

Psychological flexibility, cognitive emotion regulation and mental health outcomes among patients with asthma in Pakistan

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Background/Objective: Adults with asthma who experience difficulties in emotion regulation are prone to developing psychopathological symptoms that may affect their self-management activities and symptom control. The current research investigated the role of psychological flexibility and cognitive emotion regulation strategies in relation to mental health outcomes (psychological distress and quality of life) among patients with asthma in Pakistan. **Method:** A sample of 200 adults, diagnosed with asthma (32% men, 68% women; $M_{age} = 42.32$, $SD_{age} = 16.99$), completed the Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011) Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski, Kraaij, & Spinhoven, 2002), Depression, Anxiety, Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995) and Asthma-related Quality of Life Questionnaire (AQLQ; Juniper, Guyatt & Epstein, 1992). **Results:** Results of Pearson Product Moment Correlation showed that most of the adaptive cognitive emotion regulation strategies (positive refocusing, refocus on planning, and positive reappraisal) were positively correlated with psychological flexibility and quality of life, whereas negatively correlated with psychological distress. All the maladaptive strategies of cognitive emotion regulation had a significant inverse relationship with psychological flexibility and quality of life, while positively correlated with psychological distress. Results of serial mediation analysis through PROCESS MACRO (Hayes, 2022) showed that catastrophising and anxiety fully mediated the relationship between psychological flexibility and asthma-related quality of life. **Conclusion:** Evidence-based interventions should focus on developing psychological flexibility and identifying maladaptive patterns of cognitive emotion regulation strategies for improved mental health and quality of life outcomes for adults with asthma.

1 Psychological Flexibility, Cognitive Emotion Regulation and Mental
2 Health Outcomes among Patients with Asthma in Pakistan

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ABSTRACT

20 **Background/Objective:** Adults with asthma who experience difficulties in emotion regulation
21 are prone to developing psychopathological symptoms that may affect their self-management
22 activities and symptom control. The current research investigated the role of psychological
23 flexibility and cognitive emotion regulation strategies in relation to mental health outcomes
24 (psychological distress and quality of life) among patients with asthma in Pakistan.

25 **Method:** A sample of 200 adults, diagnosed with asthma (32% men, 68% women; $M_{age} = 42.32$,
26 $SD_{age} = 16.99$), completed the Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011)
27 Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski, Kraaij, & Spinhoven, 2002),
28 Depression, Anxiety, Stress Scale-21(DASS-21; Lovibond & Lovibond, 1995) and Asthma-
29 related Quality of Life Questionnaire (AQLQ; Juniper, Guyatt & Epstein, 1992).

30 **Results:** Results of Pearson Product Moment Correlation showed that most of the adaptive
31 cognitive emotion regulation strategies (positive refocusing, refocus on planning, and positive

32 reappraisal) were positively correlated with psychological flexibility and quality of life, whereas
33 negatively correlated with psychological distress. All the maladaptive strategies of cognitive
34 emotion regulation had a significant inverse relationship with psychological flexibility and
35 quality of life, while positively correlated with psychological distress. Results of serial
36 mediation analysis through PROCESS MACRO (Hayes, 2022) showed that catastrophising and
37 anxiety fully mediated the relationship between psychological flexibility and asthma-related
38 quality of life.

39 **Conclusion:** Evidence-based interventions should focus on developing psychological flexibility
40 and identifying maladaptive patterns of cognitive emotion regulation strategies for improved
41 mental health and quality of life outcomes for adults with asthma.

42 **Key Words:** Asthma, Psychological Flexibility, Cognitive Emotion Regulation, Mental Health,
43 Psychological Distress, Quality of Life

44

45 **Introduction**

46 Asthma is a multi-factorial chronic respiratory illness, characterized by wheezing,
47 coughing, shortness of breath and chest tightness (WHO, 2021; Global Initiative for Asthma,
48 2021). World Health Organization (2017) estimates, that there were 383000 casualties of asthma,
49 caused in 2015 around the globe. By 2025, the number of patients suffering from asthma is
50 likely to increase up to 400 million (Global Initiative for Asthma, 2017). Pakistan is the 6th most
51 populated country and more than twenty million individuals are facing asthmatic difficulties
52 (Chiesi Respiratory Diseases, 2016).

