LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
LJLLR
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

MEDIA ATTENTION AND PUBLIC RESPONSE TO CLIMATE-RELATED HEALTH RISKS IN FAISALABAD, PAKISTAN: THE MEDIATING ROLE OF PERCEIVED BENEFITS AND SELF-EFFICACY

Talha Javeed[1], Dr. Ashraf Iqbal[*2]

[1] *PhD Scholar, Department of Mass Communication, Government College University, Faisalabad, Pakistan*
[*2] *Assistant Professor, Department of Mass Communication, Government College University, Faisalabad, Pakistan*

[1]talhajaveed09@gmail.com, [*2]ashrafiqbal@gcuf.edu.pk

[1]ORCID: 0009-0004-9176-6673, [*2]ORCID: _0009-0007-8549-8045

DOI: https://doi.org/10.5281/zenodo.23663495

Keywords
Climate change, perceived benefits, self-efficacy, media attention, adherent protective behavior, Pakistan.

Article History
Received: 25 June 2026
Accepted: 16 September 2026
Published: 02 October 2026

Copyright @Author
Corresponding Author: *
Dr. Ashraf Iqbal

Abstract

Climate change has intensified air pollution into a seasonal health hazard in Pakistan, and the mass media are expected to play a role in how the public responds to it. This study examines whether attention to smog-related media messages is associated with protective behavior because it convinces people that protective actions work and that they are capable of performing them. The objectives were to examine the mediating roles of perceived benefits and self-efficacy in the relationship between media attention and adherent protective behavior. Guided by the Health Belief Model and the Extended Parallel Process Model, a cross-sectional survey was conducted with 400 adults aged 18 to 60 years, selected purposively from all six tehsils of District Faisalabad during the 2025–2026 smog season. Data were analyzed through bootstrapped mediation analysis using the PROCESS macro. Media attention was positively associated with both beliefs, and both significantly mediated its association with adherent protective behavior: perceived benefits (ab = 0.091, 95% CI [0.052, 0.134]) and self-efficacy (ab = 0.085, 95% CI [0.029, 0.140]). The two pathways were of comparable strength and together carried approximately one quarter of the total effect. The study concludes that climate-health communication is most likely to encourage protective behavior when it explains the effectiveness of protective actions and builds public confidence to perform them.

INTRODUCTION

The health effects of climate change are no longer a distant prospect for Pakistan. Heatwaves, floods, and deteriorating air quality now recur every year, and the country was ranked the most affected by climate-related extreme events in 2022 (Adil et al., 2025). Among these threats, air pollution is the one that most of the population experiences directly and repeatedly. A warming climate alters the atmospheric conditions that disperse pollutants (Szopa et al., 2021), and in Punjab the combination of stagnant winter air, crop-

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

residue burning, and urban emissions produces a dense smog every year from October to January (Majeed et al., 2024).

The health impact of this smog is well documented. Exposure has been linked to respiratory and cardiovascular disease, eye and throat irritation, and premature death (Iram et al., 2025), and the smog season places a significant burden on hospitals and clinics (Batool et al., 2024). District Faisalabad, an industrial centre of more than nine million people (Pakistan Bureau of Statistics [PBS], 2023), experiences persistently poor winter air quality (Sabir et al., 2024; Zeeshan et al., 2024). Until emissions are reduced, residents must protect themselves by wearing masks, staying at home during severe episodes, using air filters or purifiers, and adjusting their diet to cope with the effects of smog.

Mass-media communication is a key component of the public response. Smog alerts and health advisories are carried every winter by public service messages, news, documentaries, user-generated content, and social networking sites. However, much of this coverage focuses on hazard, such as hazardous air quality, low visibility, and school closures (Javed et al., 2023; Qusien, 2024). Health communication theory suggests that warnings of this type are most effective when they also convince people that protective actions are effective and that they are able to perform them (Witte, 1992). The present study examines whether attention to smog-related media messages is related to adherent protective behavior through two efficacy beliefs, namely perceived benefits, which correspond to response efficacy, and self-efficacy, as identified in the Health Belief Model (HBM; Champion & Skinner, 2008) and the Extended Parallel Process Model (EPPM; Witte, 1992).

Statement of the Problem

Despite high awareness of smog, the uptake of protective actions against air pollution in Punjab remains low. In rural Khanewal, most villagers were aware of smog but fewer than half used face masks (Yasin et al., 2025), and in South Punjab only 6.1% of adults reported that they always followed the recommended precautions (Hassan et al., 2025). This gap between awareness and action suggests that information about danger is not sufficient. Previous Pakistani studies have shown that media use is associated with smog-protective behavior (Iftikhar et al., 2024, 2025), but it remains unclear whether attention to media messages strengthens the beliefs that make protective action seem worthwhile and achievable. Moreover, evidence on these beliefs from Faisalabad is lacking.

Rationale of the Study

Medical professionals have observed that Pakistani television coverage of smog often stops short of providing actionable guidance (Mushtaq et al., 2024). If media attention is associated with protective behavior through efficacy beliefs, then coverage that explains how protective measures work and how to carry them out may be considerably more effective than coverage that only reports danger. Testing whether perceived benefits and self-efficacy mediate the association between media attention and protective behavior is therefore necessary to guide the content of climate-health communication.

