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Health-related Quality of life among patients with Ankylosing Spondylitis and its correlation with disease-related variables. A Cross-Sectional Study in Erbil City

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Abstract

Background and objectives: Ankylosing spondylitis is a chronic, rheumatic, inflammatory disease that basically involves axial skeleton. As a result, functional limitations develop that may negatively affect quality of life. Our aim is to assess the quality-of-life in patients with ankylosing spondylitis and to determine its' correlation with disease variables including disease activity, functional status, spinal mobility, and bodily pain.

Methods: A cross-sectional study enrolled fifty patients with ankylosing spondylitis in the Rizgari teaching hospital was conducted between November 2022 to March 2023. Both short form-36 and ankylosing spondylitis quality of life instruments were used to evaluate Health related quality of life. Bath Disease Activity Index, Bath Functional Index, Bath Metrology Index, and total pain visual analogue scale used to assess disease related variables.

Results: fifty patients aged (20-50) years participated, their mean age was (35.4), the majority (80%) were males. The peripheral joints were involved in 42% of these patients. The mean ankylosing spondylitis quality of life score was 8.7 ± (4.6) SD, short form-36 domains of physical role limitation, general health, vitality, and bodily pain had the lowest scores (43.5, 44.6, 45.8, 50.7) respectively. both Bath disease activity index (B = 1.047; p = 0.010) and Bath functional index (B=0.974; p=0.012) were poor predictors of Ankylosing Spondylitis Quality of Life score, while Bath Metrology Index (B = -3.444; p = 0.043) was the main predictor for physical functioning.

Conclusion: The health-related Quality of life in participants was significantly impaired. High disease activity, poor functional status and limitation in spinal mobility were recognized as poor predictors of Health-related quality of life.

Keywords: Ankylosing spondylitis (AS), Health-related quality of life (HRQoL).

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Introduction

Ankylosing spondylitis (AS) is a chronic rheumatic inflammatory disease that predominantly involves sacroiliac joints and axial skeleton, it causes stiffness and chronic back pain, and may cause vertebral fusion. Moreover, Ankylosing Spondylitis affects entheses and peripheral joints on a frequent basis along with extra-articular manifestations, additionally· AS may lead to reduced spinal mobility and permanent structural damage.[1] The early features of AS usually start in early twenties with a male to female ratio of about 2-3:1 [2] ,and its prevalence ranges from (0.1 to 1.4%).[1] The major symptoms of this disease are joint stiffness, pain, Fatigue, and gradual spinal mobility loss that leads to severe functional limitations and impaired wellbeing.[1] Moreover, AS affects adults in their working years, leading to work related incapabilities and carrier issues that significantly affect socioeconomic burden [3] ,alone or collectively these negative constituents result in decreased quality of life (QOL) in AS patients.[4] Recently, quality of life evaluation has gained a growing interest in chronic incapacitating diseases including AS [5] ,because AS negatively affect various aspects of life measures including physical functioning, fatigue, pain, and psychological wellbeing [6] ,moreover Health-Related Quality of Life (HRQoL) has been widely identified as a major indicator of AS total burden.[7] A meta-analysis revealed that Ankylosing spondylitis' effect on health-related quality of life is like rheumatoid arthritis and greater than type II diabetes mellitus.[8] "Quality of life (QoL) is defined as individuals' perceptions of their position in life according to their values and cultural background in which they live and in relation to their standards, expectations, goals, and concerns". [9] Generally, two main ways are used for evaluating quality of life (QoL) in patients; a generic instrument like SF-36 questionnaire that give a general summary on QoL, and a disease specific instrument that focus on specific issues of a particular disease like Ankylosing Spondylitis Quality of Life (ASQoL) questionnaire in AS.[5,10] Generic short form-36 (SF-36) instrument is a well-known health survey questionnaire that has been widely used for measuring Health-Related Quality of Life in musculoskeletal and rheumatological disorders [10] ,it consists of eight subscales to measure both physical and mental aspects of health status.[11] Ankylosing spondylitis quality of life (ASQoL) questionnaire is a simple, effective, and a dependable disease specific instrument used to assess AS impact on various aspects of QoL from the patient's viewpoint. For this reason, it can be considered as a representative instrument in assessing health status, and disease outcome in AS patients.[5] The aim of the present study is to assess the quality-of-life (QoL) in AS patients using generic (SF-36) and the disease specific (ASQoL), and to determine their correlation with disease related variables including disease activity, functional status, spinal mobility, and total bodily pain.