53 People suffering from any chronic illness like diabetes, chronic pain, multiple sclerosis
54 osteoporoses, and asthma etc, reported a high level of psychological distress (Mort & Philip,
55 2014) and lower quality of life (Troost et al., 2015; Preis et al., 2018). Several researches
56 indicated that almost in all three stages of asthma: onset, progression, and exacerbation (Edwards
57 et al., 2017), people suffering from asthma had reported a low level of happiness, well-being,
58 more psychological distress (anxiety, depression, & stress), and poorer quality of life in contrast
59 to healthy controls (Brumpton et al., 2013; Ampon et al., 2005) and were at more risk of having

60 asthma-related emergency room visits (Ahmedani et al., 2013). In a study conducted by Pickles
61 et al. (2018), asthma was found to be correlated with poor quality of life, exhaustion, restrictions
62 in doing daily life activities effectively, adverse impacts on well-being, as well as with reduced
63 productivity. Findings of studies conducted in Pakistan indicated that 15% of the asthmatic
64 patients experienced depressive symptoms (Motiani, Haidri & Rizvi, 2011) especially, the
65 women suffering from asthma (Malik et al., 2017). Studies further showed that emotional
66 problems related to physical illness could be considered a serious threat to a patient's quality of
67 life (Saleem, Mahmood & Naeem, 2016). In Pakistan adults with asthma experience poor health-
68 related quality of life but with the help of better medical facilities it can be improved (Malik et
69 al., 2017).

70 Certain factors could be associated with psychopathology and poorer quality of life
71 including perception or acceptance of illness such as personality dispositions (Monique &
72 Engles, 2011), psychological flexibility (Guerrini Usubini et al., 2021; Bergman & Keitel, 2020),
73 and coping strategies (Li et al., 2015; Kristofferzon, Engström & Nilsson, 2018). Psychological
74 flexibility is the most important variable of Acceptance and Commitment Therapy (ACT) and
75 emerged as a significant determinant of emotional well-being and behavioral value (Bond, Lloyd
76 & Guenole, 2013). Psychological Flexibility as an ability to build up a strong contact with the
77 present moment in presence of emotionally interfering thoughts (Hayes et al., 2006; Moran,
78 2015), has been significantly related to greater well-being (Dawson & Golijani-Moghaddam,
79 2020), a better quality of life and reduced psychological distress (Wersebe et al., 2018). Previous
80 researches suggested that Psychological Flexibility proved to be a very useful intervention for a
81 wide range of psychological disorders such as post-traumatic stress disorder, depression, anxiety,
82 stress (Powers, Vörding & Emmelkamp, 2009), and for individuals suffering from any physical
83 chronic illness (Prevedini et al., 2011). Psychological flexibility is significantly associated with
84 higher well-being among obese and enables them to make interventions for healthy living
85 (Guerrini Usubini et al., 2021). Karimzadeh and Latifi (2015) identified psychological flexibility
86 as a strong predictor of improved quality of life and reduced negative emotional consequences of
87 asthma.

88 Psychological flexibility has also been served as a coping facilitator and enhanced
89 resilience against chronic disease (Gentili et al., 2019; Vowles et al., 2014) and might be helpful

