

RESEARCH ARTICLE

Investigating the Effect of Educational Intervention Based on the BAZNEF Model on the Improvement of Various Dimensions of Quality of Life in University Students

Maryam Mohammadi^{1,2} Sahar Mohammadnabizadeh^{1*}
¹ Social Determinants of Health Research Centre, Mashhad University of Medical Sciences, Mashhad, Iran

² Department of Health Education and Health Promotion, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran


***Correspondence to:** Sahar Mohammadnabizadeh, Social Determinants of Health Research Centre, Mashhad University of Medical Sciences, Mashhad, Iran; E-mail: nabizadeh.sahar@gmail.com

Received: August 15, 2025;

Accepted: November 23, 2025;

Published: December 2, 2025.

Citation: Mohammadi M, Mohammadnabizadeh S. Investigating the Effect of Educational Intervention Based on the BAZNEF Model on the Improvement of Various Dimensions of Quality of Life in University Students. *Adv Health Behav*, 2025, 8(1): 312-320. <https://doi.org/10.25082/AHB.2025.01.001>

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Abstract: Numerous studies have demonstrated that improving factors like family and social support, subjective norms, and attitudes—key elements of the BASNEF model—can greatly influence individuals' health behaviors. This study evaluated whether an educational intervention based on the BASNEF model improves university students' quality of life. It used a quasi-experimental design with 60 participants in each of the intervention and control groups. Data were collected using three questionnaires—demographics, BASNEF constructs, and quality of life—and analyzed in SPSS. In the intervention group, most dimensions of quality of life improved from pre- to post-intervention, except vitality and emotional role functioning. Significant changes were also seen in intention, subjective norms, attitude, and enabling factors. Notably, enabling factors and attitude emerged as the strongest predictors of quality of life, suggesting that future health programs should prioritize these elements. Overall, health educators and healthcare professionals can deploy the BASNEF model as a practical, cost-effective framework for modifying lifestyle behaviors and promoting positive health-related quality of life outcomes through educational interventions.

Keywords: educational intervention, BAZNEF model, quality of life, university students

1 Introduction

The link between quality of life and health is becoming stronger, with the World Health Organization defining health as a state of complete mental, physical, and social well-being merely the absence of illness or disability. Health-related quality of life typically assesses health in terms of function and overall well-being [1]. Recognizing the importance of promoting and maintaining a healthy lifestyle, especially among university students aged 18-25 who are in a critical transition stage to adulthood, is crucial. This period entails a complex interplay of socio-psychological and biological factors that can render students vulnerable to engaging in high-risk behaviors that may negatively impact their long-term well-being and health. Students who perceive a higher quality of life tend to utilize available services and resources more effectively, leading to better integration in social and academic settings [2].

The success of health education programs largely depends on the appropriate application of models and theories. One of the most valuable educational frameworks for influencing behavior globally, particularly in developing nations, is the BASNEF model [3]. This model integrates aspects of the PRECEDE model and the behavioral intention model, focusing on behaviors, subjective norms, attitudes, and enabling factors [4]. It posits that individuals adopt new behaviors when they perceive them to be beneficial [5]. The assessment process individuals undertake to evaluate behavior efficacy shapes their attitudes towards their actions. Key individuals in a person's life can impact their decision-making for new behaviors, either facilitating or inhibiting change. Social expectations formed by beliefs influence subjective norms, influencing decision-making processes. Factors like resources, ability, and costs play crucial roles in translating intentions into effective actions [6].

Numerous studies have demonstrated that improving factors like family and social support, subjective norms, and attitudes—key elements of the BASNEF model—can greatly influence individuals' health behaviors [7, 8]. In Iran, the BASNEF model has been effectively utilized to encourage preventive behaviors in young girls [9], promote healthy lifestyles among taxi drivers [10], improve the health outcomes of cancer patients [11], enhance self-care practices in

women with high blood pressure [12], and uplift the life quality for individuals with diabetes [13]. Despite these successes, there is a lack of research on the impact of educational interventions based on the BASNEF model on enhancing health-related quality of life among students. This study aims to examine the impact of an educational intervention based on the BASNEF model on improving the quality of life for university students.

