

1. Consistency of items for Moral Injury.

Subjects	Number of questions regarding MI	Cronbach's alpha
Interventional Radiologists	10	0.71

Cronbach's alpha = 0.71 shows good reliability ($\alpha > 0.7$) of the 10 items that represent MI.

Note: Reliability for Quality of Life (QOL) is not validated since there is only one question for QOL.

2. Descriptive statistics

name	stats	N	missing	rate
Q1. With which of the following concepts are you familiar		365	0	0.00%
- Burnout only	209 (57.3%)			
- Moral injury only	1 (0.3%)			
- Both burnout and moral injury	155 (42.5%)			
Q2. How did you hear about this survey		365	0	0.00%
-Professional society-based communication	112 (30.7%)			
-Twitter	192 (52.6%)			
-Facebook	2 (0.5%)			
-LinkedIn	12 (3.3%)			
-Instagram	1 (0.3%)			
-Email	27 (7.4%)			
-etc	19 (5.2%)			
Q3. I am		365	0	0.00%
- A practicing interventional radiologist	299 (81.9%)			
- An interventional radiologist in training	66 (18.1%)			
Q4. How many years have you been in practice		365	0	0.00%
- Currently in training	57 (15.6%)			
- <1 year	23 (6.3%)			
- 1-10 years	157 (43.0%)			
- 10-20 years	73 (20.0%)			
- >20 years	55 (15.1%)			
Q5. Which country do you practice in	unique values 32	365	0	0.00%
Q6. What is your gender		365	0	0.00%
- Male	299 (81.9%)			
- Female	65 (17.8%)			
- Prefer not to say	1 (0.3%)			

Q7. What is your race ethnicity		365	0	0.00%
- Asian	77 (21.1%)			
- Black or African American	15 (4.1%)			
- Hispanic/Latinx	23 (6.3%)			
- White	206 (56.4%)			
- Mixed race	14 (3.8%)			
- Other	17 (4.7%)			
- Prefer not to say	13 (3.6%)			
Q8. What is your marital status		365	0	0.00%
- Single	61 (16.7%)			
- Long-term partner	31 (8.5%)			
- Married	268 (73.4%)			
- Prefer not to say	5 (1.4%)			
Q9. What best describes your practice		365	0	0.00%
- Academic	146 (40.0%)			
- Community	121 (33.2%)			
- Hybrid	84 (23.0%)			
- Other	14 (3.8%)			
Q10. Do you practice at more than one hospital		365	0	0.00%
- Yes	247 (67.7%)			
- No	118 (32.3%)			

3. Correlation analysis between MI and QOL

The correlation coefficient r is estimated by -0.368 with the p -value <0.001 . It implies that there is a strong negative linear correlation between MI and QOL. QOL tends to decrease as MI increases.

4. Prevalence of MI

Variable		N	Mean	Sd	t	p-value
Moral Injury	MI_Yes	223 (61.1%)	47.4	9.64	24.237	< 0.001
	MI_No	142 (38.9%)	28.0	5.68		

The average of the moral injury scores in the moral injury group is 47.4, which is higher than that of the normal group, 28.0, and this difference is statistically significant at the significance

level of 5%.

Describe

5. Tests for the mean difference of MI and QOL depending on the groups (e.g., The mean MI scores for practicing and training groups are not significantly different at the significance level of 0.05).

A t-test and ANOVA are conducted for two groups and multiple groups, respectively. The significance level is set as 0.05.

(1) Moral injury or not

Two sample t-test (Welch)

Variable		N	Mean	Sd	t	p-value
Moral Injury	MI_Yes	223 (61.1%)	47.4	9.64	24.237	< 0.001
	MI_No	142 (38.9%)	28.0	5.68		
Quality of Life	MI_Yes	223 (61.1%)	67.6	17.0	-5.035	< 0.001
	MI_No	142 (38.9%)	76.6	16.0		

(MI) The mean MI scores are significantly different for moral injury and normal groups.

(QoL) The mean QOL scores are significantly different for moral injury and normal groups.

* MI: The equal variance assumption does not hold. (Welch t-test)

The average of the moral injury scores in the moral injury group is 47.4, which is higher than that of the normal group, 28.0, and this difference is statistically significant at the significance level of 5%.

The average of the Quality of Life scores in the moral injury group is 67.6, which is lower than that of the normal group, 76.6, and this difference is statistically significant at the significance level of 5%.

(2) Practicing or training radiology groups

Two sample t-test (Welch)

Variable		N	Mean	Sd	t	p-value
Moral Injury	Practicing	299 (81.9%)	40.3	12.9	1.364	0.173
	Training	66 (18.1%)	38.0	11.0		

Quality of Life	Practicing	299 (81.9%)	70.6	17.5	-1.313	0.190
	Training	66 (18.1%)	73.6	15.4		

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

The average of the moral injury scores in the practicing group is 40.3, which is higher than that of the training group, 38.0, and this difference is not statistically significant.

The average of the Quality of Life scores in the practicing group is 70.6, which is lower than that of the training group, 73.6, and this difference is not statistically significant.

