

Assessment of community awareness about vitiligo and its treatment in Saudi Arabia

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ABSTRACT

Background: Vitiligo is a chronic skin disorder characterized by the acquired depigmentation of the skin, arising from the selective destruction of melanocytes. This study aims to explore the public knowledge, awareness, and attitude towards vitiligo in Saudi Arabia.

Method: An online cross-sectional survey study was conducted to assess public knowledge of vitiligo in October 2022. The questionnaire tool was created utilizing thorough literature reviews of papers that looked at public knowledge of vitiligo. The factors influencing the participants' knowledge of vitiligo were identified using binary logistic regression analysis.

Results: A total of 372 individual participated in this study. The mean knowledge score of the study participants was 8.2 (SD: 3.6) out of 22 (37.3% out of 100%), which represents weak level of knowledge of vitiligo among the study participants. Logistic regression analysis identified that females, younger participants (19-30 years old), and those who work in the healthcare sector were more likely to be knowledgeable about vitiligo compared to others ($p \leq 0.5$).

Conclusion: It is highly recommended that Saudi Arabia prioritize awareness initiatives. The study demonstrates the widespread occurrence of the condition and the profound psychological impact it has, leading to feelings of isolation and diminished self-worth. Clearly, targeted educational programs are necessary to rectify misconceptions and foster comprehension, particularly among underinformed groups. Collaborating with healthcare professionals could prove to be highly beneficial.

Keywords: Community; Knowledge; Vitiligo; Saudi Arabia

INTRODUCTION

Vitiligo is a chronic skin disorder characterized by the acquired depigmentation of the skin, arising from the selective destruction of melanocytes¹ and this consequently results in the dilution of pigment in the affected regions of the skin, indeed, the defining mark of this condition is a completely pigment-devoid, non-scaly, chalky-white patch with well-defined borders². Significantly, recent advancements have enhanced our comprehension of vitiligo's underlying processes, categorizing it unmistakably as an autoimmune disease, where it is linked to a combination of genetic and environmental factors, alongside metabolic, oxidative stress, and cell detachment abnormalities^{1,3}.

Vitiligo is classified into two main types, a Non-Segmental Vitiligo (NSV), and a Segmental Vitiligo (SV)³, in fact, the term vitiligo was coined to encompass various forms of NSV, comprising acrofacial, mucosal, generalized, universal, mixed, and uncommon variants, however, SV differentiated from other vitiligo types, primarily due to its significant prognostic implications^{3,4}. Moreover, it is crucial not to trivialize vitiligo as a mere cosmetic or inconsequential ailment, as its impact can be psychologically devastating, frequently imposing a significant burden on daily life¹⁻⁴.

Vitiligo stands out as the most prevalent depigmenting skin disorder, with an estimated occurrence ranging from 0.5% to 2% among both adults and children on a global scale⁴⁻⁸. Moreover, vitiligo is found in both males and females, as well as in individuals from various racial, ethnic, and socioeconomic backgrounds, with no significant distribution difference⁹. Although it can manifest at any age, where

the highest incidence is observed in the second and third decades of life, where about one-third of vitiligo cases affect children, while the majority, ranging from 70% to 80%, occur in individuals before the age of 30¹.

Patients with vitiligo in Middle Eastern nations are more susceptible to heightened psychological stress when compared to their counterparts in European countries, where this difference could be ascribed to variations in skin type, the level of public awareness, and the presence of social stigma¹⁰. In fact, skin conditions in Saudi Arabia exhibited notable variations in quality of life scores, possibly stemming from cultural distinctions in the way individuals in Saudi Arabia perceive and cope with skin diseases and the disabilities resulting from them⁹.

Vitiligo can be effectively treated with a combination of topical medication, phototherapy, and surgery, where topical treatments, including corticosteroids, calcineurin inhibitors, and vitamin D analogues, have been shown to be effective in re-pigmentation, particularly when combined with phototherapy^{11,12}. Indeed, phototherapy, such as PUVA and UVB radiation, is a common first-line treatment, while surgery, including autologous melanocyte transplantation, is a second-line option for extensive or non-responsive cases^{13,14}.