Significance of the Study

Theoretically, the study integrates the HBM with the EPPM by treating perceived benefits as response efficacy and self-efficacy as personal efficacy, and by testing both as mechanisms of media influence in the context of a climate-related health risk. Practically, the findings can help the Punjab Environmental Protection Department, district health authorities, and news organizations design messages that move audiences from awareness to action. The study also adds evidence from Faisalabad, the most polluted city in Pakistan in 2025 and one of the least studied districts of Punjab.

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
LJLLR
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

Research Objectives

- To examine the mediating role of perceived benefits in the relationship between media attention and adherent protective behavior against climate-related health risks.
- To examine the mediating role of self-efficacy in the relationship between media attention and adherent protective behavior against climate-related health risks.

Research Questions

RQ1: Do perceived benefits mediate the relationship between media attention and adherent protective behavior?

RQ2: Does self-efficacy mediate the relationship between media attention and adherent protective behavior?

Hypotheses

H1: Perceived benefits mediate the relationship between media attention and adherent protective behavior.

H2: Self-efficacy mediates the relationship between media attention and adherent protective behavior.

The alignment of the objectives, research questions, hypotheses, and analyses is presented in Table 1.

Table 1 Alignment of Objectives, Research Questions, Hypotheses, and Analyses

Objective	Research question	Hypothesis	Analysis
1. Mediating role of perceived benefits	RQ1	H1	Mediation analysis (PROCESS Model 4)
2. Mediating role of self-efficacy	RQ2	H2	Mediation analysis (PROCESS Model 4)

Scope

The study is delimited to adult residents aged 18 to 60 years in the six tehsils of District Faisalabad, and the data were collected during the 2025–2026 smog season. Winter smog is treated as the climate-related health risk under investigation. The study examines four constructs: media attention, perceived benefits, self-efficacy, and adherent protective behavior.

Literature Review

Media Communication and the Awareness–Action Gap

Several studies have documented the role of the media in public responses to smog in Pakistan. Iftikhar et al. (2024) reported that mass-media exposure, together with personality traits and social norms, was associated with protective behavior against smog, and Iftikhar et al. (2025) found that digital media use was associated with adherent health behavior among 2,000 adults in Lahore. Similarly, Safdar et al. (2026) found that exposure to climate information on social media was associated with greater awareness of climate change. However, awareness has not reliably translated into action. Yasin et al. (2025) found that most villagers in Khanewal were aware of smog but that fewer than half used masks, and Hassan et al. (2025) reported very low adherence to recommended precautions in South Punjab. Content analyses suggest one possible reason: Pakistani coverage of smog and other climate hazards concentrates on crisis

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
LJLLR
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

events and danger (Javed et al., 2023; Qusien, 2024) and seldom explains what individuals can do (Mushtaq et al., 2024).

Research on media effects has also shown that the influence of media depends on how closely audiences attend to messages rather than on mere exposure to them. Attention reflects the degree to which audiences engage with content, and it is therefore more closely related to the beliefs that messages are intended to change. Social cognitive theory proposes that media content shapes behavior both by informing audiences and by modelling actions that audiences can imitate (Bandura, 2001). Smog-related content that demonstrates protective actions and explains their effects is therefore expected to influence the beliefs that determine whether residents act on the information they receive.

Perceived Benefits as a Mediator

Perceived benefits refer to the belief that a recommended action will reduce the risk or severity of a health problem (Champion & Skinner, 2008); in EPPM terms, they correspond to response efficacy (Witte, 1992). Meta-analytic evidence identifies perceived benefits as one of the most consistent HBM predictors of health behavior (Carpenter, 2010). J. Kim and Kim (2021) found that perceived benefits positively predicted mask-wearing against particulate matter among Korean adults, whereas perceived susceptibility and severity did not. Similarly, Mehiriz and Gosselin (2022) reported that adaptation to smog occurred mainly when threat perception was combined with a strong belief that the recommended response was effective. Irfan et al. (2021) found that the perceived benefits of face masks were among the strongest predictors of mask-wearing intentions in Pakistan, and Martinez et al. (2025) reported that perceived benefits were positively associated with heat-protective behavior among more than 6,000 adults in the United States. Media reports that explain what protective measures achieve, for example how a well-fitted mask reduces exposure, are therefore expected to strengthen perceived benefits and, through them, protective behavior.

Self-Efficacy as a Mediator

Self-efficacy refers to a person's confidence in his or her ability to carry out a specific behavior (Bandura, 1977) and was incorporated into the HBM to explain behaviors that require sustained effort (Rosenstock et al., 1988). In a meta-analysis of protection motivation research, self-efficacy was among the strongest correlates of protective intentions and behavior (Floyd et al., 2000). H. K. Kim and Kim (2021) found that self-efficacy was the strongest predictor of intentions to protect oneself from particulate air pollution among South Korean adults. Similarly, Imran et al. (2025) reported that coping appraisal, which includes self-efficacy, predicted smog-protective behavior in Lahore, and Martinez et al. (2025) found that self-efficacy showed the strongest association with heat-protective behavior. In the climate-adaptation context, Tran and Chen (2022) found that self-efficacy strengthened the relationship between climate risk perception and adaptive behavior among coffee farmers in Honduras. With respect to media, Mahmood et al. (2021) showed that social media use in Pakistan during the COVID-19 pandemic was associated with higher self-efficacy, which was in turn associated with preventive behavior. Media content that demonstrates how to wear a mask correctly, how to interpret air-quality alerts, and how to protect children at home is therefore expected to strengthen self-efficacy and, through it, protective behavior.

