	NR
	Kosaraju 2015 [15]	India	6	NR	50.0	PHQ-9	NR
	Kota 2019 [16]	India	150	NR (adults)	44.0	QIDS-SR-16	NR
	Krüger 2011 [17]	Germany, Jordan	167	42.8 (NR)	30.3	BDI	NR
	Mattoo 2001 [18]	India	113	30.1 (12.5)	4.4	Diagnosed during screening	NR
	Mattoo 2002 [19]	India	113	30.1 (12.5)	2.7	Diagnosed during screening	NR
	Morales-Sanchez 2017 [20]	Mexico	150	38 (20)	34.0	BDI	NR
	Porter 1987 [21]	United States	326	Median (range), 34 (4–79)	6.4	Self-report	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	18.2	VIS	NR
	Raikhy 2017 [23]	India	53	NR (adults)	47.2	Diagnosed during screening	NR
	Sampogna 2008 [24]	Italy	181	35 (NR)	30.9	Skindex-29	NR
	Sangma 2015 [25]	India	100	29.7 (7.0)	59.0	HDRS	<0.001
	Sarkar 2018 [26]	India	61	43.8 (12.5)	62.3	Skindex-61	<0.0001
	Sarma 2020 [27]	India	3962	30.1 (18.0)	18.8–24.5	Self-report	<0.001
	Sawant 2019 [28]	India	100	Men, 35.8 (14.2); women, 36.9 (14.2)	52.0	BDI	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
	Sharma 2001 [29]	India	30	NR (adults)	10.0	Diagnosed during screening	NR
	Silpa-Archa 2020 [30]	Thailand	104	41.6 (15.9)	Overall, 37.5; mild, 24.0; moderate or worse, 13.5	PHQ-9	NR
	Sorour 2017 [31]	Egypt	108	NR	46.3	Diagnosed during screening	NR
	Topal 2016 [32]	Turkey	100	35.4 (14.3)	12.0	IPQ	NR
	Tsintsadze 2015 [33]	Georgia	15	NR (adolescents and adults)	60.0	HADS	NR
	Yamamoto 2011 [34]	Japan	54	NR	27.8	CES-D	NR
Bipolar disorder	Chen 2020 [35]	Taiwan	1432	Median, 47.1	0.1	Diagnosis on file	0.87
	Raikhy 2017 [23]	India	53	NR (adults)	7.6	Diagnosed during screening	NR
Dysthymic disorder	Balaban 2011 [36]	Turkey	42	39.7 (12.9)	4.8	SCID-I	NR
	Mattoo 2001 [18]	India	113	30.1 (12.5)	1.8	Diagnosed during screening	NR
	Mattoo 2002 [19]	India	113	30.1 (12.5)	0.9	Diagnosed during screening	NR
	Sukan 2007 [37]	Turkey	50	35.8 (12.6)	26.0	SCID-I	0.037
MDD	Ahmed 2007 [38]	India	100	24.6 (NR)	15.0	PAS	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls	
Unspecified depressive disorder	Balaban 2011 [36]	Turkey	42	39.7 (12.9)	14.3	SCID-I	NR	
	Chen 2020 [35]	Taiwan	1432	Median, 47.1	3.5	Diagnosis on file	0.05	
	Dabas 2020 [11]	India	95	NR (adults)	10.5	PRIME-MD PHQ	NR	
	Ramakrishna 2014 [39]	India	53	NR	56.6	HDRS	NR	
	Vallerand 2019 [40]	United Kingdom	7104	Median (IQR), 37.7 (15.8)	6.5	Diagnosis on file	NR	
	Ucuz 2021 [41]	Turkey	30	Mean (range), 12.3 (8–17)	23.4	K-SADS-PL	<0.001	
	Anxiety or anxiety-related disorders Anxiety	Ahmed 2007 [38]	India	100	24.6 (NR)	10.0	PAS	NR
		Ajose 2014 [2]	Nigeria	102	35.9 (13.7)	Yes, 18.6; borderline, 29.4	HADS	NR
		AlGhamdi 2010 [3]	Saudi Arabia	164	27 (13)	57	Self-report	NR
		AlShahwan 2015 [6]	Saudi Arabia	64	NR (adults)	26.6	HADS	NR
Arýcan 2008 [7]		Turkey	113	Female, 29.2 (NR); male, 33.4 (NR)	15.9	Diagnosed during screening	NR	
Chen 2020 [35]		Taiwan	1432	Median, 47.1	12.2	Diagnosis on file	<0.001	
Dabas 2020 [11]		India	95	NR (adults)	13.7 ^c	PRIME-MD PHQ	NR	
Hamidizadeh 2020 [12]		Iran	100	34.5 (12.2)	66.0	BAI	0.015	
Karelson 2013 [14]		Estonia	54	36.6 (NR)	22.2	ES-Q	NR	

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool ^a	P Value vs Healthy Controls
	Morales-Sanchez 2017 [20]	Mexico	150	38 (20)	60.0	BAI	NR