Public awareness and attitudes towards vitiligo was studied widely, and it revealed a substantial misconceptions and insufficient understanding among both the general population and individuals affected by the condition¹⁵, while the existing literature underscores the need for further examination in Saudi Arabia, this study aims to explore the

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public knowledge, awareness, and attitude towards vitiligo in Saudi Arabia.

METHOD

2.1. Study design and settings

An online cross-sectional survey study was conducted to assess public knowledge of vitiligo in October 2022.

2.2. Sampling procedure

Convenience sampling was used to generate the study sample. This sampling technique falls under the category of non-probability sampling. This study included eligible people who satisfied our inclusion criteria and were available to participate in the study. On the first page of the questionnaire, an informed consent form was shown, and participants were given the option to continue or stop at that point. To let the participants understand the importance of their participation, the study's aims were clearly described. In the study's invitation letter, the inclusion criteria were outlined.

2.3. Study population

The study population for this study consisted of everyone who was a resident of Saudi Arabia at the time the data were collected; there were no exclusion criteria based on gender, age, or occupation.

2.4. Study tool

A questionnaire used in this study to evaluate participants' vitiligo knowledge. The questionnaire tool was created utilizing thorough literature reviews of papers that looked at public knowledge of vitiligo. In addition, the questionnaire collected data on the respondents' age, gender, level of education, and employment. 22 items in the knowledge section were multiple choice questions and yes/no questions. Each right answer is worth one point, while each wrong answer is worth zero points. The more knowledge, the higher the points. Given that there were 22 questions in the knowledge section, the highest possible score is anticipated to be 22.

2.5. Piloting of the questionnaire tool

The questionnaire tool was examined and validated by clinical pharmacists from King Faisal University's College of Clinical Pharmacy. They were questioned regarding the questions' clarity, comprehensibility, face validity, and whether any of them were challenging to understand. They were questioned about any questions that offended or irritated them as well. They claimed that it was easy to comprehend and complete the questionnaire. Additionally, a pilot research with a small group of participants was undertaken to gauge comprehension before the questionnaire was used on a larger scale, and they confirmed that it is simple and clear.

2.6. Ethical approval

The research ethics committee at King Faisal University, AlAhsa, Saudi Arabia, approved the study protocol (KFU-REC-2022-OCT-ETHICS233). Informed consent was obtained from the study participants prior to study commencement. This study was conducted in accordance with the World Medical Association (WMA) Declaration of Helsinki.

Statistical analysis

SPSS software (version 27) was used to analyse the data for this study.

The knowledge score was normally distributed which was confirmed using normality measures and histogram. Therefore, we used the mean (standard deviation (SD)) to present it. The factors influencing the participants' knowledge of vitiligo were identified using binary logistic regression analysis, which used the mean knowledge score of the study participants (8.2) to define the dummy variable for the analysis. Statistical significance was defined as two-sided $p < 0.05$.

RESULTS

A total of 372 individual participated in this study. More than half (65.6%) of the study participants were females. Almost half of them (46.5%) were aged 19-30 years. Half of them (54.6%) reported that they are currently unemployed. More than half (58.9%) of them reported that they hold bachelor degree. Around 5.0% of the participants reported that they are diagnosed with vitiligo. Their main concerns when diagnosed with vitiligo were being isolated from the community and low self-esteem. Around 22.0% and 12.0% of the participants reported that they know a family member or a friend who is diagnosed with vitiligo, respectively. Table 1 below describes the demographic characteristics of the study participants.

Table 1. Demographic characteristics of the study participants

Demographic variable	Frequency	Percentage
Gender		
Female	244	65.6%
Age category		
Less than 18 years	17	4.6%
19-30 years	173	46.5%
31-40 years	85	22.8%
41-50 years	70	18.8%
51 years and above	27	7.3%
Employment status		
Work outside the healthcare area	102	27.4%
Unemployed	203	54.6%
Work inside the healthcare area	67	18.0%
Education		
Secondary school level or lower	115	30.9%
Bachelor degree	219	58.9%
Higher education	38	10.2%
Have you ever been diagnosed with vitiligo?		
Yes	19	5.1%
Main concerns when diagnosed with vitiligo: (n=19)		
Social isolation	19	100%
Low level of self-esteem	19	100%
Lower quality of life	15	78.9%
Do you know a family member or a friend who has vitiligo?		
Yes, a family member	82	22.0%
Yes, a friend	46	12.4%