(3) Sex: Male and female groups. 'prefer not to say' is removed

Two sample t-test (Welch)_'prefer not to say' removed

Variable		N	Mean	Sd	t	p-value
Moral Injury	Male	299 (81.9%)	39.4	12.2	-1.545	0.123
	Female	65 (17.8%)	42.1	14.2		
Quality of Life	Male	299 (81.9%)	71.6	17.0	1.199	0.231
	Female	65 (17.8%)	68.8	17.6		

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

The average of the moral injury scores in the male group is 39.4, which is lower than that of the female group, 42.1, and this difference is not statistically significant.

The average of the Quality of Life scores in the male group is 71.6, which is higher than that of the training group, 68.8, and this difference is not statistically significant.

(4) Sex: Male and not male (female + prefer not to say) groups.

Two sample t-test (Welch)

Variable		N	Mean	Sd	t	p-value
Moral Injury	Male	299 (81.9%)	39.4	12.2	-1.420	0.156
	Not Male	66 (18.1%)	41.9	14.2		
Quality of Life	Male	299 (81.9%)	71.6	17.0	1.068	0.286
	Not Male	66 (18.1%)	69.1	17.7		

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

The average of the moral injury scores in the male group is 39.4, which is lower than that of the not male group, 41.9, and this difference is not statistically significant.

The average of the Quality of Life scores in the male group is 71.6, which is higher than that of the not male group, 69.1, and this difference is not statistically significant.

(5) Married or not married (single + long-term partner + prefer not to say) radiology groups.

Two sample t-test (Welch)

Variable		N	Mean	Sd	t	p-value
Moral Injury	Married	268 (73.4%)	39.1	11.9	-1.697	0.092 .
	Not Married	97 (26.6%)	41.9	14.4		
Quality of Life	Married	268 (73.4%)	71.7	17.4	1.100	0.272
	Not Married	97 (26.6%)	69.5	16.5		

Q8_edt2. Male or not

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

* MI: The equal variance assumption does not hold. (Welch t-test)

The average of the moral injury scores in the married group is 39.1, which is lower than that of the not married group, 41.9, and this difference is not statistically significant.

The average of the Quality of Life scores in the married group is 71.7, which is higher than that of the not married group, 69.5, and this difference is not statistically significant.

(6) Practice more than one hospital or not radiology groups.

Two sample t-test (Welch)

Variable		N	Mean	sd	t	p-value
Moral Injury	Practice More than one	247 (67.7%)	39.5	11.9	-0.817	0.415
	Practice not more than one	118 (32.3%)	40.7	14.0		
Quality of Life	Practice	247 (67.7%)	71.8	16.8	1.048	0.295

	More than one					
	Practice not more than one	118 (32.3%)	69.8	17.9		

Q10. practice at more than one hospital

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

* MI: The equal variance assumption does not hold. (Welch t-test)

The average of the moral injury scores in the practice more than one hospital group is 39.5, which is lower than that of the practice not more than one hospital group, 40.7, and this difference is not statistically significant.

The average of the Quality of Life scores in the practice more than one hospital group is 71.8, which is higher than that of the practice not more than one hospital group, 69.8, and this difference is as not statistically significant.

(7) Practicing years radiology groups.

ANOVA__ Q4. Practicing years

Variable		n	Mean	Sd	F	p-value
MI	Currently in training	57 (15.6%)	37.9	10.7	3.239	0.013 *
	<1 year	23 (6.3%)	36.5	13.8		
	1-10 years	157 (43.0%)	40.5	12.6		
	10-20 years	73 (20.0%)	43.5	13.6		
	>20 years	55 (15.1%)	36.8	11.5		
QoL	Currently in training	57 (15.6%)	73.3	15.3	2.049	0.087 .
	<1 year	23 (6.3%)	70.7	21.3		
	1-10 years	157 (43.0%)	71.6	16.0		
	10-20 years	73 (20.0%)	66.4	16.9		
	>20 years	55 (15.1%)	73.9	19.8		

(MI) The mean MI scores are significantly different for practicing years groups.

(QoL) The mean QOL scores are not significantly different.

The average moral injury score by practicing years is the highest in '10-20 years' with 43.5 points, followed by '1-10 years' 40.5, 'Currently in training' 37.9, '>20 years' 36.8, and '<1 year' 36.5, statistically significant at the significance level of 5%.

The average quality of life score by practicing years is the highest in '>20 years' with 73.9 points, followed by 'currently in training' 73.3, '1-10 years' 71.6, '<1 year' 70.7, and '10-20 years' 66.4, no statistically significant difference.

TukeyHSD_MI

Variable #	diff	lwr	upr	p.adj
02-01	-1.391	-9.833	7.052	0.991
03-01	2.572	-2.713	7.857	0.670
04-01	5.595	-0.446	11.635	0.084
05-01	-1.094	-7.554	5.366	0.990
03-02	3.962	-3.668	11.593	0.613
04-02	6.985	-1.187	15.157	0.134
05-02	0.296	-8.190	8.783	1.000
04-03	3.023	-1.819	7.864	0.428
05-03	-3.666	-9.021	1.689	0.332
05-04	-6.689	-12.791	-0.586	0.024

From the Tukey test, the average difference of the moral injury scores between the '>20 years'(5) and '10-20 years'(4) is statistically significant at the significance level of 5%.