	Raikhya 2017 [23]	India	53	NR (adults)	11.3	Diagnosed during screening	NR
	Sharma 2001 [29]	India	30	NR (adults)	3.3	Diagnosed during screening	NR
	Sorour 2017 [31]	Egypt	108	NR (adults)	31.5	Diagnosed during screening	NR
	Sukan 2007 [37]	Turkey	50	35.8 (12.6)	6.0	SCID-I	0.003
	Topal 2016 [32]	Turkey	100	35.4 (14.3)	46.0	Self-report	NR
	Tsintsadze 2015 [33]	Georgia	15	NR (adolescents and adults)	66.7	HADS	NR
Agoraphobia	Ahmed 2007 [38]	India	100	24.6 (NR)	2.0	PAS	NR
GAD	Balaban 2011 [36]	Turkey	42	39.7 (12.9)	4.8	SCID-I	NR
	Ucuz 2021 [41]	Turkey	30	Mean (range), 12.3 (8–17)	10.0	K-SADS-PL	<0.001
Panic disorder	Dabas 2020 [11]	India	95	NR (adults)	7.4	PRIME-MD PHQ	NR
	Karelson 2013 [14]	Estonia	54	36.6 (NR)	1.9	ES-Q	NR
	Ramakrishna 2014 [39]	India	53	NR (adults)	11.3	Not specified	NR
Social phobia	Ahmed 2007 [38]	India	100	24.6 (NR)	8.0	PAS	NR
	Balaban 2011 [36]	Turkey	42	39.7 (12.9)	2.4	SCID-I	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
	Karelson 2013 [14]	Estonia	54	36.6 (NR)	7.4	ES-Q	NR
	Ramakrishna 2014 [39]	India	53	NR (adults)	67.9	Not specified	NR
	Sampogna 2008 [24]	Italy	181	35 (NR)	28	Skindex-29	NR
Depression and anxiety	Ahmed 2007 [38]	India	100	24.6 (NR)	5	PAS	NR
	Ajose 2014 [2]	Nigeria	102	35.9 (13.7)	Yes, 4.9; borderline, 5.9	HADS	NR
	Tsintsadze 2015 [33]	Georgia	15	NR (adolescents and adults)	33.3	HADS	NR
	Ucuz 2021 [41]	Turkey	30	Mean (range), 12.3 (8–17)	10.0	K-SADS-PL	<0.001
Stigma	Krüger 2015 [42]	Germany	96	Mean (range), 41.7 (18–67)	90.6	ACS	NR
	Krüger 2014 [43]	Germany, United States	74	Mean (range), children, 9.1 (7–12); adolescents, 14.5 (13–17)	44.6–93.2	Self-report	NR
	Porter 1987 [21]	United States	326	Median (range), 34 (4–79)	20–57	Self-report	NR
	Porter 1979 [44]	United States	62	Mean (range), 39 (14–69)	22.6–72	Self-report	NR
	Porter 1991 [45]	United States	158	Median (range), 38 (16–79)	100	Self-report	NR
	Premkumar 2013 [46]	India	150	NR (adolescents and adults)	17.3	Participation Scale	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	100	Self-report	NR
	Thompson 2010 [47]	United Kingdom	7	Range, 19-52	100	Self-report	NR
Adjustment disorders							
Adjustment disorder	Mattoo 2001 [18]	India	113	30.1 (12.5)	11.5	Diagnosed during screening	NR
	Mattoo 2002 [19]	India	113	30.1 (12.5)	10.6	Diagnosed during screening	NR
Helplessness	Pun 2021 [22]	Nepal	22	38.7 (3.2)	9.1	VIS	NR
Hopelessness	Hamidzadeh 2020 [12]	Iran	100	34.5 (12.2)	60.0	Beck Hopelessness Scale	0.006
Stress	Manolache 2007 [48]	Romania	32	Median (SD), 33.9 (17.8)	65.6	Holmes and Rahe Social Readjustment Rating Scale	NR
	Salzer 1995 [49]	Germany	117	Mean (range), 40 (18–80)	28.2	Freiburger Personality Inventory	NR
	Shaker 2016 [50]	Egypt	30	31.6 (13.6)	93.9	Holmes and Rahe Social Readjustment Rating Scale	NR
Unhappiness	Pun 2021 [22]	Nepal	22	38.7 (3.2)	68.2	Self-report	NR
Worry about others' thoughts	Anaba 2020 [51]	Nigeria	29	40.1 (20.6)	40.9	VitiQoL	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	31.8	VitiQoL	NR
Worry about spread	Agarwal 1998 [1]	United Kingdom	154	42 (18)	4	Self-report	NR
	Anaba 2020 [51]	Nigeria	29	40.1 (20.6)	75.9	VitiQoL	NR