Participants' knowledge about vitiligo

Table 2 below presents the participants' response to questions used to evaluate their knowledge of vitiligo. Around 3.0% stated that vitiligo is a contagious disease. Almost one-third (32.3%) of the study participants stated that vitiligo is a genetic disease. Almost half of them (47.3%) stated that vitiligo is related to immunity. More than half of them (65.9%) stated that there are several types of vitiligo and 81.7% of them reported that it can spread to other parts of the body. Environmental factors were the most commonly reported (36.0%) contributing factors that increase the likelihood of developing vitiligo.

Around one-fifth of the study participants (20.7%) reported that having other immune diseases the probability of developing vitiligo. Almost one-quarter of the study participants (24.7%) reported that sunburns are one of the causes of vitiligo. Around 35.2% of them reported that vitiligo affects a certain type of skin and 58.9% of them reported that it is possible to get vitiligo in the hair, eyelid and inside the ear. Around 11.0% of the study participants reported that gender could affect vitiligo. Adults were reported as the most susceptible age group to vitiligo (71.5%). Almost 65.0% of the study participants reported that vitiligo makes the patient more susceptible to mental illness and 38.4% confirmed that vitiligo may trigger suicidal thoughts. Around one-third of the study participants (35.2%) reported that vitiligo could affect the economic status of the patient. Almost 58.0% of the participants confirmed that it can be treated. Only one-fifth of them (20.4%) confirmed that they heard about the drug ruxolitinib for the treatment of vitiligo and social media was the most commonly reported source of information about it (88.2%).

Around one-third of the study participants confirmed that they heard about light therapy as a treatment for vitiligo (32.8%) and that vitamin D has a role in treating vitiligo (36.3%). Almost one-fifth of the study participants reported that they think tattoos can be used to treat vitiligo in places with poor pigmentation, such as the lips (22.3%) and that vitiligo can be cured by surgical treatments (19.1%). Almost one-quarter the study participants (22.5%) reported that they think that surgery will be beneficial for all types of vitiligo and 13.7% reported that acne could be a side effect of topical treatment for vitiligo.

Table 2. Participants' response to knowledge items about vitiligo

Variable	Frequency	Percentage
Vitiligo is a contagious disease (Yes)	11	3.0%
Vitiligo is a genetic disease (Yes)	120	32.3%
Do you think that vitiligo is related to immunity? (Yes)	176	47.3%
Vitiligo has several types? (Yes)	245	65.9%
Is it possible for vitiligo to spread to other parts of the body? (Yes)	304	81.7%
In your opinion, what are the factors that may increase the likelihood of developing vitiligo?		
Environmental factors	134	36.0%
Chemical factors	92	24.7%
Immunological factors	91	24.5%
Having other immune diseases such as: type 1 diabetes, gland diseases, rheumatoid arthritis increases the probability of developing vitiligo? (Yes)	77	20.7%
Are sunburns one of the causes of vitiligo? (Yes)	92	24.7%
Vitiligo affects a certain type of skin? (Yes)	131	35.2%
Is it possible to get vitiligo in the hair, eyelid and inside the ear? (Yes)	219	58.9%
Does gender affect vitiligo? (Yes)	40	10.8%
In your opinion, what is the age group most susceptible to vitiligo? (More than one answer can be chosen)		
Adults	266	71.5%
Children	119	32.0%
Elderly	71	19.1%
Infants	41	11.0%
Having vitiligo makes you more susceptible to mental illness? (Yes)	241	64.8%

Do you think vitiligo may trigger suicidal thoughts? (Yes)	143	38.4%
Do you think vitiligo affects the economic status? (Yes)	131	35.2%
Can vitiligo be treated? (Yes)	216	58.1%
Have you heard about the drug ruxolitinib for the treatment of vitiligo? (Yes)	76	20.4%
If the previous answer was yes, where did you hear about it? (n= 76)		
Social media	67	88.2%
Family and friends	36	47.4%
Physician	15	19.7%
Pharmacist	13	3.5%
Have you heard about light therapy as a treatment for vitiligo? (Yes)	122	32.8%
Do you think that vitamin D has a role in treating vitiligo? (Yes)	135	36.3%
Do you think tattoos can be used to treat vitiligo in places with poor pigmentation, such as the lips? (Yes)	83	22.3%
Do you think that vitiligo can be cured by surgical treatments? (Yes)	71	19.1%
If your answer is yes to the previous question, do you think that surgery will be beneficial for all types of vitiligo? (n=71) (Yes)	16	22.5%
Do you think that acne could be a side effect of topical treatment for vitiligo? (Yes)	51	13.7%