Synthesis of Literature Review and Research Gap

Previous studies have shown that perceived benefits and self-efficacy are among the strongest predictors of protection against air pollution and other climate-related hazards, and that media use is associated with smog-protective behavior. However, no study in Pakistan has tested whether attention to smog-related

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
LJLLR
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

media messages is associated with climate-related protective behavior through these two efficacy beliefs. The present study addresses this gap in District Faisalabad.

Theoretical Framework

The study draws on two complementary theories. The Health Belief Model proposes that people adopt a recommended health action when they believe that the action will be beneficial and that they are capable of performing it, among other beliefs (Champion & Skinner, 2008; Rosenstock et al., 1988). The Extended Parallel Process Model adds that messages lead to protective action when they build efficacy, that is, the belief that the recommended response works (response efficacy) and that one can carry it out (self-efficacy); otherwise, people tend to manage their fear rather than the danger (Witte, 1992; Witte & Allen, 2000). Following Jones et al. (2015), who recommended treating HBM beliefs as mechanisms that link communication to behavior, media attention is conceptualized as an external stimulus, and perceived benefits and self-efficacy as the efficacy beliefs through which it is related to adherent protective behavior (Figure 1).

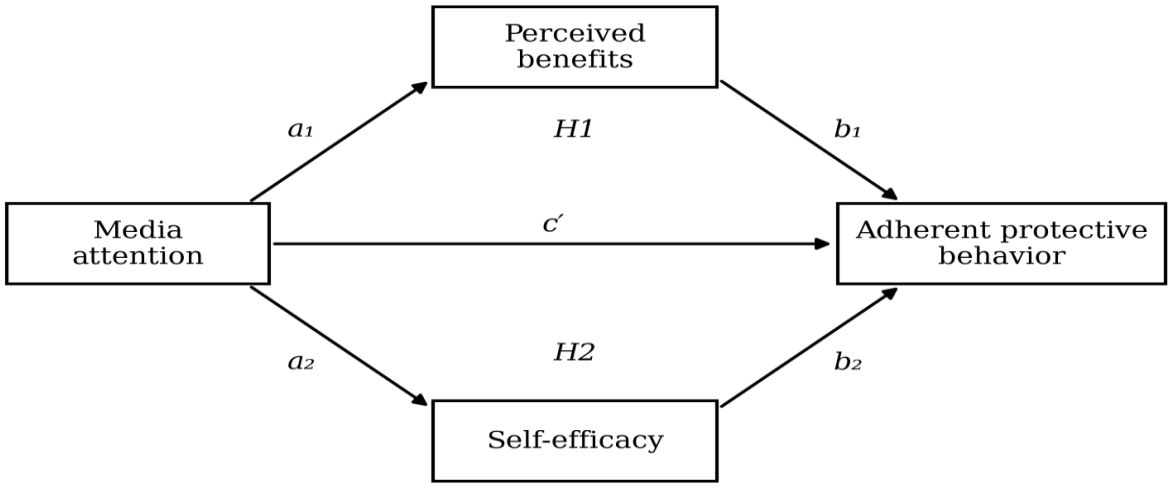


Figure 1 Conceptual Model of the Study

Note. H1 refers to the indirect relationship through perceived benefits ($a_1 \times b_1$) and H2 to the indirect relationship through self-efficacy ($a_2 \times b_2$). Both mediators were tested simultaneously in a parallel mediation model.

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

Research Methodology

Research Design

A quantitative, cross-sectional survey design was adopted within a postpositivist and deductive framework. Fieldwork was carried out from October 2025 to January 2026, which corresponds to the peak of the smog season, the highest volume of smog-related media coverage, and the issuance of official health advisories in Punjab.

Population, Sample, and Sampling Procedure

The target population comprised permanent residents of District Faisalabad aged 18 to 60 years; the district had a population of 9,075,819 in the 2023 census (PBS, 2023). The sample of 400 respondents exceeded the minimum of 384 required for a large population at a 95% confidence level and a 5% margin of error (Krejcie & Morgan, 1970). Respondents were selected through purposive sampling (Etikan et al., 2016) from urban, rural, and peri-urban localities of all six tehsils of the district: Faisalabad City (n = 116), Faisalabad Sadar (n = 81), Jaranwala (n = 61), Samundri (n = 58), Tandlianwala (n = 45), and Chak Jhumra (n = 39). Respondents were included if they were permanent residents of the district, had lived there during the last smog season, and were able to answer the bilingual questionnaire independently or with a fieldworker reading the items aloud. There were no missing data.