2 Materials and Methods

2.1 Procedures and participants

The research undertaken was a quasi-experimental intervention involving 60 participants of university students for each intervention and control group. Prior to the study's commencement, ethical approval was gained from the Ethics Committee. Additionally, all participants provided informed consent. Inclusion criteria involved not participating in relevant educational programs for at least six months prior to the study and actively engaging in training sessions. Exclusion criteria included unwillingness to continue participation, incomplete questionnaire responses, and non-attendance at training sessions.

Participants were chosen from students of university. The sample size was determined using a suitable formula and previous studies [14]. With a power of 0.80, a mean difference of 48.47, and standard deviations of 12.98 and 12.09, and at a confidence level of 0.95, the initial estimated sample size was 52 participants for each intervention and control group. To account for potential subject attrition, the final sample size for each group was increased to 60 participants.

2.2 Measures

2.2.1 Demographic information

The demographic questionnaire includes questions about age and marital status.

2.2.2 Quality of life

To evaluate quality of life, the 36-Item Short-Form Health Survey (SF-36) questionnaire was utilized [15]. The SF-36 questionnaire comprises 36 items that measure 8 dimensions of health, including social functioning (2 questions), physical function (10 questions), limitations in role due to emotional issues (3 questions), limitations in role due to physical issues (4 questions), vitality/energy (4 questions), mental health (5 questions), pain (2 questions), and perception of general health (5 questions). Each item is evaluated, totaled, and converted into a scale from 0 to 100, where higher scores reflect improved health status. The validity of this scale has been confirmed by Montazeri et al. [16]. Furthermore, the reliability, assessed from a pilot study involving 30 cases using the Cronbach's alpha coefficient, resulted in a value of 0.88.

2.2.3 BASNEF model questionnaire

The BASNEF model questionnaire consists of 24 questions using a five-point Likert scale. The questionnaire covers various subscales: subjective norms, reflecting the perceived social pressure to comply with influential individuals (6 items); attitude, representing the individual's beliefs about a situation or object that influence their response (6 items); enabling factors, encompassing resources like money, facilities, and skills necessary for behavior realization (6 items); and behavioral intention (6 items). The validity of this questionnaire in Iran was confirmed in the study by Bayat et al. [17].

2.3 Intervention

For the intervention group, the intervention according to the BASNEF model consists of 6 sessions lasting 60 minutes each over a period of 6 weeks. Various training methods are utilized, including group discussions, lectures, question and answer sessions, and educational aids such as pamphlets and PowerPoints. The educational content covers a range of topics along with educational and communication skills.

In the initial two sessions, the focus is on enhancing knowledge and altering beliefs and attitudes. Lectures are delivered on the definition of quality of life and lifestyle modifications to shift individual beliefs and attitudes, motivating participants to seek more information on health-related behaviors and understand the benefits of engaging in these behaviors. The necessity of avoiding high-risk behaviors that could negatively impact quality of life is also emphasized.

During the third and fourth sessions, previous content is reviewed, and additional education

is provided on the advantages of adopting health-promoting behaviors and the consequences of neglecting them. Participants are taught the expected behaviors and how to execute them, practical methods for managing social and emotional role functioning, mental health strategies, coping with negative emotions, and discontinuing harmful behaviors to boost behavioral intention. In addition, various interventions were implemented to enhance the enabling factors that facilitate better health outcomes. These factors included clarifying the effective components of the disease, such as access to resources like money, time, knowledge, and skills. The training also focused on teaching problem-solving strategies and coping mechanisms for adapting to challenges and managing negative thoughts through techniques like note-taking, recording, and replacing negative thoughts with positive ones.

To reinforce the training and promote continuity, educational pamphlets were distributed to all participants. Moreover, the researcher provided their telephone number for participants to reach out with questions or concerns during the study. In this study, the enabling factors that were emphasized included having the necessary facilities and conditions to achieve health-related goals, building strong relationships with others, and having access to relevant information and clear explanations about factors that promote health.