Predictors of participants' knowledge of vitiligo

The mean knowledge score of the study participants was 8.2 (SD: 3.6) out of 22 (37.3% out of 100%), which represents weak level of knowledge of vitiligo among the study participants. Logistic regression analysis identified that females, younger participants (19-30 years old), and those who work in the healthcare sector were more likely to be knowledgeable about vitiligo compared to others (p0≤0.5).

Table 3. Predictors of participants' knowledge of vitiligo

Demographic variable	Odds ratio of being knowledgeable of vitiligo	P-value
Gender		
Females (Reference group)	1.00	
Males	0.56 (0.36-0.87)	0.010
Age category		
Less than 18 years (Reference group)	1.00	
19-30 years	1.73 (1.14-2.61)	0.009
31-40 years	0.46 (0.28-0.77)	0.003
41-50 years	1.14 (0.68-1.91)	0.628
51 years and above	0.57 (0.25-1.29)	0.176
Employment status		
Unemployed (Reference group)	1.00	
Work outside the healthcare area	0.61 (0.38-0.98)	0.039
Work inside the healthcare area	2.68 (1.54-4.66)	≤0.001
Education		
Secondary school level or lower (Reference group)	1.00	
Bachelor degree	1.21 (0.80-1.84)	0.360
Higher education	1.52 (0.77-2.98)	0.227

DISCUSSION

The quality of life scores related to skin conditions in Saudi Arabia showed significant variations, possibly due to cultural differences in how individuals in the country perceive and manage skin diseases and the resulting disabilities¹⁶. The psychological effects of vitiligo can be highly distressing and have a significant impact on daily life⁴. Vitiligo is a chronic skin condition characterized by the loss of pigmentation¹. Therefore, it is crucial not to underestimate vitiligo as a purely cosmetic or inconsequential condition, as it can have severe psychological consequences¹⁻³. This study aimed to investigate the public knowledge, awareness, and attitude towards vitiligo in Saudi Arabia.

The prevalence of vitiligo in Saudi Arabia was found to be higher than what has been reported in other studies¹⁷. The study revealed that approximately 5.0% of the participants reported being diagnosed with vitiligo, indicating a significantly higher prevalence compared to the general population worldwide, which typically ranges from 0.4% to 2.0%⁸. In fact, the estimated prevalence of vitiligo in Saudi Arabia is around 3.5%, with a higher incidence observed among males and younger individuals¹⁷.

The primary concerns expressed by the study participants upon receiving a diagnosis of vitiligo were social isolation and diminished self-esteem. This highlights the psychological impact of vitiligo, which significantly affects daily life. Living with vitiligo is widely recognized as an ongoing challenge. The condition can lead to reduced self-esteem and depression, especially in individuals with noticeable symptoms. This is often attributed to the stigma and lack of social acceptance associated with vitiligo. While the psychological burden of vitiligo can be substantial, it is crucial for clinicians to acknowledge these potential effects and offer appropriate support.

Among the participants in the study, approximately 3.0% believed that vitiligo is a contagious disease. However, a significant portion (32.3%) stated that vitiligo is a genetic disease, and nearly half (47.3%) believed it is related to immunity. While the exact cause of vitiligo is not fully understood, it has been determined that it is not contagious¹⁸. Vitiligo appears to be influenced by a combination of genetic, immunological, and neurological factors^{18,19}. Variations in the DNA sequence that affect skin homeostasis, pigmentation, and immune response have been found to contribute to the risk of developing vitiligo. Additionally, depigmentation in vitiligo is closely linked to immunological factors, and its development is strongly associated with autoimmunity [26]. The destruction of melanocytes in vitiligo patients is primarily caused by the presence of autoantibodies and autoreactive T cells^{20,21}.