	Kota 2019 [16]	India	150	NR (adults)	88.0	VIS-22	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
	Porter 1987 [21]	United States	326	Median (range), 34 (4–79)	41	Self-report	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	68.2	VIS	NR
	Sampogna 2008 [24]	Italy	181	35 (NR)	60	VitiQoL	NR
						Skindex-29	NR
Sleep disturbances	Karelson 2013 [14]	Estonia	54	36.6 (NR)	29.6	ES-Q	NR
	Manolache 2007 [48]	Romania	32	Median (SD), 33.9 (17.8)	6.3	Holmes and Rahe Social Readjustment Rating Scale	NR
	Mouzas 2008 [52]	Greece	116	32.4 (9.1)	26.7–56.0	Unspecified inventory	≤0.001
	Papadopoulos 1998 [53]	United Kingdom	73	38.0 (12.6)	31	SRE	NR
	Sangma 2015 [25]	India	100	29.7 (7.0)	89.0	DLQI	NR
	Sharma 2001 [29]	India	30	NR (adults)	20.0	GHQ-H	NR
	Sorour 2017 [31]	Egypt	108	NR (adults)	4.6	Diagnosed during screening	NR
Behavioral impairment							
ADHD	Ucuz 2021 [41]	Turkey	30	Mean (range), 12.3 (8-17)	20.0	K-SADS-PL	<0.001
Binge-eating disorder	Dabas 2020 [11]	India	95	NR (adults)	7.4	PRIME-MD PHQ	NR
Obsessive disorders	Arýcan 2008 [7]	Turkey	113	Female, 29.2 (NR); male, 33.4 (NR)	19.5	Diagnosed during screening	NR
	Chen 2020 [35]	Taiwan	1432	Median, 47.1	0.1	Diagnosis on file	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
Social and situational avoidance/restriction	Raikhy 2017 [23]	India	53	NR (adults)	7.6	Diagnosed during screening	NR
	Ramakrishna 2014 [39]	India	53	NR (adults)	3.8	Not specified	NR
	Sorour 2017 [31]	Egypt	108	NR (adults)	18.5	Diagnosed during screening	NR
	Balaban 2011 [36]	Turkey	42	39.7 (12.9)	Mild, 71.4; moderate, 14.3; severe, 14.3	SDS	NR
	Bhatia 2019 [54]	France and United States	442	NR (all ages)	29–76	Self-report	NR
	Kota 2019 [16]	India	150	NR (all ages)	50.0	VIS-22	NR
	Krüger 2015 [42]	Germany	96	Mean (range), 41.7 (18–67)	66.7	ACS	NR
	Manolache 2007 [48]	Romania	32	Median (SD), 33.9 (17.8)	12.5	Holmes and Rahe Social Readjustment Rating Scale	NR
	Pichaimuthu 2011 [55]	India	150	35.1 (14.7)	17.3	Participation Scale	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	22.7 18.2–40.9	VIS VitiQoL	NR NR
	Salzer 1995 [49]	Germany	117	Mean (range), 40 (18–80)	27	Freiburger Personality Inventory	NR
	Sawant 2019 [28]	India	100	Men, 35.78 (14.23); women, 36.88 (14.22)	48.0	Participation Scale	NR
	Self-consciousness Embarrassment	Anaba 2020 [51]	Nigeria	29	40.1 (20.6)	55.5	VitiQoL

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool ^a	P Value vs Healthy Controls
Low self-esteem	Porter 1987 [21]	United States	326	Median (range), 34 (4–79)	Acute and consistent, 32; mild, 27	Self-report	NR
	Porter 1979 [44]	United States	62	Mean (range), 39 (14–69)	66.7	Self-report	NR
	Porter 1990 [56]	United States	158	Median (range), 38 (16–79)	24–55	Self-report	NR
	Porter 1991 [45]	United States	158	Median (range), 38 (16–79)	66.7	Self-report	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	31.8 27.3	VIS VitiQoL	NR NR
	Sampogna 2008 [24]	Italy	181	35 (NR)	34	Skindex-29	NR
	Sarkar 2018 [26]	India	61	43.8 (12.5)	55.7	Skindex-61	<0.0001
	Chan 2013 [8]	Singapore	222	48.4 (14.9)	6.8	RSES	NR
	Chan 2012 [9]	Singapore	145	47.4 (15.0)	6.2	RSES	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	72.7	Self-report	NR