Measures

Data were collected through a structured, bilingual (English–Urdu) questionnaire, and construct scores were calculated as item means. Media attention was measured with eight items asking how much attention respondents had paid to smog-related messages during the last smog season in the online and offline versions of public service messages, news, science-themed documentaries, science-themed movies, blogs, wikis, user-generated content, and social networking sites (Iftikhar et al., 2024). Perceived benefits were measured with four items assessing the belief that wearing a mask, staying at home, using an air purifier, and taking protective actions in general protect against the harmful effects of smog, adapted from Chen and Liu (2023) and Iftikhar and Yousaf (2021). Self-efficacy was measured with six items assessing confidence in solving smog-related health problems, achieving self-protection goals, dealing with unexpected health issues and unforeseen situations, finding several solutions, and adhering to protective behavior during smog; five items were adapted from the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) and one was developed for the smog context. Adherent protective behavior was measured with four items asking how often, during smog, respondents wore a mask, stayed at home, used an air filter or purifier, and changed their diet to cope with its effects (Iftikhar & Yousaf, 2021). Media attention and adherent protective behavior were rated from 1 (never) to 5 (almost always), and perceived benefits and self-efficacy from 1 (strongly disagree) to 5 (strongly agree). All items are provided in the Appendix.

Validity and Reliability

Three experts evaluated the relevance of the items, yielding a scale-level content validity index of .91 (Polit & Beck, 2006). A confirmatory factor analysis of all questionnaire constructs showed a good fit, $\chi^2(1179) = 1265.53$, $\chi^2/df = 1.07$, CFI = .987, TLI = .986, RMSEA = .014, SRMR = .038 (Hu & Bentler, 1999). Standardized loadings ranged from .42 to .69 for media attention, .69 to .79 for perceived benefits, .50 to .70 for self-efficacy, and .65 to .76 for adherent protective behavior. Cronbach's alpha was .79, .82, .80, and .79, and composite reliability was .80, .82, .80, and .79, respectively (Hair et al., 2019). Average variance extracted was .53 for perceived benefits; for media attention (.33), self-efficacy (.41), and adherent protective

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
LJLLR
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

behavior (.48) it was below .50, but because composite reliability exceeded .70 in each case, convergent validity was considered acceptable (Fornell & Larcker, 1981). All heterotrait–monotrait ratios among the four constructs were below .85, the largest being .79 between media attention and adherent protective behavior (Henseler et al., 2015), and the first factor in Harman's test explained 18.74% of the variance, which indicates that common method variance is unlikely to account for the results (Podsakoff et al., 2003).

Data Collection and Ethical Considerations

Trained fieldworkers administered the questionnaire in person. Ethical approval was granted by the Board of Advanced Studies and Research, Government College University, Faisalabad. Respondents participated voluntarily after giving informed consent, were free to withdraw at any stage, and were not asked for any identifying information.

Data Analysis

Descriptive statistics and Pearson correlations were computed first. H1 and H2 were tested with a parallel mediation model using the PROCESS macro, Model 4 (Hayes, 2022), in which media attention was the predictor, perceived benefits and self-efficacy were the mediators, and adherent protective behavior was the outcome. Because the study formed part of a larger project in which other Health Belief Model beliefs were also measured, these beliefs were entered as concurrent mediators, so that each specific indirect effect was estimated net of the others (Preacher & Hayes, 2008). Age, gender, education, household income, and area of residence were included as covariates in all equations. Indirect effects were estimated with 5,000 bootstrap resamples and were considered significant when the 95% percentile confidence interval did not include zero, and the type of mediation was classified following Zhao et al. (2010). The two indirect effects were compared through a pairwise contrast. All tests were two-tailed with a significance level of .05.

Results

Descriptive Statistics and Correlations

As shown in Table 2, perceived benefits were above the scale midpoint of 3 and self-efficacy was close to it, whereas media attention and adherent protective behavior were below it. All four variables were positively and significantly correlated. Media attention was correlated with perceived benefits ($r = .43$), self-efficacy ($r = .54$), and adherent protective behavior ($r = .62$), and perceived benefits and self-efficacy were each correlated with adherent protective behavior ($r = .49$).

Table 2 Means, Standard Deviations, Reliability, and Correlations of the Study Variables

Variable	M	SD	α	1	2	3
1. Media attention	2.58	0.75	.79	—		
2. Perceived benefits	3.50	0.96	.82	.43	—	
3. Self-efficacy	3.12	0.89	.80	.54	.33	—
4. Adherent protective behavior	2.82	0.94	.79	.62	.49	.49

Note. N = 400. Media attention and adherent protective behavior were rated from 1 (never) to 5 (almost always); perceived benefits and self-efficacy from 1 (strongly disagree) to 5 (strongly agree). α = Cronbach's alpha. $p < .001$ (two-tailed).

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
LJLLR
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

Testing of Hypotheses

The total effect of media attention on adherent protective behavior was c = 0.707, SE = 0.047, p < .001, 95% CI [0.614, 0.800]. The path coefficients of the mediation model are presented in Table 3 and the indirect effects in Table 4.

H1: Perceived benefits mediate the relationship between media attention and adherent protective behavior. It is predicted that media attention is associated with stronger perceived benefits, which are in turn associated with more adherent protective behavior.

Media attention positively predicted perceived benefits (a_1 = 0.500, SE = 0.058, p < .001), and perceived benefits positively predicted adherent protective behavior when media attention and the other model variables were controlled (b_1 = 0.181, SE = 0.036, p < .001). The indirect effect through perceived benefits was significant, ab = 0.091, 95% CI [0.052, 0.134], and accounted for 12.8% of the total effect. Because the direct effect of media attention remained significant (c′ = 0.318, p < .001), the mediation was complementary (partial) (Zhao et al., 2010). Therefore, H1 was supported.

