

# Intervention for burnout among postgraduate chemistry education students

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Florence Obiageli Ezeudu<sup>1</sup>,  
Florence Oboochi Attah<sup>1</sup>,  
Anthonia Ebere Onah<sup>1</sup>,  
Tochukwu Longinus Nwangwu<sup>2</sup> and  
Ekwutosi Monica Nnadi<sup>3</sup> 

## Abstract

**Objective:** This study investigated the efficacy of a group rational emotive behavioural intervention for burnout among postgraduate chemistry education students in Nigeria.

**Method:** Participants were 36 postgraduate chemistry education students with high burnout symptoms; 18 students were randomly assigned to an experimental group and 18 to a control group. The Oldenburg Burnout Inventory – *Student Version* was used to assess burnout.

**Results:** There was no significant difference between the experimental group and control group in pretest mean burnout scores. However, experimental group posttest scores showed a significant improvement compared with both experimental group pretest scores and with control group posttest scores, indicating that the group rational emotive behavioural intervention was effective in enabling postgraduate chemistry education students to manage burnout. Experimental group follow-up scores showed a significantly sustained improvement compared with both experimental group posttest scores and with control group follow-up scores, indicating that the effect of the intervention was maintained at follow-up.

**Conclusion:** The group rational emotive behavioural intervention was an effective treatment modality for burnout in postgraduate chemistry education students.

<sup>3</sup>Department of Arts Education, University of Nigeria  
Nsukka, Enugu State, Nigeria

## Corresponding author:

Florence Oboochi Attah, Harden Building, Department of  
Science Education, University of Nigeria Nsukka, P.M.B  
410001, Enugu State, Nigeria.

Email: [florence.attah@unn.edu.ng](mailto:florence.attah@unn.edu.ng)

<sup>1</sup>Department of Science Education, University of Nigeria  
Nsukka, Enugu State, Nigeria

<sup>2</sup>Department of Educational Foundations, University of  
Nigeria Nsukka, Enugu State, Nigeria



## Keywords

Burnout, postgraduate students, chemistry education, Nigeria, rational emotive behaviour therapy, intervention

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## Introduction

Research shows that burnout is a growing problem among postgraduate students.<sup>1-3</sup> Student burnout is a syndrome characterized by exhaustion and disengagement owing to prolonged stressful experiences in school. Burnout is a significant predictor of suicidal ideation,<sup>4</sup> depression and life dissatisfaction.<sup>5</sup> However, interventional studies have demonstrated that rational emotive behavioural interventions can help to reduce burnout symptoms in undergraduate students,<sup>6</sup> school teachers<sup>7,8</sup> and nurses.<sup>9</sup> The basic assumption behind the use of rational emotive behavioural interventions to treat burnout is that irrational beliefs predict burnout symptoms,<sup>10</sup> and that the alteration of irrational beliefs associated with school work can substantially change burnout scores.<sup>6</sup> Thus, we proposed that a group rational emotive behavioural intervention could reduce burnout in postgraduate chemistry education students in Nigeria.

In Nigeria, the objectives of postgraduate chemistry education programmes include the production of high-quality chemistry teachers, educators and administrators; the development of scholars who are knowledgeable, competent and have the requisite skills in chemistry education; the production of a high-level workforce for policy initiation and implementation in chemistry education for industrial and technological development; and the production of chemistry teachers who can give Nigerian education a national identity and help it make a global impact.<sup>11</sup> These objectives

may not be fully realizable if chemistry education students experience mental health problems. A recent survey of 611 chemistry education students in universities in south-east Nigeria identified high burnout in these students (80.4% had signs of substantial exhaustion, 71.2% had signs of high depersonalization and 77.7% had signs of low personal accomplishment).<sup>12</sup> Given that burnout is prevalent in chemistry education students in Nigerian universities, we aimed to examine the implementation of a group rational emotive behavioural intervention to reduce burnout among these students. The research goal was to investigate the efficacy of a group rational emotive behavioural intervention on burnout in postgraduate chemistry education students in universities in southeast Nigeria. The research question that guided this investigation was 'What is the efficacy of a group rational emotive behavioural intervention on burnout in postgraduate chemistry education students?'