90 in the selection of adaptive coping strategies and related behaviors. Adaptive cognitive emotion
91 regulation strategies like Acceptance, Putting into perspective, Refocus on Planning, Positive
92 refocusing, Positive reappraisal (as cited in Garnefski, Kraaij & Spinhoven, 2001) and
93 psychological flexibility had a positive impact on the quality of life of the people suffering from
94 any chronic illness and enable people to cope effectively with their disease (Li et al., 2015;
95 Momeniarbat et al., 2017). In contrast to psychological flexibility, inflexibility is particularly
96 known as Experiential avoidance [(tendency to escape from challenging experiences, thoughts,
97 feelings, and situations (Hayes et al., 2006)] has found to be related to maladaptive coping and
98 poorer quality of life, well-being and impaired psychological/emotional outcomes such as
99 depression, anxiety, stress, (Fergus, Bardeen & Orcutt, 2013; Nielsen, Sayal & Townsend, 2018).
100 Maladaptive cognitive emotion regulation strategies including self-blame, rumination,
101 catastrophising, and blaming others (as cited in Garnefski, Kraaij & Spinhoven, 2001) might also
102 act as a central part in the perception of illness and also in the quality of life of the individuals
103 suffering from chronic physical illness such cancer (Postolica et al., 2017). Especially
104 Catastrophising has been reportedly linked with psychological outcomes of physical illness such
105 as poorer quality of life (Sherwin, Leary & Henderson, 2017). In an Iranian sample of asthma
106 patients, it was revealed that catastrophising proved to be a strong mediator between alexithymia
107 and physical symptoms of asthma (Ghorbani et al., 2017). So, it can be seen that when a person
108 suffers from any physiological disease, it will affect his/ her quality of life and develop
109 psychological distress among them. If the psychological flexibility is high then it will play an
110 important role in maintaining a better quality of life and decreasing emotional distress. That is
111 why it is very important to know how to cope with disease so that the quality of life will be
112 maintained. Literature provides that no study was found, that focused on the association between
113 cognitive-emotional regulation strategies and psychological flexibility with psychological
114 distress and quality of life in patients living with asthma. Thus the current research intends (a) to
115 check the association among cognitive emotion regulation coping techniques (adaptive,
116 maladaptive), psychological/emotional flexibility, and mental health outcomes (psychological
117 distress & asthma-related quality of life) among individuals suffering from asthma; (b) to explore
118 the mediating effect of psychological distress and catastrophising on the association between
119 psychological flexibility and health-related quality of life in patients with asthma.

120 **Method**

121 **Participants & Procedure**

122 This manuscript is the sub session of MS dissertation which was approved from board of
123 studies at the Department of Applied Psychology Government College University Faisalabad,
124 Pakistan (Under Reference No. Psy/206). After getting ethical approval the procedure of data
125 collection was started. At first 235 questionnaires were distributed from which 15 participants
126 refused to participate in research; 9 did not provide essential demographic information and 11
127 participants did not meet the inclusion criteria. Finally, a total sample of 200 individuals ($M_{age} =$
128 42.32 , $SD_{age} = 16.99$) above 18 years, both men ($n = 63$; $M_{age} = 48.84$, $SD_{age} = 18.97$) and women
129 ($n = 137$; $M_{age} = 39.32$, $SD_{age} = 15.16$) diagnosed with asthma since one year at least and
130 receiving treatment at the time of research, were drawn from pulmonology unit of different
131 public/private sector hospitals and clinics of Faisalabad (Pakistan). Purposive sampling
132 technique and correlational research design were followed. Patients with any other physiological
133 co-morbidity (diabetes, heart failure, kidney failure etc) and mental health problems were
134 excluded. After seeking permission from the hospital authorities and clinics, written informed
135 consent was obtained from patients diagnosed with asthma and their caregivers to fulfill the
136 ethical requirement. Participants were instructed about the questionnaires and asked to complete
137 Cognitive Emotion Regulation Questionnaire (CERQ), Acceptance and Action Questionnaire-II
138 (AAQ-II) Depression, Anxiety Stress Scale-21 (DASS-21), and Asthma Quality of Life
139 Questionnaire (AQLQ). Authors have permission to use these instruments from copy right
140 holders (permissions attached in supplementary files). Besides these questionnaires, a
141 demographic information sheet was also used to record the essential demographics of the
142 participants. It was made sure that all information was kept confidential and will use only for
143 research purposes.

144 **Instruments**

145 **1. Cognitive Emotional Regulation Questionnaire (CERQ; Garnefski, Kraaij &**
146 **Spinhoven, 2002).** CERQ is a multi-dimensional self-report instrument containing 36
147 items, measure 9 adaptive and maladaptive cognitive emotion regulation coping
148 strategies on 5 points Likert scale. Five subscales measure adaptive strategies
149 (acceptance, putting into perspective, positive refocusing, refocus on planning, & positive
150 reappraisal) while, four subscales (catastrophising, rumination, self-blame & other blame)

151 are categorized as maladaptive cognitive emotion regulation strategies. Each subscale has
152 4 items. Researches on cognitive emotion regulation questionnaire confirmed that each
153 subscale showed good reliability coefficient (.68 to .86); (Garnefski, Kraaij & Spinhoven,
154 2002). In current study Urdu version of CERQ (Butt et al., 2016) was used with adequate
155 Chronbach alpha reliability ($\alpha = .71$).