Salzer 1995 [49]	Germany	117	Mean (range), 40 (18–80)	30	Freiburger Personality Inventory	NR	
Emotional impairment	Agarwal 1998 [1]	United Kingdom	154	42 (18)	6	Self-report	NR
	AlGhamdi 2010 [3]	Saudi Arabia	164	27 (13)	39–59	IPQ	NR
	Anaba 2020 [51]	Nigeria	29	40.1 (20.6)	55.2	VitiQoL	NR
	Bae 2018 [57]	South Korea	1123	49.8 (15.2)	Mild, 65.0; severe, 46.0	Skindex-29	NR
	Chen 2020 [35]	Taiwan	1432	Median, 47.1	23.1	Diagnosis on file	NR
	Porter 1987 [21]	United States	326	Median (range), 34 (4–79)	32–47	Self-report	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
	Porter 1979 [44]	United States	62	Mean (range), 39 (14–69)	53.3	Self-report	NR
	Porter 1991 [45]	United States	158	Median (range), 38 (16–79)	7–36	Self-report	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	18.2–36.4	VitiQoL	NR
	Salzer 1995 [49]	Germany	117	Mean (range), 40 (18–80)	32	Freiburger Personality Inventory	NR
	Sarkar 2018 [26]	India	61	43.8 (12.48)	24.6	Skindex-61	0.13
Cognitive impairment Schizophrenia	Chen 2020 [35]	Taiwan	1432	Median, 47.1	0.3	Diagnosis on file	NR
	Raikhy 2017 [23]	India	53	NR (adults)	3.8	Diagnosed during screening	NR
Unspecified	Sarkar 2018 [26]	India	61	43.8 (12.5)	50.8	Skindex-61	<0.0001
Relationship difficulties and sexual dysfunction Relationships	Porter 1987 [21]	United States	326	Median (range), 34 (4–79)	23	Self-report	NR
	Porter 1990 [56]	United States	158	Median (range), 38 (16–79)	15	Self-report	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	4.5	VIS	NR
	Ahmed 2007 [38]	India	100	24.6 (NR)	81.8	Self-report	NR
	Kim 2013 [58]	South Korea	167	36.1 (NR)	2.0	PAS	NR
Sexual	Manolache 2007 [48]	Romania	32	Median (SD), 33.9 (17.8)	21.6	Self-report	NR
					3.1	Holmes and Rahe Social	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool ^a	P Value vs Healthy Controls
						Readjustment Rating Scale	
	Papadopoulos 1998 [53]	United Kingdom	73	38.0 (12.6)	16.4	SRE	NR
	Porter 1979 [44]	United States	62	Mean (range), 39 (14–69)	33.3	Self-report	NR
	Porter 1990 [56]	United States	158	Median (range), 38 (16–79)	10–23	Self-report	NR
	Sorour 2017 [31]	Egypt	108	NR (adults)	48.2	Diagnosed during screening	NR
	Sukan 2007 [37]	Turkey	50	35.8 (12.6)	36.0	ASEX	0.000
Alexithymia	Dehghani 2017 [59]	Iran	30	31.6 (11.1)	46.7	TAS-20	NR
	Maghami 2018 [60]	Iran	52	NR (adults)	Confirmed, 38.5; borderline, 27.0	TAS-20	0.57
	Picardi 2003 [61]	Italy	31	31.9 (9.6)	Confirmed, 35.5; borderline, 32.3	TAS-20	NR
	Sampogna 2008 [24]	Italy	181	35 (NR)	Confirmed, 23.8; possible, 22.2	TAS-20	NR
Anger	Agarwal 1998 [1]	United Kingdom	154	42 (18)	14	Self-report	NR
	AlGhamdi 2010 [3]	Saudi Arabia	164	27 (13)	34	IPQ	NR
	Salzer 1995 [49]	Germany	117	Mean (range), 40 (18-80)	32	Freiburger Personality Inventory	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
	Sampogna 2008 [24]	Italy	181	35 (NR)	36.9	Skindex-29	NR
	Sarkar 2018 [26]	India	61	43.8 (12.5)	36.1	Skindex-61	0.11
	Topal 2016 [32]	Turkey	100	35.4 (14.3)	29.0	IPQ	NR
Suicidality Attempts	Sharma 2001 [29]	India	30	NR (adults)	3.3	Diagnosed during screening	NR
	Sorour 2017 [31]	Egypt	108	NR	3.7	Diagnosed during screening	NR
