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Effect of a Six-Month Certificate Course in Health Professions Education on the Adversity Quotient of Medical Teachers

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ABSTRACT

Medical teachers frequently face high-stakes, stressful situations that challenge their emotional and professional effectiveness. Adversity Quotient (AQ) reflects an individual's ability to withstand stress, and faculty development programs like CHPE may enhance both teaching competence and psychological resilience. **Objective:** To evaluate the effects of a six-month course in CHPE on the AQ of the medical teachers. **Methods:** The study was a pre-test post-test quasi-experimental quantitative study on 55 medical teachers who participated in the CHPE program at Fatima Jinnah Medical University, Lahore. The data were gathered on the Adversity Response Profile (ARP) questionnaire. The measurement of AQ scores was undertaken before the course and after the course. IBM SPSS Statistics version 28.0 was used to analyze the data.

Results: The AQ of the participants improved significantly after the CHPE intervention (Median [IQR]: 106 [96-118] vs. 142 [134-156]; $Z = -5.943$, $p < 0.001$). Before the course, 69.1% had Low AQ and 30.9% had Moderately Low AQ. Once it was completed, 49.1% got Moderately High AQ, and 5.5% got High AQ. The subgroup analyses showed an increase in median AQ scores where gender and years of experience did not significantly affect the results ($p > 0.05$).

Conclusions: The six-month CHPE program had a statistically significant impact on the Adversity Quotient of the medical teachers and implied that a well-designed faculty development intervention could make academic healthcare professionals resilient and adaptive.

INTRODUCTION

Medical practitioners are exposed to stressful and emotionally demanding circumstances regularly when working in the hospital or when doing their studies. This exposure requires one to be strong to ensure good health and performance [1]. AQ is a construct that was created by Stoltz; it represents the ability of a person to survive and overcome challenges, and it affects their performance, motivation, and adaptability [2]. The concept explains the manner in which individuals react to the challenge in four quantifiable dimensions, namely control, origin and ownership, reach, and endurance (CO2RE), which are the cognitive and behavioral processes that allow them to

maintain perseverance in response to pressure [3]. Unfortunately, the medical professionals often face unpleasant situations in the healthcare facilities, where the patient and family are the initial victims, and the healthcare professionals involved are the second victims. The second victim phenomenon significantly impacts clinical staff, fellow workers, colleagues, and, subsequently, patients, students, and personal contacts [4]. Low resilience can compromise teaching effectiveness, decision-making, and interpersonal relationships, ultimately affecting learning and patient care [5]. Individuals with high AQ exhibit stronger problem-



solving abilities, greater emotional stability, and superior organizational behavior, including altruism and conscientiousness [6]. Health Professions Education (HPE) courses generally range from 6-month Certificate courses at various universities to 2-year Master's and Ph.D. programs. Health Professions Education (HPE) faculty development programs are aimed at improving the teaching effectiveness, leadership ability, and reflective practice of medical educators [7]. The Certificate in Health Professions Education (CHPE), as an example of a structured program, combines the most important elements. They cover multiple facets of the approach towards teaching and learning, professionalism, and leadership skills, requiring in-depth insight into human psychology, and have been observed to create a change in the personality traits, style, and behaviors of the teachers, all of which are conceptually in line with elements of the Adversity Quotient (AQ) [8, 9]. Although some previous studies focused on AQ in the medical student group and its relationship with academic performance have been conducted [10, 11], limited research has explored whether educational interventions can enhance AQ among medical teachers, particularly in developing countries. This study investigates the effect of a six-month Certificate Course in Health Professional Education (CHPE) on the AQ of medical teachers at a government medical university in Pakistan. Using the Adversity Response Profile (ARP) questionnaire, adapted from Stoltz's validated instrument [12], the study evaluates whether formal HPE training enhances resilience and adaptability.

There is scanty evidence on the causal effectiveness of faculty development interventions such as CHPE in promoting psychological resilience (Adversity Quotient) of medical teachers. Medical teachers work under a lot of pressure, and evidence-based interventions to construct resilience in their professional training are not intensively researched and implemented. The findings are expected to contribute evidence for integrating psychological resilience training into faculty development programs to strengthen educator performance and institutional well-being. This study aims to evaluate the effects of a six-month course in CHPE on the AQ of the medical teachers.