## Method

### *Study design and ethical considerations*

This was a group randomized controlled trial. The research was conducted according to the principles of the Helsinki Declaration, and was approved by the Faculty of Education Research Ethics Committee, University of Nigeria, Nsukka. This study was also conducted in accordance with the research principles of

the American Psychological Association. Written informed consent was obtained from all participants.

### **Participant selection**

A total of 620 postgraduate chemistry education students in universities in southeast Nigeria were initially surveyed for inclusion in the study. Inclusion criteria were as follows: not currently involved in a burnout treatment intervention, and not suffering from any type of psychiatric disorders. Sample size adequacy was assessed using G\*power software (Heinrich-Heine-Universität Düsseldorf, Germany),<sup>13</sup> which gave an *a priori* statistical power of .90 for conducting within-between subjects analysis of variance (ANOVA) (chosen effect size  $f = .25$ ,  $\alpha = .05$ ).

### **Study procedure and intervention**

Participants were randomly assigned to study groups using Random Allocation Software (RAS) (Dr Mahmood Saghaei, Isfahan University of Medical Sciences, Iran).<sup>14</sup> The computer software-generated random numbers from RAS enabled the researchers to eliminate selection bias as the study participants had an equal chance of being allocated to either the treatment or control group. A statistician with a doctoral degree carried out the participant assignment and the concealment of allocation was conducted using sequentially numbered containers. The Oldenburg Burnout Inventory for Students (OLBI-S)<sup>15</sup> was used to collect participant data at pretest, posttest and follow-up. The OLBI-S has 16 items that assess student burnout on a four-point rating scale and two dimensions (exhaustion and disengagement). The OLBI-S has been validated for Nigerian samples.<sup>6,8</sup> In this study, Cronbach's alpha reliability coefficients for the two OLBI-S dimensions were .82 (Exhaustion) and .83

(Disengagement). Higher OLBI-S scores indicate greater burnout. The time between pretest and posttest was 4 weeks; the time between posttest and follow-up data collection was 14 weeks. A rational emotive behavioural treatment manual for student burnout by Ogbuanya et al.<sup>6</sup> was used to enable students in the experimental group to manage burnout for 12 weeks. The details of this treatment manual, including session goals, techniques and activities, have been previously published (Ogbuanya et al.).<sup>6</sup> Students in the control group received school-based counselling developed by the participating universities to benefit their students. The counselling comprises year-round counselling services that provide mental health support, short-term therapy, academic and career guidance, personal and social support and other psychological services to individual students and groups; it is run by professional therapists who maintain student confidentiality.

### **Data screening and analysis**

Screening for missing data showed that there were no data missing. A mixed within-between subjects ANOVA was used to analyse the pretest, posttest and follow-up data. A paired *t*-test was used to analyse the within-group effect of the intervention on student burnout. The effect size measure was eta squared. Statistical analyses were conducted using SPSS, version 22 (IBM Corp., Armonk, NY, USA).

## **Results**

Of the 620 students initially surveyed, 36 were identified as having burnout at pretest and they participated in this study (18 students in the experimental group; 18 students in the control group). The mean age difference ( $\pm$ standard deviation) between the experimental group ( $32.00 \pm 2.43$  years) and

control group ( $31.94 \pm 2.51$  years) was not significant. In terms of sex, 20 female (55.56%) and 16 male (44.44%) students constituted the study sample. There was no dropout and no participants reported any adverse effects of the intervention. The ANOVA results showed no significant difference between the pretest mean burnout scores of students in the experimental group ( $44.55 \pm 3.31$ ) and those in the control group ( $44.33 \pm 3.19$ ). Experimental group posttest burnout scores ( $19.61 \pm 9.83$ ) showed a significant improvement compared with control group posttest burnout scores ( $44.83 \pm 3.15$ ):  $F(1,34) = 107.504$ ,  $P = .000$ ,  $\eta^2 = .760$ , indicating that the intervention enabled students to manage burnout. In addition, experimental group posttest burnout scores ( $19.61 \pm 9.83$ ) showed a significant improvement compared with experimental group pretest scores ( $44.55 \pm 3.31$ ):  $t(17) = 11.036$ ,  $P = .000$ ; ( $R = .263$ ,  $P = .293$ ), 95% confidence interval (CI) = 19.99589, 29.448556, indicating that the intervention enabled students to manage burnout.