The most frequently mentioned contributing factors for developing vitiligo were environmental factors, cited by 36.0% of participants. Additionally, 20.7% of participants noted that having other immune diseases increases the likelihood of developing vitiligo. In addition, approximately 24.7% of the participants identified sunburns as a contributing factor to vitiligo. While genetic factors play a significant role in the development of vitiligo, environmental triggers such as malnutrition, infections, and oxidative stress are also believed to influence its onset^{22,23}. Elevated levels of proinflammatory cytokines, particularly TNF- α , which are commonly associated with autoimmune diseases, have been found to potentially be linked to vitiligo^{24,25}. Furthermore, sunburns have been suggested as a risk factor for developing vitiligo^{26,27}. Specifically, individuals with a reduced ability to achieve a tan and a history of blistering sunburns have a higher likelihood of developing vitiligo²⁶. However, the exact connection between sunburns and vitiligo is not fully understood, highlighting the need for further research to explore this potential link.

Furthermore, approximately 35.2% of the participants in the study indicated that vitiligo specifically affects a particular type of skin, while 58.9% reported that it can also manifest in the hair, eyelids, and inside the ear. Notably, individuals with darker skin are more prone to developing vitiligo compared to those with lighter skin, as highlighted by previous research²⁸. The destruction of melanocytes, which are responsible for producing skin pigment, can occur extensively in vitiligo, affecting the skin, mucous membranes, eyes, and occasionally the hair follicles and ears²⁹. Additionally, gender was found to have an impact on vitiligo, with a higher prevalence observed in females compared to males^{30,31}. However, it was also reported that males tend to experience a longer duration of the disease and have a higher likelihood of having a family history of vitiligo³⁰. Among adults, the age group most susceptible to vitiligo is reported to be 71.5%. The majority of vitiligo cases, ranging from 70% to 80%, occur in adults before the age of 30¹. However, other studies show different results, reporting that vitiligo starts in childhood, with an average onset age of 5-6 years^{32,33}. The relationship between age and vitiligo incidence varies greatly due to various factors such as genetics, immune system, and neurological factors^{18,19}.

Among the study participants, almost 65.0% of them reported that vitiligo makes the patient more susceptible to mental illness and 38.4% confirmed that vitiligo may trigger suicidal thoughts, in fact, vitiligo has a complex relationship with mental health, with a high degree of psychiatric morbidity reported in vitiligo patients³⁴, where this association is further supported by the finding that vitiligo is associated with hospitalization for mental health disorders in US adults³⁵. Moreover, around one-third of the study participants (35.2%) reported that vitiligo could affect the economic status of the patient, where treatments for vitiligo, such as topical corticosteroids, calcineurin inhibitors, and NB-UVB phototherapy, can be effective, but their cost-effectiveness may vary for different patients³⁶, where in US it was found that there is inequity in the distribution of health among vitiligo patients given current patterns of insurance coverage for treatment³⁷, which substantially affect the economic status for vitiligo patients.

In addition, the study revealed that approximately 58.0% of the participants acknowledged the treatability of vitiligo. Various treatment options, such as phototherapy and surgical methods, are available and have the potential to produce positive outcomes in a majority of patients³⁸. Furthermore, only 20.4% of the participants were aware of the drug ruxolitinib for vitiligo treatment. Ruxolitinib cream has demonstrated promising results in treating vitiligo, with significant improvements in Vitiligo Area Scoring Index (VASI) scores and a high percentage of patients achieving re-pigmentation³⁹. Moreover, the cream is well-tolerated, with mild adverse effects like erythema, pruritus, and acne^{39,40}. Approximately one-third of the participants in the study confirmed their awareness of light therapy as a treatment for vitiligo (32.8%), as well as the role of vitamin D in treating the condition (36.3%). Light therapy, specifically UV-based therapy, has been proven effective in treating vitiligo and is considered the preferred initial treatment option^{41,42}. Additionally, there is a significant positive correlation between adequate vitamin D levels and disease stability, as well as satisfactory re-pigmentation, in vitiligo patients⁴³.