156 **2. Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011).** Acceptance and
157 Action Questionnaire (AAQ) is a measure of Psychological Flexibility/Experiential
158 Avoidance. It is 7 points Likert scale high scores indicate higher levels of psychological
159 inflexibility or experiential avoidance, while low scores indicate psychological flexibility
160 (Bond et al., 2011). It has been widely used in health-related psychological studies and
161 showed good psychometric properties (Bond et al., 2011, Zhang et al., 2017; Paladines-
162 Costa et al., 2021). For present study Urdu Version of AAQ-II (Khawar & Aslam, 2018)
163 was used.

164 **3. Depression Anxiety Stress Scale (DASS – 21; Lovibond & Lovibond, 1995).**
165 Depression Anxiety Stress Scale was developed to measure the adverse impacts of three
166 negative emotions including depression, anxiety and stress (Lovibond & Lovibond,
167 1995). The measure originally consists of 42 items on 4 point Likert scale. Its short-form
168 called DASS-21 consists of 7 items for each subscale (Lovibond & Lovibond, 1995) and
169 has been widely used across populations and cultures bearing sound psychometric
170 properties (Pezirkianidis et al., 2018; Coker, Coker & Sanni, 2018; Bibi et al., 2020). In
171 current research, Urdu version of DASS-21 was used (Farooqi & Habib, 2010).

172 **4. Asthma Quality of Life Questionnaire (AQLQ; Juniper et al., 1992).** Asthma Quality
173 of Life Questionnaire was used to assess the practical issues (psychological/emotional,
174 physical, social and everyday work-related) experienced by the patients of asthma. There
175 are 32 questions in AQLQ divided into 4 subscales including symptoms of asthma,
176 limitations in daily life activities, emotional functions and environmental stimuli. The
177 instrument provides an overall score for means of all items and mean scores for each
178 domain (Bateman et al., 2015). Participants are instructed to complete this scale about
179 how they have been experienced the last fourteen days and to answer each of the 32 items
180 on a 7 point scale (7 = not impaired at all to 1 = severely impaired). It has excellent test-

181 retest reliability ($r = 0.95$) (Juniper et al., 1992). For current research translated Urdu
182 version of AQLQ with.87 Chronbach alpha reliability, was used.

183 **5. Demographic Information Sheet.** Demographic information (age, gender, education,
184 number of family size, family system, monthly income, and duration of illness) of the
185 adults with asthma was also obtained.

186 **Results**

187 The data were analyzed through the IBM Statistical Package for Social Sciences version
188 22 (SPSS, Inc., Chicago, IL, USA). The data were interpreted in the form of two sections,
189 Section I is labeled as “Descriptive Statistics” containing all the demographic information of the
190 sample; while Section II is named as “Inferential Statistics” consisting of Correlation analysis,
191 mediation, etc. 0.05 significance level was used for analysis.

192 **Table 1 insert here**

193 Table 1 demonstrates the demographic information of the sample including age, area of
194 residence, marital status, education, duration of illness etc.

195

196 **Table 2 insert here**

197 Table 2 shows the descriptive statistics and reliability coefficients for all the study
198 measures and their subscales. Data are normally distributed as per criteria for social sciences
199 (skewness & kurtosis ± 2) defined by Gravetter and Wallnau (2014), and that is suitable for
200 parametric statistics.

201

Table 3 insert here

202

203 In table 3 the results of Pearson Product Moment correlation between all the study
204 variables were shown. Both adaptive and maladaptive cognitive emotion regulation coping
205 techniques were significantly correlated with psychological flexibility, psychological distress and
206 domains of asthma related quality of life ($p < .001$, $p < .01$, $p < .05$). All adaptive cognitive
207 emotion regulation strategies except acceptance and putting into perspective were positively
208 correlated with psychological flexibility and quality of life; while all maladaptive strategies and
209 two adaptive strategies (putting into perspective & acceptance) had a significant negative
210 association with psychological flexibility and quality of life.