The ANOVA results for the follow-up assessment showed a significantly sustained improvement in experimental group follow-up burnout scores ( $19.56 \pm 10.04$ ) compared with control group follow-up burnout scores ( $44.89 \pm 3.16$ ):  $F(1,34) = 104.225$ ,  $P = .000$ ,  $\eta^2 = .754$ . The paired  $t$ -test results showed that the effect of the intervention was maintained at follow-up as shown by a sustained improvement in experimental group follow-up burnout scores ( $19.56 \pm 10.04$ ) compared with posttest burnout scores ( $19.61 \pm 9.83$ ):  $t(17) = .566$ ,  $P = .579$ ; ( $R = .999$ ,  $P = .000$ ), 95% CI =  $-.15140$ ,  $0.26251$ .

## Discussion

This study aimed to investigate the efficacy of a group rational emotive behavioural intervention on burnout in postgraduate

chemistry education students in universities in southeast Nigeria. The analyses showed no significant difference in pretest mean burnout scores in the experimental and control groups. There was a significant improvement in mean burnout posttest and follow-up scores of students in the experimental group compared with their pretest scores, and compared with posttest and follow-up scores of students in the control group. The findings suggest that the group rational emotive behavioural intervention is an effective treatment modality for burnout in postgraduate chemistry education students. The findings are consistent with those of previous studies indicating that rational emotive behavioural interventions are effective for treating burnout.<sup>6-9</sup> The theoretical and practical implications of the findings are as follows. Theoretically, the results support the use of group rational emotive behavioural interventions for the treatment of student burnout. Practically, as research has demonstrated the presence of burnout in chemistry education students,<sup>8</sup> more action-oriented research is needed to help these students to overcome burnout symptoms.

One of the study strengths is its use of strong methodological and evidence-based theoretical frameworks to develop an intervention to reduce burnout in postgraduate chemistry education students. However, there were some study limitations. The sample size was small and the follow-up period a little too short. As such, these findings require further validation using a larger sample and a longer follow-up period. In addition, the external validity of this study may be limited: the results may be generalizable only to postgraduate chemistry education students. We suggest that future research includes students from other specialties and geopolitical zones. Other limitations include the lack of tables to explain the study results and insufficient information about students' demographic

characteristics. In future research, tables should be used to display the results and the moderating role of demographic characteristics (e.g. sex, age, level of study, income status, relationship status) on the effect of the intervention on burnout should be addressed. An additional study limitation is that one assumption of ANOVA is that groups possess the same or similar standard deviations. More robust statistical methods need to be used by future researchers replicating this study. Additionally, the use of confrontational techniques by rational emotive behavioural intervention therapists may be experienced as intimidation by some clients, and the therapy does not easily permit the exploration of accounts of the individual's childhood.<sup>16</sup> Because burnout is a growing problem among postgraduate chemistry education students in Nigeria, more therapeutic interventions based on rational emotive behavioural principles are required to continuously combat burnout among these students. Given that burnout is a syndrome which also significantly affects nurses, doctors and medical students,<sup>17,18</sup> we suggest testing the efficacy of group rational emotive behavioural interventions to reduce burnout among these groups.

## Conclusion

This study found no significant difference in pretest mean burnout scores of postgraduate chemistry education students in the experimental and control groups. The findings showed that the experimental group experienced a significant improvement in posttest and follow-up scores compared with their counterparts in a control therapy group. This indicated that the group rational emotive behavioural intervention was useful in enabling postgraduate chemistry education students to manage burnout. Thus, group rational emotive behavioural intervention can be considered an effective

treatment modality for burnout in postgraduate chemistry education students.

## Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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## ORCID iD

Ekwutosi Monica Nnadi  <https://orcid.org/0000-0002-1905-9657>

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