In sessions five and six, we recognized the significant role that family members play in shaping individuals' health-oriented behaviors. Due to the limitations of face-to-face contact with some family members, trained materials were provided to participants' family members in a booklet format.

In the final session, we employed brainstorming, group discussions, and peer exchange to identify the weaknesses and strengths of participants in performing health-related behaviors. We then provided guidance on how to improve these areas. Additionally, educational pamphlets focusing on health-promoting behaviors were distributed to the intervention group participants. To further encourage learners to adopt healthy behaviors, individual counseling was offered to those who struggled with these behaviors, with a focus on breaking down goals into smaller, achievable steps. Learners who successfully completed parts of the program were encouraged to do so in the presence of their peers. Finally, to ensure continuity and follow-up, a WhatsApp group was formed and training messages were sent to study subjects once a week for three months.

The control group will not receive any educational interventions. However, at the conclusion of the study, educational pamphlets will be distributed to all participants in this group. The questionnaires will be completed by participants at two points in time: before the intervention begins, and again three months after the completion of the six-week intervention.

2.4 Statistical analyses

The initial phase of the data analysis involved evaluating the normality of the variables using the Kolmogorov-Smirnov test. Following this, paired t-tests were employed to compare means both before the intervention and at a six-week follow-up, as well as to assess differences between groups. Additionally, linear regression analyses were performed to determine the influence of various constructs and the predictive power of the BASNEF model. The data analysis was carried out using SPSS22, with a statistical significance threshold set at $p < 0.05$.

2.5 Ethics

Prior to the study's commencement, ethical approval was gained from the Ethics Committee. Additionally, all participants provided informed consent.

3 Results

The demographic analysis shown in [Table 1](#) indicates that there were no statistically significant differences in age and marital status between the intervention and control groups.

Table 1 The characteristics of participants at baseline

Variable	Control	Intervention	<i>P</i> value
Age, Mean (Standard Deviation)	20.93 (1.76)	20.87 (1.90)	0.84
Marital status, Number (Presence)			
Married	7 (11.7)	10 (16.7)	0.47
Single	53 (88.3)	50 (83.3)	

The results displayed in [Table 2](#) show that there were no significant differences between the two groups concerning total quality of life and its dimensions before the intervention. However, following the intervention, the mean scores for most dimensions of quality of life—except for vitality and emotional role functioning—demonstrated significant changes between pre- and post-intervention measurements. Specifically, the intervention group showed higher scores after the intervention compared to their scores before the intervention.

Table 2 Comparison of the mean and standard deviation scores of BAZNEF constructs

Variable	Time	Control	Intervention	P value
Attitude	Pretest	20.38 (5.57)	19.95 (5.92)	0.24
	Follow-up	20.60 (5.42)	23.47 (5.27)	0.003
	P value	0.17	0.001	
Subjective norms	Pretest	17.30 (6.42)	18.85 (6.29)	0.19
	Follow-up	16.73 (6.37)	20.28 (6.88)	0.001
	P value	0.14	0.001	
Enabling factors	Pretest	16.12 (6.07)	16.48 (5.31)	0.19
	Follow-up	16.35 (5.44)	18.75 (6.35)	0.004
	P value	0.38	0.01	
Intention	Pretest	18.15 (5.72)	18.08 (5.94)	0.92
	Follow-up	18.88 (6.17)	21.80 (6.39)	0.003
	P value	0.10	0.001	

The analysis indicated that there were no significant differences between the control and intervention groups at the beginning of the study (baseline) for all constructs of the BASNEF model, as shown in [Table 3](#). However, within the intervention group, a significant change was noted between the pre- and post-intervention periods for intention, subjective norms, attitude, and enabling factors.