211

212

Figure 1 insert here

213

214 Figure 1 showed the serial mediation analysis to identify the effect of psychological
215 flexibility on quality of life through catastrophising and anxiety; while gender and duration of
216 diagnosis of illness were taken as covariates and none of them were found to be significant.
217 Serial mediation analysis (Model 6) was performed by estimating 5000 bootstrap sample through
218 PROCESS MACRO (Hayes, 2022). Findings indicated that total effect of psychological
219 flexibility on quality of life was significant [$b = .017$, $p < .01$; C.I 95% (.007, .027)] while direct
220 effect was non-significant [$b = -.003$, C.I 95% (-.014, .008)]. On the other hand indirect effect by
221 assuming 95% C.I were as follows: [Psychological flexibility \rightarrow Catastrophising \rightarrow Quality of
222 Life ($b = .124$, C.I 95% (.022, .232)], [Psychological flexibility \rightarrow Anxiety \rightarrow Quality of Life (b
223 = .023, C.I 95% (-.039, .087)], Psychological flexibility \rightarrow Catastrophising \rightarrow Anxiety \rightarrow Quality
224 of Life ($b = .120$, C.I 95% (.068, .184)]. (see Supplementary table 4). Total indirect effect of
225 psychological flexibility on quality of life was 28%. The overall findings indicated that
226 catastrophising and anxiety serially, fully mediated the relationship between psychological
227 flexibility and quality of life. Findings showed that an increase in psychological flexibility tend
228 to decrease in catastrophising while by increasing catastrophising tend to increase in anxiety.
229 Moreover, an increase in anxiety tends to decrease in quality of life among patients with asthma.

230

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Table 4 insert here

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234 Discussion

235 The findings of current study showed that psychologically flexibility is significantly
236 correlated with lower levels of psychological distress (including depression, anxiety and stress
237 on DASS 21) and health-related quality of life (activity limitation, physical symptoms and
238 emotional function on AQLQ). This association was however stronger for depression and QoL
239 based on physical symptoms. Previous studies illustrated that psychological flexibility has been
240 constantly related to lower psychological distress and better emotional or psychological well-
241 being among individuals suffering from chronic illness (Tyndall et al., 2020; Wersebe et al.,
242 2018). Psychological flexibility could also be helpful in better disease management and leads
243 toward a better quality of life among patients suffering from chronic respiratory disease in Hong
244 Kong (Cheung & Mak, 2016). The underline mechanism of this positive association was further
245 explored in terms of cognitive emotion regulation strategies.

246 Positive link between psychological flexibility, lower level of distress and higher quality
247 of life found in present study was explored through cognitive emotion regulation strategies;
248 hence psychological flexibility and adaptive cognitive emotion regulation strategies are
249 significantly positively correlated with each other and psychological flexibility serves as a buffer
250 against psychological distress. In various researches, it was proved that psychological flexibility
251 could reduce the negative effects of current life stressors on mental health and well-being
252 (Gloster, Meyer & Lieb, 2017; Fonseca et al., 2020). Current study indicated that maladaptive
253 cognitive emotion regulation coping techniques and psychological flexibility were inversely
254 correlated with each other. AAQ-II in terms of high scores is considered as an instrument for
255 measuring experiential avoidance (Bond et al., 2011). In our study experiential
256 avoidance/inflexibility had been particularly linked with catastrophising and rumination. Both of
257 these cognitive emotion regulation strategies are not only considered maladaptive coping
258 (Garnefski & Kraaij, 2018) but also have a significant role in general cognitive distortions

259 (Mahaffey et al., 2013). Rueda and Valls (2020) revealed that psychological flexibility had an
260 indirect impact on distress and well-being mediated through avoidant coping techniques which
261 indicated that by using avoidant/maladaptive coping strategies the effect of psychological
262 flexibility turns into inflexibility and had adverse impacts on quality of life.