H2: Self-efficacy mediates the relationship between media attention and adherent protective behavior. It is predicted that media attention is associated with greater self-efficacy, which is in turn associated with more adherent protective behavior.

Media attention positively predicted self-efficacy (a_2 = 0.618, SE = 0.051, p < .001), the strongest association of media attention with any of the beliefs examined, and self-efficacy positively predicted adherent protective behavior when media attention and the other model variables were controlled (b_2 = 0.137, SE = 0.041, p = .001). The indirect effect through self-efficacy was significant, ab = 0.085, 95% CI [0.029, 0.140], and accounted for 12.0% of the total effect. The mediation was complementary (partial). Therefore, H2 was supported.

The contrast between the two indirect effects was not significant (difference = 0.006, 95% CI [−0.060, 0.074]), which indicates that the two pathways were of comparable strength. Together, the indirect effects through perceived benefits and self-efficacy accounted for 24.8% of the total effect of media attention on adherent protective behavior.

Table 3 Path Coefficients of the Mediation Model

Path	B	SE	β	t	p	95% CI
a_1: MA → PB	0.500	0.058	.39	8.58	< .001	[0.385, 0.614]
a_2: MA → SE	0.618	0.051	.52	12.02	< .001	[0.517, 0.719]
b_1: PB → APB	0.181	0.036	.19	4.97	< .001	[0.109, 0.253]
b_2: SE → APB	0.137	0.041	.13	3.31	.001	[0.056, 0.218]
c′: MA → APB (direct effect)	0.318	0.056	.25	5.69	< .001	[0.208, 0.427]
c: MA → APB (total effect)	0.707	0.047	.57	14.92	< .001	[0.614, 0.800]

Note. N = 400. Unstandardized coefficients (PROCESS Model 4). All equations controlled for age, gender, education, household income, and area of residence; the b and c′ paths were also estimated net of the other Health Belief Model beliefs measured in the larger study. R^2 = .223 for perceived benefits and .303 for self-efficacy. MA = media attention; PB = perceived benefits; SE = self-efficacy; APB = adherent protective behavior.

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

Table 4 Indirect Effects of Media Attention on Adherent Protective Behavior

Indirect path	Effect	Boot SE	95% Boot CI	% of total
MA → PB → APB (H1)	0.091	0.020	[0.052, 0.134]	12.8
MA → SE → APB (H2)	0.085	0.028	[0.029, 0.140]	12.0
Contrast (PB − SE)	0.006		[−0.060, 0.074]	

Note. N = 400. Indirect effects were tested with 95% percentile bootstrap confidence intervals based on 5,000 resamples; an interval that excludes zero indicates a significant effect. MA = media attention; PB = perceived benefits; SE = self-efficacy; APB = adherent protective behavior.

Table 5 Summary of Hypothesis Tests

Hypothesis	Key result	Decision
H1: Mediation by perceived benefits	ab = 0.091, 95% CI [0.052, 0.134]	Supported
H2: Mediation by self-efficacy	ab = 0.085, 95% CI [0.029, 0.140]	Supported

Discussion

Explaining how media attention is translated into protective behavior is necessary because awareness of smog in Punjab is high while protective action remains limited. This study examined whether perceived benefits and self-efficacy mediate the relationship between media attention and adherent protective behavior in District Faisalabad. Both hypotheses were supported.

With regard to the first objective, perceived benefits carried a significant share of the association between media attention and protective behavior. Residents who paid more attention to smog-related media messages were more convinced that masks, staying indoors, air purification, and protective action in general actually protect them, and this conviction was associated with more frequent protective behavior. Perceived benefits had the strongest association with protective behavior among the beliefs examined. The finding is consistent with meta-analytic evidence that perceived benefits are among the most reliable predictors of health behavior (Carpenter, 2010), and with evidence on mask-wearing against particulate matter (J. Kim & Kim, 2021), adaptation to smog (Mehiriz & Gosselin, 2022), mask-wearing in Pakistan (Irfan et al., 2021), and heat-protective behavior (Martinez et al., 2025). In EPPM terms, it confirms the importance of response efficacy: messages promote protection when they convince audiences that the recommended response works (Witte, 1992). Residents also agreed more strongly that masks protect against respiratory disease than that air purifiers protect against smog, and air purifiers were the least used protective measure, which indicates that residents act in line with their beliefs about the effectiveness of specific actions.

With regard to the second objective, self-efficacy also carried a significant share of the association. Media attention was more strongly associated with self-efficacy than with any other belief examined: residents who paid more attention to smog-related messages felt considerably more confident that they could protect themselves and adhere to protective behavior, and this confidence was associated with more protective behavior. This result agrees with studies that identified self-efficacy as a key predictor of protection against air pollution (H. K. Kim & Kim, 2021; Imran et al., 2025) and other climate-related hazards (Martinez et al., 2025; Tran & Chen, 2022), with meta-analytic evidence on protection motivation (Floyd et al., 2000),

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

and with evidence that media use was associated with self-efficacy and prevention in Pakistan during COVID-19 (Mahmood et al., 2021). Social cognitive theory explains this pattern, because media messages supply vicarious examples of others protecting themselves and verbal encouragement from doctors and officials, which are principal sources of efficacy beliefs (Bandura, 1977, 2001). The more modest association between self-efficacy and behavior indicates, however, that confidence is translated into action only partly, most plausibly because cost and work that requires outdoor presence continue to constrain protective behavior.