Table 3 Comparison of the mean and standard deviation scores of quality of life components

Variable	Time	Control	Intervention	P value
Vitality	Pretest	55.18 (14.45)	54.47 (14.60)	0.57
	Follow-up	55.08 (14.76)	54.30 (13.58)	0.57
	P value	0.93	0.89	
Physical functioning	Pretest	66.80 (10.93)	67.17 (11.59)	0.08
	Follow-up	68.00 (11.25)	72.50 (8.90)	0.004
	P value	0.08	0.001	
Bodily pain	Pretest	63.62 (10.74)	65.15 (11.03)	0.09
	Follow-up	62.88 (11.35)	67.45 (11.34)	0.001
	P value	0.64	0.01	
General health perceptions	Pretest	61.37 (13.48)	62.75 (11.96)	0.22
	Follow-up	61.92 (12.69)	68.52 (10.40)	0.001
	P value	0.62	0.001	
Physical role functioning	Pretest	54.52 (13.47)	53.55 (13.89)	0.11
	Follow-up	53.98 (13.76)	59.15 (12.93)	0.003
	P value	0.12	0.001	
Emotional role functioning	Pretest	55.40 (13.81)	55.18 (13.96)	0.82
	Follow-up	56.07 (14.01)	55.53 (12.42)	0.73
	P value	0.32	0.81	
Social role functioning	Pretest	66.30 (11.18)	66.48 (10.89)	0.78
	Follow-up	67.15 (11.08)	71.13 (10.39)	0.01
	P value	0.10	0.001	
Mental health	Pretest	64.03 (12.05)	63.93 (12.25)	0.91
	Follow-up	63.10 (12.28)	70.43 (11.65)	0.001
	P value	0.10	0.001	
Quality of life (total)	Pretest	94.50 (26.33)	93.98 (26.40)	0.06
	Follow-up	96.43 (25.53)	136.03 (26.74)	0.0001
	P value	0.06	0.0001	

Moreover, [Table 4](#) demonstrates that enabling factors and attitude were identified as the most significant predictors of life quality.

Table 4 Rates of analyses regression of constructs of BASNEF model

Independent Variable	β Standard	<i>t</i>	<i>P</i>	95% CI		<i>R</i> ²	Dependent Variable
				Lower	Upper		
Attitude	0.27	4.32	0.001	0.19	0.51	0.88	Quality of life
Subjective norms	0.21	2.02	0.04	0.004	0.42		
Enabling factors	0.30	3.51	0.001	0.15	0.55		
Intention	0.21	2.28	0.02	0.03	0.42		

Note: CI = Confidence Interval

4 Discussion

Research has shown that model-based training has a positive effect on behavior, leading to improved outcomes. As a result, it is suggested that health programs should incorporate model-based training approaches instead of traditional education-based training plans, in order to enable measurable impact.

Our findings indicated that after the intervention, the mean quality of life score showed a significant difference between pre- and post-intervention, with the intervention group displaying higher scores. The application of BASNEF, proves to be effective in improving overall health-related quality of life among students. In particular, this program showed positive impacts on various subscales, including bodily pain, physical functioning, general health perceptions, mental health, social role functioning, and physical role functioning. Previous studies have consistently shown that behavior modification through educational programs utilizing the BASNEF model is often successful [18, 19]. According to the BASNEF model, when attitudes and subjective norms are favorable towards a particular behavior, and enabling factors act as mediators, behavioral intention can lead to the desired behavior [20]. In this case, it appears that the BASNEF-based intervention program was successful in changing the attitudes and behaviors of the students towards a healthier lifestyle, resulting in improved quality of life outcomes. The study's findings highlight the importance of using evidence-based models such as BASNEF to design and implement effective health promotion programs for students.

Despite a lack of studies on the BASNEF model's application in university students to improve health-related quality of life, research has been conducted on its effectiveness in other populations. For instance, Zendehtalab et al.'s paired t-test results showed a significant increase in QOL dimensions after the intervention compared to before [13]. Furthermore, Baljani et al. found that a self-management interventions for hemodialysis patients were effective only in improving specific aspects of life quality [21]. A study by Aghajani et al. based on the BASNEF model among hemodialysis patients found that there were significant differences between the control and intervention groups in the subscales of physical symptoms, anxiety, and social dysfunction, after the intervention [22].