263 Cognitive emotion regulation strategies have been significantly linked with psychological
264 problems such as depression, anxiety, stress (Garnefski & Kraaij, 2006; 2007; Gross & Jazaieri,
265 2014; Liu & Thompson, 2017) and quality of life (Li et al., 2015, Kanwa & Iftikhar, 2019). Our
266 results indicated that adaptive cognitive emotion regulation strategies especially positive
267 refocusing, refocus on planning, and positive reappraisal were significantly negatively associated
268 with psychological distress (depression, anxiety, stress) and positively linked with asthma related
269 quality of life. Current research also highlighted the significant positive correlation between
270 maladaptive cognitive emotion regulation coping (rumination, catastrophising, self-blame, &
271 other blame) and psychological distress. Literature provides significant verdicts for these
272 findings that more use of adaptive strategies such as positive reappraisal, refocus on planning
273 and positive refocusing was negatively associated with anxiety and depression (Min et al., 2013;
274 Barberis et al., 2017) while positively linked with better quality of life (Li et al., 2015) among
275 patients with chronic illness. Rumination and self-blaming were found to be directly associated
276 with depression; catastrophising and other-blame were exclusively related to more anxious signs
277 and symptoms (Garnefski & Kraaiji, 2018). Literature proved that the person who uses
278 maladaptive cognitive coping experienced more psychological problems like depression, anxiety,
279 stress; and poor emotional well-being (Bahrami et al., 2017; Garnefski, Hossain & Kraaij, 2017).
280 In a study conducted in Serbian breast cancer patients' support our findings that catastrophising
281 and rumination are significant maladaptive cognitive coping strategies which would be helpful in
282 changing the intensity of psychological distress and reflected in person's health related quality of
283 life (Kovač et al., 2020).

284 Further, it was revealed that an increase in acceptance was highly significantly linked
285 with an increase in depression, anxiety, stress and poorer quality of life, which is consistent with
286 previous literature (Domaradzka, & Fajkowska, 2018; Dubey, Podder & Pandey, 2020; Manju,
287 2017). Although acceptance is an adaptive strategy, few studies suggested that acceptance should
288 be treated as maladaptive (Martin & Dahlen, 2005, Tuna & Bozo, 2012). As in acceptance

289 subscale, some items (I think I cannot change anything, I must learn to live with this situation
290 etc) appeared as maladaptive and may provide a sense of hopelessness or helplessness for current
291 research. Moreover, our results also showed that increased use of putting into perspective as an
292 adaptive coping strategy was significantly related to high level of depression and stress and poor
293 quality of life. Previous research also showed negative relationship between this strategy and
294 quality of life (Li et al., 2015). It may cause due to an uncertain situation of disease as when
295 individuals suffer from chronic illness it was very difficult for them to focus on thinking and
296 planning positive events or situations in their lives and it becomes more stressful. Hence, it was
297 revealed by our findings that the more one fails to put less emphasis on stressful things or
298 situations and tries to accept his/her physical illness, the more it will be depressing, stressful and
299 helpless for him/her; the more one tries to focus on positive and pleasant things in life, engaging
300 in thinking positive aspects of the situation instead of the negative situation, and making plans
301 about deciding what steps should be taken to overcome the stress, the more sense of worth he/she
302 will develop.

303 Results of serial mediation analysis using PROCESS MACRO (Hayes, 2022) revealed
304 catastrophising (maladaptive cognitive emotion regulation strategy) and anxiety mediated the
305 link between psychological flexibility and quality of life. When we introduce catastrophising as
306 mediator the effect of psychological flexibility on quality of life was diminished because the
307 higher catastrophising lowers the psychological flexibility/higher experiential avoidance and
308 leads towards the poorer quality of life. Psychological flexibility as a personality trait has shown
309 greater openness in accepting life stressors and carrying valued living. In this way, psychological
310 flexibility is positively associated with greater individual well-being and quality of life
311 (Berghoff, et al., 2014; Ramaci et al., 2019). Psychological flexibility also minimized emotional
312 distress and psychological health of patients with asthma (Karimzadeh & Latifi, 2015). It was
313 found in previous researches that coping and psychological distress (anxiety) was significantly
314 mediated between personality traits and health-related quality of life (Pereira-Morales et al.,
315 2018). Literature supports our findings that quality of life among patients suffering from asthma
316 was mediated through cognitive coping techniques (Van Lieshout & MacQueen, 2012). Previous
317 researches provide strong verdicts that among cognitive emotion regulation strategies just
318 catastrophising, plays a mediating role among alexithymia subscales and physical symptoms
319 among asthmatics patients, in this way catastrophizing intensifies the asthmatic symptoms and

320 leads toward greater psychological distress and poorer quality of life (Rieffe et al., 2010). In
321 another study, it was found that catastrophising and psychological distress significantly mediated
322 the link between pain-related fear and quality of life among people with chronic low back pain
323 (Marshall, Schabrun, & Knox, 2017). Catastrophising is directly related to psychological distress
324 and in this way more emotional issues are related to this coping style.