Patients and methods

This study is a cross-sectional study which included fifty AS patients in both inpatient and outpatient units of the rheumatology department in Rizgari teaching hospital in Erbil city. Data was collected between (November 2022 to March 2023), patients between (20-50) years old, who fulfilled the "modified New York criteria" [12] , for diagnosis of ankylosing spondylitis and were able to verbally communicate without obvious mental or cognitive disability were included in this study. Patients with other rheumatological diseases or any concurrent chronic diseases, and patients with hip, pelvis, spine surgery were excluded. Patients' data reported by using a paper-based questionnaire. Basic characteristics and socio-demographic data obtained, and all

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participants assessed by complete clinical examination. Disease related variables include (disease activity, functional status, spinal mobility and total bodily pain) all assed by using their special forms, like disease activity is measured by using Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and Ankylosing Spondylitis Disease Activity Score (ASDAS-ESR). Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) is a form that consists of six questions about five major symptoms of AS during the last week, using 10 cm visual analog scale to answer, start with 0 (no disease activity) to 10 (high disease activity). [13] Ankylosing Spondylitis Disease Activity Score (ASDAS) joins both objective and patient-claimed points and lab inflammatory markers (CRP or ESR) to assess the disease activity.[14] Bath Ankylosing Spondylitis Functional Index (BASFI) was used to evaluate the functional status which contains 10 questions on daily functioning during last month. With values between 0 and 10, '10' indicates the worst functional condition.[15] Bath Ankylosing Spondylitis Metrology Index (BASMI) is used to assess spinal mobility, it consists of four spinal and one hip measurements. The higher the BASMI score the more severe the patient's movement limitation because of AS.[13] The severity of the total pain and fatigue evaluated by a 10-cm horizontal line pain Visual Analogue Scale (VAS) score.[13] Generic SF-36 questionnaire used to assess QoL of the patients, that contains 36 items to measures eight aspects of health status during the last four weeks, these items grouped in to eight domains that include "physical functioning, physical role limitation, general health, bodily pain, emotional role limitation, social functioning, vitality, and mental health". The first four domains represent the Physical Component Summary (PCS), while the rest represent Mental Component Summary (MCS), their scores range from (0-100) with lower scores representing worse quality of life.[11] The specific Ankylosing spondylitis quality of life (ASQol) questionnaire used to assess disease specific Quality of Life; this questionnaire contains 18 yes or no questions about the impacts of AS on patients' life at the current moment. With a score ranges from (0 to 18), the lower the score the better the quality of life.[5] Statistical Package for Social Sciences (SPSS, version 26) used to analyze data. The mean ranks of two groups compared by using Mann-Whitney test. The Spearman correlation coefficient (rho) was calculated to assess the strength of correlations. Multiple regression analysis was used to detect the predictors of QoL. A p value of ≤ 0.05 was considered statistically significant. The purpose of this study was explained to each participant and Clinical permission obtained by informed verbal consent. The study was submitted to Ethics and Scientific committees of Kurdistan Higher Council of Medical specialties for scientific and ethical approval (Number 9).

Results

Fifty patients with ankylosing spondylitis (AS) enrolled in this study. Their age was between (20-50) years, their mean age (SD) was 35.4 ± (8.6) years. Most of them (80%) were males. The mean disease duration was 8.1 years ± (5.1). The peripheral joints were involved in 42% of the patients, more than half (60%) of the patients were on biologic monotherapy Table (1).

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Table (1): Demographic and clinical characteristics.