Ideation	Kota 2019 [16]	India	150	NR (adults)	23.3	QIDS-SR-16	NR
	Porter 1987 [21]	United States	326	Median (range), 34 (4–79)	3	Self-report	NR
	Pun 2021 [22]	Nepal	22	38.7 (3.2)	4.5	VIS	NR
	Sangma 2015 [25]	India	100	29.7 (7.0)	8	HDRS	NR
	Sharma 2001 [29]	India	30	NR (adults)	10.0	Diagnosed during screening	NR
	Sorour 2017 [31]	Egypt	108	NR (adults)	25.0	Diagnosed during screening	NR
Unspecified	Ramakrishna 2014 [39]	India	53	NR (adults)	28.3	Not specified	NR
Somatoform disorder	Dabas 2020 [11]	India	95	NR (adults)	6.3	PRIME-MD PHQ	NR
	Raikhy 2017 [23]	India	53	NR (adults)	9.4	Diagnosed during screening	NR
	Sharma 2001 [29]	India	30	NR (adults)	6.7	GHQ-H	NR

Psychosocial Comorbidity	Reference	Country	Number of Patients With Vitiligo	Age, Mean (SD), y	Prevalence, %	Comorbidity Screening Tool^a	P Value vs Healthy Controls
Alcohol dependence or abuse	Balaban 2011 [36]	Turkey	42	39.7 (12.9)	2.4	SCID-I	NR
	Dabas 2020 [11]	India	95	NR (adults)	6.3	PRIME-MD PHQ	NR
	Raikhy 2017 [23]	India	53	NR (adults)	7.6	Diagnosed during screening	NR

ACS, Adjustment to Chronic Skin Disorders Questionnaire; ADHD, attention-deficit/hyperactivity disorder; ASEX, Arizona Sexual Experience Scale; BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; CES-D, Center for Epidemiologic Studies Depression Scale; DLQI, Dermatology Life Quality Index; ES-Q, Emotional State Questionnaire; GAD, generalized anxiety disorder; GHQ-H, Hindi version of the General Health Questionnaire; HADS, Hospital Anxiety and Depression Scale; HDRS, Hamilton Depression Rating Scale; IPQ, Illness Perception Questionnaire; IQR, interquartile range; K-SADS-PL, Schedule for Affective Disorders and Schizophrenia for School Age Children-Present and Lifetime Version; MDD, major depressive disorder; NR, not reported; PAS, Psychiatric Assessment Schedule; PHQ-9, Patient Health Questionnaire-9; PRIME-MD PHQ, Primary Care Evaluation of Mental Disorders–Patient Health Questionnaire; QIDS-SR-16, Quick Inventory of Depressive Symptomatology–Self Report; RSES, Rosenberg Self-Esteem Scale; SCID-I, Structured Clinical Interview for DSM-IV Axis I Disorders; SDS, Sheehan Disability Scale; SRE, Schedule of Recent Experience; TAS-20, Toronto Alexithymia Scale-20; VIS, Vitiligo Impact Scale; VIS-22, Vitiligo Impact Scale 22; VitiQoL, Vitiligo-specific Quality of Life.

^a Where “diagnosis on file” and “diagnosed during screening” are listed as the comorbidity screening tool, the article specified a formal diagnosis or provided diagnostic criteria/codes (ie, Diagnostic and Statistical Manual of Mental Disorders IV/5 or International Classification of Diseases 9/10), suggestive of a formal diagnosis.

^b Includes MDD and other depressive disorders.

^c Includes panic disorders and other anxiety disorders.

References

1. Agarwal G. Vitiligo: an under-estimated problem. *Fam Pract.* 1998;15 suppl 1:S19-23.
2. Ajose FO, Parker RA, Merrall EL, Adewuya AO, Zachariah MP. Quantification and comparison of psychiatric distress in African patients with albinism and vitiligo: a 5-year prospective study. *J Eur Acad Dermatol Venereol.* 2014;28(7):925-32.