METHODS

This study employed a pre-test post-test quasi-experimental design without a control group at the Department of Medical Education, Fatima Jinnah Medical University (FJMU), Lahore, Pakistan, after taking the ethical approval (88/Research Proposal/Medicine/FJ/ERC). The duration of the study was October 2023 to May 2024. This design allows for the measurement of change over time but limits causal inference; therefore, results are interpreted as pre-post associations. The purposive

sampling technique required participation from both genders, who are presently engaged in academic teaching and undergoing the six-month CHPE course at FJMU. Only those who could understand and were ready to fill out the study questionnaire were taken into consideration. Those who had either a history or current mental problem that might affect the study or confound the outcome were not considered. A total of 55 participants were included from consecutive CHPE batches. The sample size was determined using Cochran's formula for finite populations ($n=52$). The initial population frame (N) comprised all eligible medical teachers enrolled in the CHPE program during the study period ($n=60$), with a 95% confidence level, $Z=1.96$, margin of error of 0.05, and an estimated population proportion (p) of 0.5, with an additional 10% allowance for potential attrition. To account for potential non-response or attrition, this was increased by 10%, resulting in a target sample size of 57. The Adversity Response Profile (ARP) questionnaire was used to collect data based on the Adversity Quotient (AQ) framework adapted by Stoltz. The ARP is a psychometric instrument that was validated and whose development was done by Paul G. Stoltz to determine how well an individual will react positively to the unwanted or a challenging situation. It is highly construct valid and reliable (Cronbach alpha coefficients of between 0.76 and 0.90 in its four subscales, Control, Ownership, Reach, and Endurance (CORE)) to be highly internally consistent and stable across a variety of populations [11]. It consists of 20 scenarios or statements reflecting common professional and personal challenges. Each item is rated on a five-point Likert scale: strongly disagree/never (1), disagree/rarely (2), neutral/sometimes (3), agree/often (4), and strongly agree/always (5). The ARP evaluates four core dimensions collectively referred to as CO²RE, which represent: Control (C): The extent to which individuals perceive control over adverse events. Origin/Ownership (O): The degree of accountability individuals assume for dealing with adversity. Reach (R): The perceived scope of the impact of adversity across different life domains. Endurance (E): The perceived duration of adversity's effects. Scores for each dimension were computed by summing item responses corresponding to that subscale. The subscale item responses were then added to obtain scores in each dimension. It was then calculated as the total Adversity Quotient $AQ = (C + O + R + E) \times 2$. A higher score means that one is more resilient and flexible to adapt to a negative situation. Mean AQ score in each participant was obtained by dividing the overall AQ score by the number of items answered, giving a standard measure of AQ to be compared with other respondents. Based on total scores, participants were categorized into five AQ levels as follows: Low AQ: 117 or below, Moderately Low AQ: 118-134, Moderate

AQ: 135–160, Moderately High AQ: 161–177, and High AQ: 178 or above [12]. Data collection was carried out in two phases. In the pre-intervention phase, participants completed the Adversity Response Profile (ARP) before commencing the Certificate Course in Health Professions Education (CHPE). In the post-intervention phase, the same cohort completed the ARP again upon completion of the six-month program, immediately after their final assessment. In order to guarantee consistency in the course delivery process, the facilitator manual was elaborated to describe the aims of the courses, methods of instruction, and evaluation. Consistent checking was done by conducting different faculty observations, reviewing teaching sessions, and surveys of participant feedback, whereby the implementation of course objectives was the same in all batches. The study was voluntary, and informed consent was obtained through a written form after a briefing on the purpose and confidentiality of the study. Data analysis was performed using IBM SPSS Statistics version 28.0. Normality of continuous variables was assessed using the Shapiro-Wilk test. As age, years of teaching experience, and Adversity Quotient (AQ) scores were non-normally distributed, they were summarized as

median with interquartile range (IQR). Categorical variables, including gender, designation, and qualification, were expressed as frequencies and percentages. Pre- and post-intervention AQ scores were compared using the Wilcoxon signed-rank test. Differences in AQ scores by gender were analyzed using the Mann-Whitney U test, while comparisons across years of teaching experience were performed using the Kruskal-Wallis test. Demographic variables (age, gender, and designation) were stratified, and post-intervention AQ categories were compared using the Chi-square test. Subgroup analyses were also conducted, with median AQ scores compared across gender and years of experience. A p -value < 0.05 was considered statistically significant.

RESULTS

Among the 55 medical teachers enrolled in the six-month Certificate Course in Health Professional Education (CHPE), the majority were females, most participants had extensive professional exposure holding various postgraduate degrees, the majority belonged to clinical sciences, and most were working in public sector institutions (Table 1).