	No.	(%)
Age range (years)	(20-50)	
Mean (SD)	35.4 ± 8.6	
Male	40	(80.0)
Female	10	(20.0)
disease duration (years)	(1-25)	
Mean (SD)	8.1±5.1	
Peripheral joints involvement	21	(42.0)
No peripheral joints involvement	29	(58.0)
Biology therapy	30	(60)
Non-biologic therapy (CDMARD+ NSAID)	20	(40)
Total	50	(100.0)

The descriptive details for the following parameters are showed in Table (2): ASQOL, SF-36 QoL, pain VAS (visual analogue scale), (BASDI, and ASDAS-ESR), (BASFI), and (BASMI). The mean BASDAI was 4.9 ± (2) SD and the mean value for ASDAS-ESR was 2.7 ± (1.3) SD, and mean value for both BASFI and BASMI was (4). Mean ASQoL was 8.7 ± (4.6).

Table (2): Clinical characteristics.

	Mean	(SD)	Median	Minimum	Maximum
ESR (mm/h)	20.3	(14.5)	15.5	2	65
Total pain (VAS)	5.4	(2.5)	6.0	1	9
BASDAI	4.9	(2.0)	5.0	1.0	8.0
ASDAS-ESR	2.7	(1.3)	2.9	1.0	5.5
BASFI	4.0	(2.1)	3.6	1.0	8.0
BASMI	4.0	(1.9)	3.5	1.5	8.5
ASQOL	8.7	(4.6)	8.5	2	16
SF-36 QoL domains					
Physical function	63.4	(22.9)	67.5	15	100
Role physical	43.5	(34.9)	50.0	0	100
Bodily pain	50.7	(27.7)	45.0	0	90
General health	44.6	(20.2)	45.0	0	85
Physical component summary	50.55				
Vitality	45.8	(27.2)	40.0	5	90
Social function	59.3	(26.0)	62.0	25	100
Role emotional	60.4	(38.6)	66.0	0	100
Mental health	53.0	(25.3)	54.0	12	92
Mental component summary	54.63				

Strong positive correlations ($p < 0.001$) were found between ASQOL and the following disease related variables: BASDAI (rho=0.902), ASDAS-ESR (rho=0.868), BASFI (rho=0.703), total pain (rho=0.835). Significant ($p < 0.001$) negative correlations were detected between all SF-36 subscale scores and the mentioned disease variables. Most of these correlations were considered as strong correlations (rho > 0.7), BASDAI was

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major contributor to all domains of SF-36 and its strongest correlation was with vitality (rho=-0.919), while BASFI and BASMI had highest association (rho= -0.868, rho= -0.786) with physical functioning respectively, Table (3).

Table (3): The Correlation between QoL scores and disease related variables.

Variables / scores		BASDAI	ASDAS ESR	BASFI	BASMI	Total Pain VAS	p value
ASQOL SF-36	rho	0.902	0.868	0.867	0.703	0.835	<0.001
Physical functioning	rho	-0.829	-0.765	-0.868	-0.786	-0.814	<0.001
Role physical	rho	-0.852	-0.754	-0.802	-0.699	-0.815	<0.001
Bodily pain	rho	-0.87	-0.797	-0.755	-0.571	-0.81	<0.001
General health	rho	-0.715	-0.697	-0.726	-0.576	-0.715	<0.001
Vitality	rho	-0.919	-0.818	-0.814	-0.658	-0.885	<0.001
Social functioning	rho	-0.854	-0.794	-0.726	-0.578	-0.81	<0.001
Role emotional	rho	-0.78	-0.721	-0.716	-0.642	-0.724	<0.001
Mental health	rho	-0.866	-0.765	-0.755	-0.593	-0.824	<0.001

The mean and mean rank of the ASQOL among patients with peripheral joint involvement were (12.19 and 36.55) respectively, they were significantly higher than patients with no joint involvement (6.21 and 17.5) respectively, (p value< 0.001). The mean and mean rank of the SF-36 QoL eight subscales were significantly (p < 0.001) low among those with joint involvement than those with no joint involvement with the lowest score reported in physical role limitation mean and mean rank (19.05 and 15.52) respectively, Table (4).

Table (4): Quality of life (ASQoL and SF-36) scores by joint involvement.