The two pathways were of comparable strength and were both significant when tested together, net of the other beliefs and the demographic characteristics of the respondents. Together, they accounted for approximately one quarter of the association between media attention and protective behavior. This pattern supports the view of Jones et al. (2015) that HBM beliefs function as mechanisms linking communication to behavior, and the EPPM proposition that efficacy, both response efficacy and self-efficacy, is central to the success of risk communication (Witte & Allen, 2000). It also has direct relevance for Pakistan, where smog coverage focuses mainly on danger and gives comparatively little attention to what individuals can do (Javed et al., 2023; Mushtaq et al., 2024; Qusien, 2024). Because efficacy beliefs carry a meaningful part of the association, coverage that strengthens them is likely to be more effective in promoting protection than coverage that merely reports hazardous conditions.

Practical Implications

The findings have implications for the Punjab Environmental Protection Department, district health authorities, and news organizations. First, to strengthen perceived benefits, smog coverage should explain clearly how and to what extent masks, staying indoors during peak pollution hours, and air purification protect health, and should address doubts about the effectiveness of particular measures such as air purifiers. Second, to strengthen self-efficacy, messages should give step-by-step guidance on how to obtain and wear suitable masks, how to interpret air-quality alerts, and how to protect children and older adults at home, ideally showing ordinary residents performing these actions. Third, every smog alert should be accompanied by clear and actionable information rather than warnings alone. Finally, such content should be disseminated through television, radio, and popular social media platforms, in Urdu and Punjabi, and should begin before the onset of the smog season.

Limitations and Future Research

Because of the cross-sectional design, the study cannot establish cause-and-effect relationships; the mediation results should be read as statistical associations, and it is possible that residents who already protect themselves pay more attention to smog coverage (Savitz & Wellenius, 2023). All variables were self-reported, and the sample was selected purposively, which limits generalization to the district population. The average variance extracted was low for media attention and self-efficacy, and media attention was closely associated with protective behavior, which limits the precision with which their effects can be separated. Future research should use longitudinal or experimental designs to test whether efficacy-focused messages strengthen perceived benefits and self-efficacy, and should examine the conditions under which these beliefs are translated into action.

Conclusion

The first objective of the study was to examine the mediating role of perceived benefits, and the second was to examine the mediating role of self-efficacy, in the relationship between media attention and adherent

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

protective behavior against climate-related health risks. For this purpose, a quantitative survey was conducted with 400 adults across the six tehsils of District Faisalabad during the 2025–2026 smog season. The results revealed that both efficacy beliefs significantly mediated the relationship, that the two pathways were of comparable strength, and that together they carried approximately one quarter of the association between media attention and protective behavior. Climate-health communication in Pakistan is therefore most likely to encourage protective behavior when it convinces people that protective actions work and gives them the confidence to carry them out.

Author Contribution

Talha Javeed contributed to conceptualization, methodology, data collection, formal analysis, and writing of the original draft. Ashraf Iqbal supervised the study, provided methodological guidance, and reviewed and edited the manuscript.

Conflict of Interest

The authors of the manuscript have no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

Data supporting the findings of this study will be made available by the corresponding author upon request.

Funding Details

No funding has been received for this research.

Generative AI Disclosure Statement

To be completed by the authors: state accurately whether and how generative AI tools were used in preparing this manuscript.

REFERENCES

Adil, L., Eckstein, D., Künzel, V., & Schäfer, L. (2025). Climate Risk Index 2025: Who suffers most from extreme weather events? Germanwatch. https://www.germanwatch.org/en/cri

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (2001). Social cognitive theory of mass communication. Media Psychology, 3(3), 265–299. https://doi.org/10.1207/S1532785XMEP0303_03

Batool, Z., Shaheen, M., Mansoor, J., & Tariq, M. (2024). Smog: A burden on the health care system of Pakistan. Asia Pacific Journal of Public Health, 36(4), 417–418. https://doi.org/10.1177/10105395241246286

Carpenter, C. J. (2010). A meta-analysis of the effectiveness of health belief model variables in predicting behavior. Health Communication, 25(8), 661–669. https://doi.org/10.1080/10410236.2010.521906

Champion, V. L., & Skinner, C. S. (2008). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), Health behavior and health education: Theory, research, and practice (4th ed., pp. 45–65). Jossey-Bass.

Chen, Y., & Liu, X. (2023). Determinants of Beijing residents' intentions to take protective behaviors against smog: An application of the health belief model. Health Communication, 38(3), 447–459. https://doi.org/10.1080/10410236.2021.1956036

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Floyd, D. L., Prentice-Dunn, S., & Rogers, R. W. (2000). A meta-analysis of research on protection motivation theory. Journal of Applied Social Psychology, 30(2), 407–429. https://doi.org/10.1111/j.1559-1816.2000.tb02323.x

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39–50. https://doi.org/10.1177/002224378101800104

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage Learning.