Table 1: Demographic Characteristics of Study Participants (n=55)

Variables	Category	Frequency (n%)
Gender	Male	19 (34.5%)
	Female	36 (65.5%)
Years of Teaching Experience	< 1 Year	6 (10.9%)
	5–10 Years	14 (25.5%)
	11–15 Years	14 (25.5%)
	> 15 Years	21 (38.2%)
Specialty	Medicine and Allied (Medicine, Pediatrics, Dermatology, Psychiatry, Nephrology)	13 (23.6%)
	Surgery and Allied (General Surgery, Orthopedics, Neurosurgery, Plastic Surgery, Urology, ENT, Ophthalmology, Anesthesiology)	15 (27.3%)
	Obstetrics & Gynaecology	6 (10.9%)
	Basic Sciences (Anatomy, Physiology, Pharmacology, Community Medicine, Microbiology)	10 (18.2%)
	Diagnostic Specialties (Pathology, Radiology)	6 (10.9%)
	Medical Education	5 (9.1%)
Qualification	MBBS + MCPS	4 (7.3%)
	MBBS + MPhil	10 (18.2%)
	MBBS + FCPS	35 (63.6%)
	MBBS + MHPE / MRCP	6 (10.9%)
Job Sector	Public	40 (2.7%)
	Private	15 (27.3%)

A statistically significant increase was observed in the median AQ scores of participants following the six-month CHPE course ($Z = -5.943$, $p < 0.001$). However, in the absence of a control group, this improvement represents a pre-post association and should not be interpreted as definitive evidence of a causal effect from the CHPE program, indicating a substantial improvement in their ability to cope with and respond to adversity (Table 2).

Table 2: Comparison of Pre- and Post-Intervention Adversity Quotient(AQ)Scores(n=55)

Variables	Median (IQR)	Z-value	p-value	Effect size (r)	95% Confidence Interval
Pre-intervention AQ	106 (96-118)	-5.943	<0.001*	0.80	0.68 - 0.88
Post-intervention AQ	142 (134-156)				

*Wilcoxon Signed-Rank Test, p-value<0.05

Following completion of the six-month course, substantial improvement was observed, with 98.3% medical teachers achieving a marked positive shift in resilience levels after the intervention. Only 1.8% remained in the Low AQ category(Figure1).

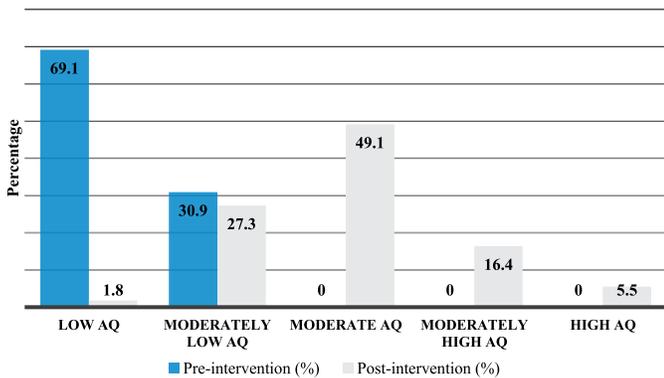


Figure 1: Comparison of Adversity Quotient (AQ) Categories of Medical Teachers Before and After the Certificate Course in Health Professional Education(CHPE)(n=55)

Before the CHPE intervention, male participants demonstrated slightly higher median AQ scores than females, and this difference was statistically significant (U = 228.000, Z = -2.023, p=0.043). After completion of the six-month course, the difference between male and female AQ scores was no longer significant (U = 291.500, Z = -0.895, p=0.371), suggesting comparable post-intervention resilience gains across genders. Analysis of Pre-intervention AQ scores revealed a significant difference

Table 4: Comparison of AQ Scores by Gender and Years of Experience

Gender	Years of Experience	Pre-intervention AQ Median (IQR)	Post-intervention AQ Median (IQR)	Gender Effect p-value	Experience Effect p-value	Gender × Experience Interaction p-value
Male	<1 Year	102 (94-112)	144.33 (144-145)	0.059	0.101	0.405
	5-10 Years	108 (100-120)	138.43 (120-160)			
	11-15 Years	117 (102-124)	116.80 (90-170)			
	>15 Years	103.5 (92-110)	141.75 (130-155)			
Female	<1 Year	87.33 (82-95)	163.33 (152-175)	0.079	0.315	0.368
	5-10 Years	110.57 (102-122)	138.57 (130-150)			
	11-15 Years	108.44 (104-126)	147.78 (140-160)			
	>15 Years	95.76 (94-112)	146.24 (130-160)			

DISCUSSION

Medical practitioners often encounter stressful experiences in clinical and academic practice, and patients and their families are often viewed as the initial victims, and their caregivers as the second victims in unfortunate

occurrences. The research touches upon this essential point that has been previously ignored, i.e., the psychological health of medical teachers, thereby contributing to our knowledge on AQ and its possible