TukeyHSD_QoL

Variable #	diff	lwr	upr	p.adj
02-01	-2.577	-14.125	8.971	0.973
03-01	-1.730	-8.959	5.499	0.965
04-01	-6.932	-15.195	1.331	0.147
05-01	0.611	-8.224	9.447	1.000
03-02	0.847	-9.590	11.284	0.999
04-02	-4.356	-15.534	6.823	0.823
05-02	3.188	-8.420	14.796	0.944
04-03	-5.202	-11.825	1.420	0.200
05-03	2.341	-4.984	9.666	0.905

05-04	7.544	-0.803	15.891	0.098
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From the Tukey test, the average difference of the quality of life scores between the '>20 years'(5) and '10-20 years'{4} is statistically significant at the significance level of 5%.

(8) Practice type radiology groups.

ANOVA_ Q9. Practice type

Variable		n	Mean	Sd	F	p-value
MI	Academic	146 (40.0%)	40.1	14.4	1.459	0.225
	Community	121 (33.2%)	38.2	11.3		
	Hybrid	84 (23.0%)	41.9	10.9		
	Other	14 (3.8%)	39.6	12.5		
QoL	Academic	146 (40.0%)	70.2	17.5	0.424	0.736
	Community	121 (33.2%)	71.9	18.9		
	Hybrid	84 (23.0%)	71.0	14.0		
	Other	14 (3.8%)	74.6	15.5		

Q9. Practice type

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

The average moral injury score by practice type is the highest in hybrid with 41.9 points, followed by academic 40.1, other 39.6, and community 38.2, with no statistically significant difference.

The average quality of life score by practice type is the highest in other with 74.6 points, followed by community 71.9, hybrid 71.0, and Academic 70.2, with no statistically significant difference.

(9) Race/ethnicity(Black + Hispanic/Latin) radiology groups.

ANOVA_ Q7 _edt. Race/ethnicity_v

Variable		n	Mean	Sd	F	p-value
MI	Asian	77 (21.1%)	38.8	12.3	0.046	0.831
	White	206 (56.4%)	40.3	12.8		

	Black & Hispanic/Latin	38 (10.4%)	41.2	14.5		
	Other	44 (12.1%)	38.9	10.6		
QoL	Asian	77 (21.1%)	71.2	16.3	0.434	0.511
	White	206 (56.4%)	71.8	17.2		
	Black & Hispanic/Latin	38 (10.4%)	68.3	16.2		
	Other	44 (12.1%)	70.2	19.3		

Q7_edt. Race ethnicity_v

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

The average moral injury score by race/ ethnicity (Black + Hispanic/Latin) is the highest in Black & Hispanic/Latin with 41.2 points, followed by White 40.3, other 38.9, and Asian 38.8, with no statistically significant difference.

The average quality of life score by race/ ethnicity (Black + Hispanic/Latin) is the highest in White with 71.8 points, followed by Asian 71.2, other 70.2, and Black & Hispanic/Latin 68.3, with no statistically significant difference.

(10) Marital status (Long-term partner + prefer not to say) radiology groups.

ANOVA_ Q8_edt3. Marital status_v

Variable		n	Mean	Sd	F	p-value
MI	Single	61 (16.7%)	41.1	13.9	0.172	0.679
	Married	268 (73.4%)	39.1	11.9		
	Long-term partner & Prefer not to say	36 (9.9%)	43.3	15.3		
QoL	Single	61 (16.7%)	68.4	16.6	0.994	0.319
	Married	268 (73.4%)	71.7	17.4		
	Long-term partner & Prefer not to	36 (9.9%)	71.2	16.3		

	say					
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- Marital status v3

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

The average moral injury score by marital status (Long-term partner + prefer not to say) is the highest in long-term partner & prefer not to say with 43.3 points, followed by single 41.1, and married 39.1, with no statistically significant difference.

The average quality of life score by marital status (Long-term partner + prefer not to say) is the highest in married with 71.7 points, followed by long-term partner & prefer not to say 71.2, and single 68.4, with no statistically significant difference.

(11) Practice type radiology groups.

ANOVA_ Q9_edt3. Practice type_v

Variable		n	Mean	Sd	F	p-value
MI	Academic	146 (40.0%)	40.1	14.4	0.449	0.503
	Community	121 (33.2%)	38.2	11.3		
	Hybrid & Other	98 (26.8%)	41.6	11.1		
QoL	Academic	146 (40.0%)	70.2	17.5	0.460	0.498
	Community	121 (33.2%)	71.9	18.9		
	Hybrid & Other	98 (26.8%)	71.6	14.2		

- Practice type v3

(MI) The mean MI scores are not significantly different.

(QoL) The mean QOL scores are not significantly different.

The average moral injury score by practice type is the highest in Hybrid & Other with 41.6 points, followed by Academic 40.1, and Community 38.2, with no statistically significant difference.

The average quality of life score by practice type is the highest in Community with 71.9 points, followed by Hybrid & Other 71.6, and Academic 70.2, with no statistically significant difference.