3. AlGhamdi KM. Beliefs and perceptions of Arab vitiligo patients regarding their condition. *Int J Dermatol.* 2010;49(10):1141-5.
4. Al-Harbi M. Prevalence of depression in vitiligo patients. *Skinmed.* 2013;11(6):327-30.
5. Alharbi MA. Identifying patients at higher risk of depression among patients with vitiligo at outpatient setting. *Mater Sociomed.* 2020;32(2):108-11.
6. AlShahwan MA. The prevalence of anxiety and depression in Arab dermatology patients. *J Cutan Med Surg.* 2015;19(3):297-303.
7. Arýcan Ö, Koç K, Ersoy L. Clinical characteristics in 113 Turkish vitiligo patients. *Acta Dermatovenerologica Alpina, Pannonica et Adriatica.* 2008;17(3):129-32.
8. Chan MF, Thng TG, Aw CW, Goh BK, Lee SM, Chua TL. Investigating factors associated with quality of life of vitiligo patients in Singapore. *Int J Nurs Pract.* 2013;19 suppl 3:3-10.
9. Chan MF, Chua TL, Goh BK, Aw CW, Thng TG, Lee SM. Investigating factors associated with depression of vitiligo patients in Singapore. *J Clin Nurs.* 2012;21(11-12):1614-21.
10. Choi S, Kim DY, Whang SH, Lee JH, Hann SK, Shin YJ. Quality of life and psychological adaptation of Korean adolescents with vitiligo. *J Eur Acad Dermatol Venereol.* 2010;24(5):524-9.
11. Dabas G, Vinay K, Parsad D, Kumar A, Kumaran MS. Psychological disturbances in patients with pigmentary disorders: a cross-sectional study. *J Eur Acad Dermatol Venereol.* 2020;34(2):392-9.
12. Hamidizadeh N, Ranjbar S, Ghanizadeh A, Parvizi MM, Jafari P, Handjani F. Evaluating prevalence of depression, anxiety and hopelessness in patients with vitiligo on an Iranian population. *Health Qual Life Outcomes.* 2020;18(1):20.

13. Henning SW, Jaishankar D, Barse LW, Dellacecca ER, Lancki N, Webb K et al. The relationship between stress and vitiligo: evaluating perceived stress and electronic medical record data. *PLoS One*. 2020;15(1):e0227909.
14. Karelson M, Silm H, Kingo K. Quality of life and emotional state in vitiligo in an Estonian sample: comparison with psoriasis and healthy controls. *Acta Derm Venereol*. 2013;93(4):446-50.
15. Kosaraju SK, Reddy KS, Vadlamani N, Sandhya L, Kalasapati L, Maganti S et al. Psychological morbidity among dermatological patients in a rural setting. *Indian J Dermatol*. 2015;60(6):635.
16. Kota RS, Vora RV, Varma JR, Kota SK, Patel TM, Ganjiwale J. Study on assessment of quality of life and depression in patients of vitiligo. *Indian Dermatol Online J*. 2019;10(2):153-7.
17. Kruger C, Smythe JW, Spencer JD, Hasse S, Panske A, Chiuchiarelli G et al. Significant immediate and long-term improvement in quality of life and disease coping in patients with vitiligo after group climatotherapy at the Dead Sea. *Acta Derm Venereol*. 2011;91(2):152-9.
18. Mattoo SK, Handa S, Kaur I, Gupta N, Malhotra R. Psychiatric morbidity in vitiligo and psoriasis: a comparative study from India. *J Dermatol*. 2001;28(8):424-32.
19. Mattoo SK, Handa S, Kaur I, Gupta N, Malhotra R. Psychiatric morbidity in vitiligo: prevalence and correlates in India. *J Eur Acad Dermatol Venereol*. 2002;16(6):573-8.
20. Morales-Sanchez MA, Vargas-Salinas M, Peralta-Pedrero ML, Olguin-Garcia MG, Jurado-Santa Cruz F. Impact of vitiligo on quality of life. *Actas Dermosifiliogr*. 2017;108(7):637-42.
21. Porter J, Beuf AH, Lerner A, Nordlund J. Response to cosmetic disfigurement: patients with vitiligo. *Cutis*. 1987;39(6):493-4.
22. Pun J, Randhawa A, Kumar A, Williams V. The impact of vitiligo on quality of life and psychosocial well-being in a Nepalese population. *Dermatol Clin*. 2021;39(1):117-27.