Additionally, almost one-fifth of the study participants reported that they think tattoos can be used to treat vitiligo in places with poor pigmentation, such as the lips (22.3%), indeed, research has shown that tattoos can be an effective treatment for vitiligo, particularly in areas like the lips and gingival tissues^{44,45}, where the procedure is relatively safe and can provide cosmetically acceptable results, with better outcomes in dark-complexioned individuals^{44,46}, and it can help restore pigmentation and improve the emotional and psychological

well-being of individuals with vitiligo⁴⁷. Moreover, 19.1% of the study participants reported that vitiligo can be cured by surgical treatments. Also, almost one-quarter of the study participants (22.5%) reported that they think that surgery will be beneficial for all types of vitiligo, where surgical treatments for vitiligo have been shown to be safe and effective for selective patients, particularly those with stable disease^{48,49}, these treatments, which include grafting and non-grafting techniques, can lead to significant re-pigmentation⁴⁹. However, they are invasive and require specific expertise⁵⁰, as well as innovative approaches, such as the exploration of stem cell utilization, are being investigated to enhance the effectiveness of surgical treatments for vitiligo⁵¹. Also, 13.7% of the study participants reported that acne could be a side effect of topical treatment for vitiligo, where acne along with erythema, and pruritus are found to be a mild adverse effects associated with topical treatment of vitiligo, especially with ruxolitinib administration³⁹.

The study result found that the mean knowledge score of the study participants was 8.2 out of 22 (37.3% out of 100%), which represents a weak level of knowledge of vitiligo among the study participants, where limited knowledge and negative attitudes towards vitiligo found to be similar in various population, where in India only a small percentage of the population knew that vitiligo is treatable and not contagious, and many held misconceptions about the disease⁵². Also, similar findings were reported in Saudi Arabia⁵³, where these misconceptions can have a significant impact on the lives of those with vitiligo, as the disease can have a considerable psychological burden⁴. On the other hand, studies from various regions, including Saudi Arabia, Jordan, and Ethiopia⁵⁴⁻⁵⁶, as well as studies conducted at Hail University in Saudi Arabia⁵⁷, reveals that although the public generally possesses some knowledge about vitiligo, there are notable gaps in understanding the disease, particularly regarding its immunological basis and hereditary nature.

In our study, logistic regression analysis revealed that females, younger participants (aged 19-30 years), and individuals employed in the healthcare sector were more likely to demonstrate knowledge about vitiligo compared to others, where this increased knowledge among these groups may be due to that vitiligo is more prevalent among females and individuals aged less than 30 years^{1,31}, also health care providers believed to be knowledgeable about vitiligo⁵⁸.

Based on the study findings, it is highly recommended prioritizing awareness campaigns in Saudi Arabia based on the significant findings of the vitiligo study. The research underscores the condition's high prevalence and its profound psychological impact, including feelings of isolation and low self-esteem. There is a clear need for targeted educational initiatives to dispel misconceptions and promote understanding, particularly among demographics with lower knowledge levels. Collaboration with healthcare professionals, especially considering their higher awareness levels, could be instrumental. Additionally, addressing economic barriers to treatment and ensuring equitable access to healthcare services should be key considerations in future interventions. This multifaceted approach has the potential to enhance both public awareness and support for individuals with vitiligo, significantly improving their quality of life.

CONCLUSION

It is strongly suggested that Saudi Arabia put awareness efforts at the top of its list of priorities. The study shows how common the condition is and how deeply it affects people's minds, causing them to feel alone and have low self-esteem. It is clear that focused educational programs are needed to clear up misunderstandings and improve understanding, especially among groups that don't

know much already. Working together with health care workers could be very helpful, especially since they are more aware of the issues. Also, getting rid of financial barriers to treatment and making sure everyone has equal access to healthcare services should be important parts of future actions. This multifaceted method could raise public awareness and get more people to help people with vitiligo, which would make their quality of life much better.

Author Contributions

A.K.A supervised this study in term of methodology, statistical analysis and rafting. All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Ethics Approval and Informed Consent:

The study was approved by the Research Ethics Committee at King Faisal University, Saudi Arabia (KFU-REC-2022-OCT-ETHICS233). This study was performed in accordance with the principles stated in the Declaration of Helsinki. All participants gave their consent before being involved in this study.

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