325 **Conclusion**

326 The present study provides one of the first looks at the role of different cognitive emotion
327 regulation strategies (adaptive, maladaptive) and gives an insight into the frequency of these
328 strategies, psychological flexibility, and their impacts on quality of life. This study will prove to
329 be a significant addition in literature not only for health psychology as well as for better asthma
330 management in medical sciences and provide strong foundations for further researches regarding
331 this issue.

332 Although the current study has provided significant contributions to the field of health
333 psychology, but the following limitations were observed: In present research, the sample was
334 obtained from few hospitals of Faisalabad due to the shortage of time, that's why many hospitals
335 from different regions were neglected. In future the data would be collected from different cities
336 in exchange for generalizability. There is no control group in this study that is a major limitation.
337 A control group would yield the more degree of evidence for results. The sample size was
338 restricted due to the shortage of time and reduces the chances of generalization of current
339 research. Some participants showed hesitation in giving their personal information. A qualitative
340 analysis should be incorporated due to the subjectivity of many factors involved. The findings of
341 current research would be implicated in health psychology and counseling for patients with
342 asthma.

343

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Table 1 (on next page)

table 1 demographics

1 **Table 1**2 **Demographic Characteristics of Study Sample (N = 200)**

Variables	Groups	Gender		Total
		Men	Women	
		<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)
Age	18 – 35 years	19 (9.5)	71 (35.5)	90 (45)
	36 – 55 years	16 (8.0)	42 (21.0)	58 (29)
	56 – 80 years	28 (14.0)	24 (12.0)	52 (26)
	Total	63 (31.5)	137 (68.5)	200 (100)
Marital Status	Single	6 (3.0)	13 (6.5)	19 (9.5)
	Married	48 (24.0)	101 (50.5)	149 (74.5)
	Separated	3 (1.5)	7 (3.5)	10 (5.0)
	Widowed/Widower	6 (3.0)	16 (8.0)	22 (11.0)
	Total	63 (31.5)	137 (68.5)	200 (100)
Area of Residence	Rural	24 (12.0)	63 (30.0)	84 (42)
	Urban	39 (19.5)	77 (38.5)	116 (58)
	Total	63 (31.5)	137 (68.5)	200 (100)
Family Type	Nuclear	38 (19.0)	98 (49.0)	136 (68)
	Joint/Extended	25 (12.5)	39 (19.5)	64 (32)
	Total	63 (31.5)	137 (68.5)	200 (100)
Monthly income	10000 – 50000	50 (25.0)	116 (58.0)	116 (83)
	51000 – 100000	12 (6.0)	18 (9.0)	30 (15)
	101000-150000	1 (0.5)	3 (1.5)	4 (2)
	Total	63 (31.5)	137 (68.5)	200 (100)
Education	Illiterate	2 (1.0)	20 (10)	22 (11)
	Middle and below	30 (15.0)	53 (26.5)	83 (41.5)
	Secondary/Higher Secondary	19 (9.5)	40 (20)	59 (29.5)
	Graduation and above	12 (6.0)	24 (12.0)	36 (18.0)
	Total	63 (31.5)	137 (68.5)	200 (100)
Duration of Illness	1 – 5 years	39 (19.5)	91 (45.5)	139 (65)
	6 – 10 years	14 (7.0)	30 (15.0)	44 (22)
	11 – 15 years	10 (5.0)	16 (8.0)	26 (13)
	Total	63 (31.5)	137 (68.5)	200 (100)

Table 2 (on next page)

table 2 descriptives

1 **Table 2**2 **Descriptive Statistics and Alpha Level of All the Study Measures and their Subscales**