23. Raikhy S, Gautam S, Kanodia S. Pattern and prevalence of psychiatric disorders among patients attending dermatology OPD. *Asian J Psychiatr*. 2017;29:85-8.
24. Sampogna F, Raskovic D, Guerra L, Pedicelli C, Tabolli S, Leoni L et al. Identification of categories at risk for high quality of life impairment in patients with vitiligo. *Br J Dermatol*. 2008;159(2):351-9.

25. Sangma LN, Nath J, Bhagabati D. Quality of life and psychological morbidity in vitiligo patients: a study in a teaching hospital from north-East India. *Indian J Dermatol.* 2015;60(2):142-6.
26. Sarkar S, Sarkar T, Sarkar A, Das S. Vitiligo and psychiatric morbidity: a profile from a vitiligo clinic of a rural-based tertiary care center of Eastern India. *Indian J Dermatol.* 2018;63(4):281-4.
27. Sarma N, Chakraborty S, Poojary S, Shashi Kumar BM, Gupta LK, Budamakuntla L et al. A nationwide, multicentric case-control study on vitiligo (MEDEC-V) to elicit the magnitude and correlates. *Indian J Dermatol.* 2020;65(6):473-82.
28. Sawant NS, Vanjari NA, Khopkar U. Gender differences in depression, coping, stigma, and quality of life in patients of vitiligo. *Dermatol Res Pract.* 2019;2019:6879412.
29. Sharma N, Koranne RV, Singh RK. Psychiatric morbidity in psoriasis and vitiligo: a comparative study. *J Dermatol.* 2001;28(8):419-23.
30. Silpa-Archa N, Pruksaeakanan C, Angkoolpakdeekul N, Chaiyabutr C, Kulthanan K, Ratta-Apha W et al. Relationship between depression and quality of life among vitiligo patients: a self-assessment questionnaire-based study. *Clin Cosmet Investig Dermatol.* 2020;13:511-20.
31. Sorour F, Abdelmoaty A, Bahary MH, El Birqdar B. Psychiatric disorders associated with some chronic dermatologic diseases among a group of Egyptian dermatology outpatient clinic attendants. *J Egypt Womens Dermatol Soc.* 2017;14(1):31-6.
32. Topal IO, Duman H, Goncu OE, Durmuscan M, Gungor S, Ulkumen PK. Knowledge, beliefs, and perceptions of Turkish vitiligo patients regarding their condition. *An Bras Dermatol.* 2016;91(6):770-5.
33. Tsintsadze N, Beridze L, Tsintsadze N, Krichun Y, Tsivadze N, Tsintsadze M. Psychosomatic aspects in patients with dermatologic diseases. *Georgian Med News.* 2015(243):70-5.
34. Yamamoto Y, Tanioka M, Hayashino Y, Mishina H, Kato M, Fukuhara S et al. Application of a two-question screening instrument to detect depressive symptoms in patients with vitiligo: a pilot study. *J Am Acad Dermatol.* 2011;64(5):e69-70.
35. Chen CY, Wang WM, Chung CH, Tsao CH, Chien WC, Hung CT. Increased risk of psychiatric disorders in adult patients with vitiligo: a nationwide, population-based cohort study in Taiwan. *J Dermatol.* 2020;47(5):470-5.

36. Balaban ÖD, Atagün Mİ, Özgüven HD, Özsan HH. Psychiatric morbidity in patients with vitiligo. *Dusunen Adam*. 2011;24(4):306-13.
37. Sukan M, Maner F. The problems in sexual functions of vitiligo and chronic urticaria patients. *J Sex Marital Ther*. 2007;33(1):55-64.
38. Ahmed I, Ahmed S, Nasreen S. Frequency and pattern of psychiatric disorders in patients with vitiligo. *J Ayub Med Coll Abbottabad*. 2007;19(3):19-21.
39. Ramakrishna P, Rajni T. Psychiatric morbidity and quality of life in vitiligo patients. *Indian J Psychol Med*. 2014;36(3):302-3.
40. Vallerand IA, Lewinson RT, Parsons LM, Hardin J, Haber RM, Lowerison MW et al. Vitiligo and major depressive disorder: a bidirectional population-based cohort study. *J Am Acad Dermatol*. 2019;80(5):1371-9.
41. Ucuz I, Altunisik N, Sener S, Turkmen D, Kavuran NA, Marsak M et al. Quality of life, emotion dysregulation, attention deficit and psychiatric comorbidity in children and adolescents with vitiligo. *Clin Exp Dermatol*. 2021;46(3):510-5.