Hassan, M. M., Javaid, I., Jamal, F., Ameeq, M., Danish, M., Kargbo, A., & Javed, A. (2025). Multidimensional impact of smog on respiratory and ocular health: A cross-sectional study with socio-psychological and public health prospective. Health Science Reports, 8(9), Article e71205. https://doi.org/10.1002/hsr2.71205

Hayes, A. F. (2022). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (3rd ed.). Guilford Press.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6(1), 1–55. https://doi.org/10.1080/10705519909540118

Iftikhar, M., & Yousaf, M. (2021). The impact of climate change coverage on public adherence towards health threat: An empirical validation of the Health Belief Model. Sir Syed Journal of Education & Social Research, 4(2), 402–413.

Iftikhar, M., Horáčková, K., Yousaf, M., & Amir, J. (2025). Decoding the impact of digital media on climate health and smog solutions in Pakistan: Adherent health behaviors and mediating factors. Journal of Environmental Health, 88(5), 28–39. https://doi.org/10.70387/001c.154088

Iftikhar, M., Yousaf, M., Raza, S. H., Zaman, U., & Ogadimma, E. C. (2024). Unraveling the nexus: Exploring the interplay of mass media, personality traits and social norms in fostering protective behavior against smog. Global Knowledge, Memory and Communication. Advance online publication. https://doi.org/10.1108/GKMC-01-2024-0045

Imran, M., Tallat, A., & Özçatalbaş, O. (2025). Trust, knowledge, and risk appraisal as predictors of protective behavior during smog crisis in Lahore. Discover Sustainability, 6, Article 1336. https://doi.org/10.1007/s43621-025-02052-5

Iram, S., Qaisar, I., Shabbir, R., Pomme, M. S., Schmidt, M., & Hertig, E. (2025). Impact of air pollution and smog on human health in Pakistan: A systematic review. Environments, 12(2), Article 46. https://doi.org/10.3390/environments12020046

Irfan, M., Akhtar, N., Ahmad, M., Shahzad, F., Elavarasan, R. M., Wu, H., & Yang, C. (2021). Assessing public willingness to wear face masks during the COVID-19 pandemic: Fresh insights from the theory of planned behavior. International Journal of Environmental Research and Public Health, 18(9), Article 4577. https://doi.org/10.3390/ijerph18094577

Javed, H., Asgher, S., & Far Bukhari, S. (2023). Role of media in promoting environment protection during smog crisis in Lahore. Journal of Media & Communication, 4(1), 1–23.

Jones, C. L., Jensen, J. D., Scherr, C. L., Brown, N. R., Christy, K., & Weaver, J. (2015). The health belief model as an explanatory framework in communication research: Exploring parallel, serial, and moderated mediation. Health Communication, 30(6), 566–576. https://doi.org/10.1080/10410236.2013.873363

Kim, H. K., & Kim, Y. (2021). Protective behaviors against particulate air pollution: Self-construal, risk perception, and direct experience in the theory of planned behavior. Environmental Communication, 15(8), 1092–1108. https://doi.org/10.1080/17524032.2021.1944891

Kim, J., & Kim, Y. (2021). What predicts Korean citizens' mask-wearing behaviors? Health beliefs and protective behaviors against particulate matter. International Journal of Environmental Research and Public Health, 18(6), Article 2791. https://doi.org/10.3390/ijerph18062791

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30(3), 607–610. https://doi.org/10.1177/001316447003000308

Mahmood, Q. K., Jafree, S. R., Mukhtar, S., & Fischer, F. (2021). Social media use, self-efficacy, perceived threat, and preventive behavior in times of COVID-19: Results of a cross-sectional study in Pakistan. Frontiers in Psychology, 12, Article 562042. https://doi.org/10.3389/fpsyg.2021.562042

Majeed, R., Anjum, M. S., Imad-ud-din, M., Malik, S., Anwar, M. N., Anwar, B., & Khokhar, M. F. (2024). Solving the mysteries of Lahore smog: The fifth season in the country. Frontiers in Sustainable Cities, 5, Article 1314426. https://doi.org/10.3389/frsc.2023.1314426

Martinez, B., Beck, C., & Ghosh, J. K. (2025). Utilizing the Health Belief Model to understand heat mitigation behaviors in the United States: Results of an online panel survey. PLoS ONE, 20(10), Article e0334697. https://doi.org/10.1371/journal.pone.0334697

Mehiriz, K., & Gosselin, P. (2022). The effect of perceived threats and response efficacy on adaptation to smog: An instrumental variables design. Risk Analysis, 42(5), 1042–1055. https://doi.org/10.1111/risa.13814

Mushtaq, A., Ameen, M., & Baloch, R. B. (2024). From screens to surveys: Exploring Pakistan's smog crisis through media analysis and healthcare perspectives. Human Nature Journal of Social Sciences, 5(2), 104–120.