Variables	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	α
AAQ-II	22.60	6.97	.68	.12	.89
CERQ					.71
Positive refocusing	11.41	3.42	.52	-.48	.80
Acceptance	12.68	2.53	-.11	-.33	.68
Positive reappraisal	11.25	3.09	.66	-.23	.76
Refocus on planning	13.63	2.65	.12	-.07	.73
Putting into perspective	12.91	2.08	-.08	1.15	.45
Self-Blame	11.68	2.35	-.29	-.27	.57
Rumination	13.09	1.95	-.81	1.67	.49
Catastrophising	14.18	3.24	-.27	-.35	.81
Other Blame	11.46	2.41	-.12	.92	.69
DASS-21 total	68.66	14.63	.12	.00	.82
Depression	22.05	6.63	-.21	.12	
Anxiety	22.85	6.02	.14	-.11	
Stress	23.76	4.84	.23	.60	
AQLQ total	3.07	.52	-.70	.34	.87
Activity limitations	3.53	.68	-.35	-.16	
Symptoms	3.22	.61	-.71	.89	
Emotional Function	2.76	.73	.17	.24	
Environmental Stimuli	3.41	.73	.08	.59	

Table 3 (on next page)

table 3 correlation

2 Table 3

3 Inter-correlation among Psychological Flexibility, Adaptive and Maladaptive Cognitive Emotion Regulation Strategies,
4 Psychological Distress and Quality of Life ($N = 200$)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.Psychological Flexibility	1																	
2.Acceptance	-.44***	1																
3.Positive Refocusing	.44***	-.54***	1															
4.Refocus on Planning	.20**	-.32***	.69***	1														
5.Positive Reappraisal	.41***	-.44***	.82***	.68***	1													
6.Putting into Perspective	-.28***	.16*	.048	.15*	.12	1												
7. Self-blame	-.47***	.51***	-.42***	-.18*	-.38***	.25***	1											
8. Rumination	-.50***	.31***	-.12	.15*	-.15*	.30***	.44***	1										
9. Catastrophising	-.59***	.63***	-.64***	-.35***	-.56***	.28***	.60***	.49***	1									
10. Other blame	-.46***	.42***	-.42***	-.34***	-.37***	.27***	.45***	.34***	.58***	1								
11.Activity limitations AQLQ	.17*	-.19**	.35***	.27***	.34***	-.06	-.21	-.10	-.32***	-.30***	1							
12.Symptoms AQLQ	.24**	-.29***	.36***	.33***	.33***	-.22**	-.22	-.12	-.40***	-.30***	.71***	1						
13.Emotional Function AQLQ	.19**	-.25***	.40***	.36***	.33***	-.13	-.24	-.07	-.36***	-.32***	.61***	.75***	1					
14.Environmental Stimuli AQLQ	.08	-.10	.04	.11	.02	-.02	-.09	-.02	-.03	-.22**	-.10	.10	.11	1				

15. AQLQ Total	.23**	-.28***	.40***	.35***	.36***	-.17*	-.25***	-.11	-.40***	-.36***	.17*	.24**	.19**	.08	1			
16. Depression	-.49***	.57***	-.55***	-.39***	-.51***	.15*	.54***	.30***	.60***	.49***	-.30***	-.40***	-.38***	-.11	-.49***	1		
17. Anxiety	-.34***	.43***	-.51***	-.44***	-.47***	.11	.36***	.12	.52***	.34***	-.44***	-.49***	-.43***	-.01	-.35***	.65***	1	
18. Stress	-.48***	.32***	-.41***	-.28***	-.40***	.22**	.47***	.31***	.52***	.46***	-.25***	-.31***	-.29***	-.12	-.48***	.55***	.39**	1

5 Note: *** $p < .001$, ** $p < .01$, * $p < .05$. AQLQ (Asthma Related Quality of Life Questionnaire)

6

7

Table 4(on next page)

table 4 mediation output

1 **Table 4**2 **Total, direct and indirect effects of Psychological Flexibility on Quality of Life**

	β	<i>SE</i>	<i>Boot C.I 95%</i>	
			<i>LL</i>	<i>UL</i>
Total Effect				
Psychological Flexibility → Quality of Life	.017	.005	.007	.027
Direct Effect				
Psychological Flexibility → Quality of Life	-.003	.006	-.014	.008
Indirect Effects				
Psychological Flexibility → Catastrophising → Quality of Life	.124	.053	.022	.232
Psychological Flexibility → Anxiety → Quality of Life	.023	.032	-.039	.087
Psychological Flexibility → Catastrophising → Anxiety → Quality of Life	.120	.030	.068	.184

Figure 1 (on next page)

figure 1 medaition

Figure 1

Mediating Effect of Catastrophising and Anxiety on the Association among Psychological Flexibility and Quality of Life