Table 3: Association of Pre- and Post-Intervention Adversity Quotient(AQ)Scores with demographics(n=55)

Variables	Gender	Median (IQR)	Z-value	p-value
AQ Measure				
Pre-intervention AQ	Male	108 (98-120)	-2.023	0.043*
	Female	103 (94-115)		
Post-intervention AQ	Male	140 (130-154)	-0.895	0.371
	Female	143 (135-158)		
AQ Score				
Variables	Gender	Median (IQR)	χ ² (df)	P-value
Pre-AQ	<1 Year	99.0 (90.0-110.0)	8.79 (3)	0.032 [§]
	5-10 Years	110.0 (101.0-118.0)		
	11-15 Years	112.0 (100.0-124.0)		
	> 15 Years	96.0 (84.0-108.0)		
Post-AQ	<1 Year	154.0 (145.0-165.0)	2.15 (3)	0.542 [§]
	5-10 Years	139.0 (122.0-158.0)		
	11-15 Years	137.0 (120.0-162.0)		
	>15 Years	146.0 (135.0-160.0)		

[§]Kruskal-Wallis H test

The gender and years of experience analysis of the AQ scores revealed that all subgroups had an increase in their median AQ scores after the educational intervention. Even though the median scores showed a positive change in all the groups, the results showed that AQ scores were not statistically influenced by gender or years of experience, and the interaction between Gender and Years of Experience was not significant(Table 4).

impact on empowering teachers, thereby enhancing the quality of medical education [12, 13]. The current study has appropriately assessed the effects of a six-month-long Certificate Course in Health Professional Education (CHPE) on the AQ of medical teachers who had attended the course at a public-sector medical university in Pakistan. The findings revealed that there was a considerable increase in AQ scores after the CHPE program was undertaken. It was found that the median AQ rose to 142 (IQR 134–156) ($p < 0.001$). These results align with the past research that has shown that professional education interventions, especially those that include reflective learning and self-regulation, may support psychological flexibility and coping strategies by educators and clinicians [14, 15]. Most of the participants (69.1%) recorded low AQ levels prior to intervention, but after the CHPE course, nearly half the participants (almost 50.4%) reported moderate AQ, and another 21.9% reported moderately high or high AQ. Adult learning principles, mentoring, and feedback integrated in the faculty development programs have proven to have positive effects on self-efficacy, motivation, and professional identity variables that are closely interconnected with AQ improvement [16]. The analysis of gender showed that the participants who are male presented with a slightly higher AQ when compared to women ($p = 0.043$), which may be due to prior exposure to leadership or decision-making positions. The same patterns can be noted in other resilience training and emotional intelligence programs in which gender differences in coping styles and stress perception may be minimized with the help of structured learning environments [17, 18]. Interestingly, there was no significant difference in AQ improvement with teaching experience, with participants of all levels of experience showing similar post-intervention improvements. This fact can be interpreted to mean that the CHPE course is not only beneficial to senior faculty but also to early-career educators. As per previous research, resilience can be developed by means of specific training, irrespective of professional experience, which supports the idea that adaptability is something that can be taught and changed [19, 20]. This observation is not a new one since previous research has established that training programs that are well-planned usually have an equal impact on the learners regardless of their gender. As an example, a systematic review revealed that communication training in medical education had an equal positive effect on both male and female students [21]. Secondly, teacher training studies have indicated that there are no consistent gender or years-of-teaching differences in programs that can boost self-efficacy and well-being. Collectively, these results support the idea that designed educational interventions can generate similar effects in heterogeneous cohorts of

participants, at least when very well designed, and are therefore especially useful in inclusive professional development [22].

A primary methodological limitation is the pre-test post-test design without a concurrent control group. Despite the fact that this study showed a substantial post-intervention change in AQ, its small sample and single-institution design have the potential to limit its generalizability. Also, the experiment used self-reported scores of AQ, which may be subject to the social desirability bias. Future studies need to involve multicenter longitudinal investigations involving bigger samples to determine the sustainability of AQ improvement. Lack of a control group and short-term follow-up was another limitation of this study.

CONCLUSIONS

The results indicate that faculty development programs like the CHPE program are crucial in enhancing the resilience and flexible nature of medical teachers. The inclusion of AQ-related modules in health professional education programs in the future would result in improved general well-being, instructional performance, and leadership potential of medical educators in the long run, benefiting learners and healthcare systems.

Authors' Contribution

Conceptualization: BS

Methodology: BS

Formal analysis: BS

Writing and Drafting: BS

Review and Editing: BS

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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