Pakistan Bureau of Statistics. (2023). 7th population and housing census 2023: District-wise results, Punjab. Government of Pakistan. https://www.pbs.gov.pk/

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, 88(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. Research in Nursing & Health, 29(5), 489–497. https://doi.org/10.1002/nur.20147

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior Research Methods, 40(3), 879–891. https://doi.org/10.3758/BRM.40.3.879

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
LJLLR
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

Qusien, R. (2024). More often and more intense: Media coverage of smog, heatwaves, and floods in the Pakistani media [Doctoral dissertation, Dublin City University]. DORAS. https://doras.dcu.ie/29355/

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. Health Education Quarterly, 15(2), 175–183. https://doi.org/10.1177/109019818801500203

Sabir, M. A., Nawaz, M. F., Khan, T. H., Zulfiqar, U., Haider, F. U., Rehman, A., Ahmad, I., Rasheed, F., Gul, S., Hussain, S., Iqbal, R., Chaudhary, T., Mustafa, A. E.-Z. M. A., & Elshikh, M. S. (2024). Investigating seasonal air quality variations consequent to the urban vegetation in the metropolis of Faisalabad, Pakistan. Scientific Reports, 14, Article 452. https://doi.org/10.1038/s41598-023-47512-y

Safdar, G., Iftikhar, A., & Yasin, F. (2026). Examining the role of social media in shaping public perceptions of climate change in Pakistan. Media and Communication Review, 6(1), 118–138. https://doi.org/10.32350/mcr.61.06

Savitz, D. A., & Wellenius, G. A. (2023). Can cross-sectional studies contribute to causal inference? It depends. American Journal of Epidemiology, 192(4), 514–516. https://doi.org/10.1093/aje/kwac037

Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), Measures in health psychology: A user's portfolio. Causal and control beliefs (pp. 35–37). NFER-Nelson.

Szopa, S., Naik, V., Adhikary, B., Artaxo, P., Berntsen, T., Collins, W. D., Fuzzi, S., Gallardo, L., Kiendler-Scharr, A., Klimont, Z., Liao, H., Unger, N., & Zanis, P. (2021). Short-lived climate forcers. In V. Masson-Delmotte et al. (Eds.), Climate change 2021: The physical science basis (pp. 817–922). Cambridge University Press. https://doi.org/10.1017/9781009157896.008

Tran, T. T., & Chen, H. (2022). Climate change risk perception and adaptive behavior of coffee farmers: The mediating role of climate-related attitudinal factors and moderating role of self-efficacy. Journal of Environmental Studies and Sciences, 12(2), 354–368. https://doi.org/10.1007/s13412-021-00732-y

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. Communication Monographs, 59(4), 329–349. https://doi.org/10.1080/03637759209376276

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. Health Education & Behavior, 27(5), 591–615. https://doi.org/10.1177/109019810002700506

Yasin, G. Y., Jamil, A., Zubair, M., Imtiaz, M. T., Shrahili, M., Alharbi, S. A., & Rahman, S. U. (2025). Public awareness, behavior and preventive practices of the rural people in the adaptation to smog episodes. Global NEST Journal, 27(3). https://doi.org/10.30955/gnj.06260

Zeeshan, N., Murtaza, G., Ahmad, H. R., Awan, A. N., Shahbaz, M., & Freer-Smith, P. (2024). Particulate and gaseous air pollutants exceed WHO guideline values and have the potential to damage human health in Faisalabad, Metropolitan, Pakistan. Environmental Monitoring and Assessment, 196, Article 659. https://doi.org/10.1007/s10661-024-12763-3

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. Journal of Consumer Research, 37(2), 197–206. https://doi.org/10.1086/651257

LIBERAL JOURNAL OF LANGUAGE AND LITERATURE REVIEW
An International Double-Blind Peer-Reviewed Open Access Journal
ISSN (Online): 3006-3175 | ISSN (Print): 3006-3167
Volume 5, Issue 8 October, 2026

Appendix

Table A1 Questionnaire Items Used in This Study

Code	Item
Media attention (During the last smog season, how much attention did you pay to smog-related messages in the online and offline versions of the following sources?)	
MA1	Public service messages
MA2	News (television, radio, newspapers and news websites)
MA3	Science-themed documentaries
MA4	Science-themed movies
MA5	Blogs (e.g., Blogspot, WordPress)
MA6	Wikis (e.g., Wikipedia)
MA7	User-generated content (e.g., YouTube)
MA8	Social networking sites (e.g., Facebook, X/Twitter)
Perceived benefits	
PB1	Wearing a mask can protect me from respiratory diseases during smog.
PB2	Staying at home during smog is beneficial in protecting me from eye diseases.
PB3	Using an air purifier at home can protect me from the harmful effects of smog.
PB4	I feel that protective actions can protect me from long-term illness caused by smog.
Self-efficacy	
SE1	I can always manage to solve different problems related to the effects of smog on my health.
SE2	I feel that I can accomplish my self-protection goals regarding my health.
SE3	I can deal efficiently with unexpected health issues during smog.
SE4	I can handle unforeseen situations caused by the effects of smog on my health.
SE5	I can confront health problems during smog by finding several solutions to protect myself.
SE6	I am confident that I can adhere to protective behavior to protect myself during smog.
Adherent protective behavior	
APB1	During smog, I wear a mask to protect myself.
APB2	During smog, I stay at home.
APB3	During smog, I use an air filter/purifier to protect myself.
APB4	During smog, I change my diet to cope with its effects.

Note. Media attention and adherent protective behavior were rated from 1 (never) to 5 (almost always); perceived benefits and self-efficacy from 1 (strongly disagree) to 5 (strongly agree). Each item was presented in English followed by its Urdu translation.