	Peripheral Joint Involvement (n=21)			No Peripheral Joint Involvement (n=29)			
	Mean	(SD)	Mean Rank	Mean	(SD)	Mean Rank	p value
ASQOL	12.19	(3.17)	36.55	6.21	(3.73)	17.50	< 0.001
SF-36 domains							
Physical functioning	47.38	(21.31)	15.24	75.00	(16.15)	32.93	< 0.001
Role physical	19.05	(26.11)	15.52	61.21	(29.57)	32.72	< 0.001
Bodily pain	30.81	(19.33)	15.12	65.10	(23.66)	33.02	< 0.001
General health	32.62	(18.82)	16.98	53.28	(16.71)	31.67	< 0.001
Vitality	25.71	(18.05)	14.43	60.38	(23.30)	33.52	< 0.001
Social functioning	44.19	(19.64)	16.86	70.31	(24.65)	31.76	< 0.001
Role emotional	34.52	(33.98)	15.76	79.21	(30.17)	32.55	< 0.001
Mental health	35.67	(19.19)	15.45	65.52	(21.60)	32.78	< 0.001

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Multiple regression analysis showed the significant positive correlation between ASQoL with BASDAI (B=1.047; P=0.010), and BASFI (B= 0.974; P=0.012), while physical functioning (PF) was found to be correlated negatively with BASMI (B = -3.444; p = 0.043), and bodily pain (B = -2.845; p = 0.047), Table (5).

Table (5): Multiple regression analysis for the predictors of ASQoL and physical functioning subscale of SF-36.

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
ASQoL	B	Std. Error	Beta	T	p	Lower Bound	Upper Bound
(Constant)	-1.227	0.828		-1.482	0.146	-2.897	0.442
BASDAI	1.047	0.390	0.467	2.684	0.010	0.260	1.833
BASFI	0.974	0.370	0.451	2.633	0.012	0.228	1.720
Physical Functioning							
(Constant)	113.145	4.778		23.681	0.000	103.510	122.781
Total pain	-2.845	1.388	-0.310	-2.049	0.047	-5.644	-0.045
BASMI	-3.444	1.655	-0.289	-2.081	0.043	-6.781	-0.106

Discussion

Assessing QoL in patients with Ankylosing spondylitis is a difficult concept since AS has a frequent and not negligible impact on patients' health related quality of life, with a variety of physical, social, and mental impairments.[16] In this study, all SF-36 subscale scores were low, but "physical role limitation, general health, vitality, and bodily pain" were the most affected health aspects, their mean values were (43.5, 44.6, 45.8, 50.7) respectively. Similarly, both Ozdemir [4], and Alkan et al.[17] , reported the same findings in their studies. This might be due to nearly the same socio-demographic and clinical characteristics of patients recruited in these studies.While both Elolemy et al.[13] ,and Huang et al.[18], reported that physical domains are more impaired than mental domains in patients with AS. The results of our study showed that both physical and mental components of SF-36 were affected to nearly the same level (mean=50.55, and 54.63) respectively. This can be explained by the different disease perception of our patients, besides their patient groups were older in age with longer disease duration and more physical impairment than our patients. In support with our study, Alkan et al.[17] ,and Ibn Yacoub et al.[19], reported the same results. The mean ASQoL in our patients was 8.7±(4.6SD) which was comparable to those obtained by Elolemy et al.[13], (mean= 8.8 ±3.6). While different scores reported by different studies [20,21], these variations might be assigned to different socio-demographic characteristics, and disease patterns of patients enrolled in these studies. The results of correlation analyses for both SF-36 and ASQoL with disease related variables showed that ASQoL had a strong correlation with BASDAI, ASDAS, BASFI, and total bodily pain (rho= 0.902, 0.868, 0.703, 0.835) respectively (p value<0.001). in agreement with our findings Sallam et al.[22], emphasized that ASQoL has strong correlation with disease activity followed by functional limitation. The disease activity's rank was first among variables that influenced the quality of life in our patients. All domains of SF-36 were strongly correlated (rho > 0.7), with BASDAI, BASFI, and total bodily pain.