42. Kruger C, Schallreuter KU. Stigmatisation, avoidance behaviour and difficulties in coping are common among adult patients with vitiligo. *Acta Derm Venereol*. 2015;95(5):553-8.
43. Kruger C, Panske A, Schallreuter KU. Disease-related behavioral patterns and experiences affect quality of life in children and adolescents with vitiligo. *Int J Dermatol*. 2014;53(1):43-50.
44. Porter J, Beuf AH, Nordlund JJ, Lerner AB. Psychological reaction to chronic skin disorders: a study of patients with vitiligo. *Gen Hosp Psychiatry*. 1979;1(1):73-7.
45. Porter JR, Beuf AH. Racial variation in reaction to physical stigma: a study of degree of disturbance by vitiligo among black and white patients. *J Health Soc Behav*. 1991;32(2):192-204.
46. Premkumar R, Kar B, Rajan P, Richard J. Major precipitating factors for stigma among stigmatized vitiligo and psoriasis patients with brown-black skin shades. *Indian J Dermatol Venereol Leprol*. 2013;79(5):703-5.
47. Thompson AR, Clarke SA, Newell RJ, Gawkrödger DJ, Appearance Research Collaboration. Vitiligo linked to stigmatization in British South Asian women: a qualitative study of the experiences of living with vitiligo. *Br J Dermatol*. 2010;163(3):481-6.
48. Manolache L, Benea V. Stress in patients with alopecia areata and vitiligo. *J Eur Acad Dermatol Venereol*. 2007;21(7):921-8.

49. Salzer BA, Schallreuter KU. Investigation of the personality structure in patients with vitiligo and a possible association with impaired catecholamine metabolism. *Dermatology*. 1995;190(2):109-15.
50. Shaker OG, Eltahlawi SM, Tawfic SO, Eltawdy AM, Bedair NI. Corticotropin-releasing hormone (CRH) and CRH receptor 1 gene expression in vitiligo. *Clin Exp Dermatol*. 2016;41(7):734-40.
51. Anaba EL, Oaku RI. Prospective cross-sectional study of quality of life of vitiligo patients using a vitiligo specific quality of life instrument. *West Afr J Med*. 2020;37(7):745-9.
52. Mouzas O, Angelopoulos N, Papaliagka M, Tsogas P. Increased frequency of self-reported parasomnias in patients suffering from vitiligo. *Eur J Dermatol*. 2008;18(2):165-8.
53. Papadopoulos L, Bor R, Legg C, Hawk JL. Impact of life events on the onset of vitiligo in adults: preliminary evidence for a psychological dimension in aetiology. *Clin Exp Dermatol*. 1998;23(6):243-8.
54. Bhatia B, Kechichian E, Eleftheriadou V, Castelneau JP, Seite S, Meurant JM et al. Habits and risk perception associated with sun exposure in vitiligo patients according to their participation in a patients' organization. *J Eur Acad Dermatol Venereol*. 2019;33(3):e100-e3.
55. Pichaimuthu R, Ramaswamy P, Bikash K, Joseph R. A measurement of the stigma among vitiligo and psoriasis patients in India. *Indian J Dermatol Venereol Leprol*. 2011;77(3):300-6.
56. Porter JR, Beuf AH, Lerner AB, Nordlund JJ. The effect of vitiligo on sexual relationships. *J Am Acad Dermatol*. 1990;22(2 Pt 1):221-2.
57. Bae JM, Lee SC, Kim TH, Yeom SD, Shin JH, Lee WJ et al. Factors affecting quality of life in patients with vitiligo: a nationwide study. *Br J Dermatol*. 2018;178(1):238-44.
58. Kim DY, Lee J, Oh SH, Hann SK, Shin YJ. Impact of genital involvement on the sexual lives of vitiligo patients. *J Dermatol*. 2013;40(12):1065-7.
59. Dehghani F, Dehghani F, Kafaie P, Taghizadeh MR. Alexithymia in different dermatologic patients. *Asian J Psychiatr*. 2017;25:42-5.
60. Maghami Z, Sepaskhah M, Sarani EM, Bagheri Z, Maghami M. Alexithymia in vitiligo patients: a case-control study. *Iran J Dermatol*. 2018;21(4):138-41.

61. Picardi A, Pasquini P, Cattaruzza MS, Gaetano P, Melchi CF, Baliva G et al. Stressful life events, social support, attachment security and alexithymia in vitiligo. A case-control study. *Psychother Psychosom.* 2003;72(3):150-8.