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BASDAI was a major contributor to all domains of SF-36 and its strongest correlations were noted with vitality (rho=-0.919, p/0.001), and bodily pain (rho=-0.870, p/0.001), Similarly, Ozdimir et al.[4] ,determined that BASDAI (rho=-0.599 / 0.001) has the strongest correlation with vitality, and total bodily pain. This might be because most of our patients were in an active disease state as their mean BASDAI was (4.9), this resulted in more bodily pain and worse vitality. On the other hand, BASFI and BASMI were closely associated with physical function subscale (rho= -0.868, rho= -0.786 p/0.001) respectively. However, in disagreement with our results, Ibn Yacoub et al.[19] revealed that a lower functional ability (BASFI score), and spinal mobility index (BASMI score) are leading factors in deteriorating SF-36 subscales in AS patients in comparison to disease activity index (BASDAI). This is because their patients had more functional disability than our patients with 8% of them had total joint replacement due to AS. But in our study, we exclude patients with joint replacement. Although the main characteristic feature of AS is axial involvement, different prevalence of peripheral arthritis (20–51%) was recorded by different studies. The incidence of peripheral involvement in our study was (42%), a similar result was reported by Huang et al.[18], (45%). The mean and mean rank of the ASQoL among patients with peripheral joint involvement (12.19 and 36.55), were significantly higher than that of patients with no joint involvement (6.21 and 17.5 respectively), ($p < 0.001$). similarly sallam et al.[22] ,stated that the score of ASQol is significantly higher in patients with peripheral joint involvement in comparison to patients without peripheral arthritis (11.4 ± 3.1 VS 7.3 ± 3.4, $p < 0.001$), besides, the mean and mean rank of all SF-36 domains were significantly ($p < 0.001$) lower among those with joint involvement than those without joint involvement, with the lowest scores recorded in physical role limitation and vitality (mean=19.05, mean=25.71) respectively, ($P<0.001$). These results indicate that peripheral joint involvement affected both physical and mental aspects of HRQol in our patients. Similarly, Yilmaz et al.[23] revealed significantly ($P<0.05$) low scores in all SF-36 domains, and higher scores in ASQol (11.24), in comparison to patients without peripheral arthritis. Results of regression analysis for ASQol, and physical functioning subscale of SF-36 showed BASDAI ($B = 1.047$; $p = 0.010$) and BASFI ($B = 0.974$; $p = 0.012$) as the main poor predictors for ASQol , Similarly, Sallam et al.[22] ,reported that the strongest predictors of ASQoL were disease activity BASDAI ($B = 1.08$; $p = 0.02$) and functional disability BASFI ($B = 0.79$; $p = 0.04$). This similarity is because of same number of patients with similar age group, disease duration nearly equal disease variable scores of both study group. Regarding physical functioning subscale, it was found to be negatively correlated with BASMI ($B = -3.444$; $p = 0.043$) and total pain ($B = -2.845$; $p = 0.047$). Similarly, Elolemy et al.[13], showed BASMI ($B = -3.45$, $P < 0.028$) as a major contributing factor for physical functioning in patients with AS, On the other hand Huang et al.[18], in their multiple regression analysis identified BASFI ($p<0.001$) as the main predicting variable affecting physical functioning, this disparity may be due to larger sample size, longer disease duration and more physical impairment in their patients, as nearly one third of them had severe kyphosis. The findings in our study shared many similarities with larger studies of other countries, suggesting that the perception of quality of life is nearly the same in this group of AS patients. Moreover, not all concerns of patients regarding their health status could be covered totally by using these instruments.

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Study limitations are the following: single center study, limited number of participants recruited in, and heterogeneity of patients regarding disease activity and duration.

Conclusion

In this study QoL was impaired in patients with AS by both instruments (ASQol and SF-36). Disease activity, functional status, spinal mobility, and total bodily pain correlated significantly with Qol scores especially in patients with peripheral joint involvement. BASDAI and BASFI are recognized as major poor predictors of ASQol, while BASMI and bodily pain were major predictors of SF-36. Both instruments have similar achievements in evaluating quality of life in AS patients. Thus, using them together can give better evaluation of patients' health status.

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Conflict of Interest:
The authors have no conflict of interests to declare.

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