Research by Ngoma et al. demonstrated that training utilizing BASNEF model was effective in improving physical, anxiety, depression, and social function dimensions [23]. The study by Bayat et al. found that a BASNEF-based intervention was effective in improving quality of life among health volunteers [17]. In another study, Hatami et al. reported that patients showed no significant difference in quality of life scores before the intervention, but three months after the intervention, a significant difference was observed between the control and intervention groups [24]. The study by Michalsen et al. among cardiovascular patients found significant improvements in dimensions of mental health, general health, vitality, physical functioning, social functioning, physical limitation, and bodily pain after the intervention [25]. Research has consistently shown that interventional programs according to the BASNEF model are often successful in changing behaviors [17, 26]. Our results note that while the model has been successful in improving certain aspects of quality of life, there is still a need for further research on its long-term effects on student health outcomes. This highlights the importance of continued evaluation and refinement of the model to ensure its effectiveness in promoting positive health behaviors and outcomes.

Our findings revealed a significant average difference in subjective norms between the pre- and post-intervention periods within the intervention group. The social norms, which were comprised of family, friends, classmates, and school officials like teachers, played a crucial role in influencing the assertive behavior of BASNRF group cases. This indicates that important individuals, such as friends and family members can influence patients' perceptions of their

well-being. As such, significant people have a critical role to play in facilitating individuals to adopt assertive behaviors [27]. In support of this finding, Torknejad et al. found that subjective norms improved among patients in the intervention group following a 4-week educational program [28]. Villarino et al. discovered that a BASNEF-based education can enhance various aspects of participants' lifestyle by modifying social norms through the involvement of their family members [29]. This research highlights the importance of involving patients, healthcare workers, family members, and individuals who have an impact on patient behavior in lifestyle interventions for managing hypertension. Perception of social and psychological health is influenced by a wide range of individuals, including family, friends, and other significant people.

As such, the BASNEF model not only affects an individual's lifestyle and behaviors but also impacts their social and psychological health by involving family members and other significant people. Likewise, Giri and Taksande's study evaluated the effectiveness of the BASNEF model on the life quality of perimenopausal women and found that the mean scores for subjective norms significantly improved in the intervention group by the end of the third month [30]. The results of Bayat et al.'s study, which assessed the impact of an interventional program based on BASNEF model on enhancing life quality of health volunteers, indicated that the mean scores of subjective norms significantly increased in the intervention group following the intervention [17]. Thus, the BASNEF model can be effective in improving health outcomes by influencing subjective norms and promoting positive behaviors.

Our findings demonstrated a significant average difference in attitudes between the pre- and post-intervention periods within the intervention group. The improvement in attitudes within the BASNEF group may be linked to the influence of students' subjective norms and enabling factors present in the intervention program. This aligns with other investigations that have shown that enabling factors can contribute to shifts in attitudes [31]. Villarino et al.'s study illustrated that an educational programs based on BASNEF can enhance various aspects of individuals' lifestyle by bolstering their attitudes [29]. Similarly, Torknejad et al.'s study found that patients' attitudes improved immediately and three months after an BASNEF-based education on treatment adherence after coronary artery bypass surgery [29]. These studies suggest that the BASNEF model can be effective in promoting positive attitude changes among individuals, which can lead to improved health behaviors and outcomes. Our findings offer evidence of the BASNEF model's effectiveness in fostering positive attitude changes among individuals, underscoring its potential as a valuable tool for encouraging healthy behaviors and improving health outcomes.

Our findings indicated a significant average difference in enabling factors between the pre- and post-intervention periods within the intervention group. Consistent with our results, Hazavehei et al.'s study, which aimed to apply the BASNEF model to educate large populations about Cutaneous Leishmaniasis, showed that mean scores of enabling factors significantly increased in the intervention group after the education [32]. In a similar vein, Zendehtalab et al.'s study aimed at enhancing life quality of health volunteers through the BASNEF model revealed a notable increase in enabling factors scores following the intervention when compared to scores from before the intervention [13]. These studies collectively demonstrate that enabling factors play a crucial role in changing behavioral intention into taking intended behavior based on BASNEF model planning and implementing educational programs. Thus, enabling factors can be a valuable indicator of the effectiveness of an educational program in promoting positive behavior changes.

Our findings indicated a significant average difference in intention between the pre- and post-intervention periods within the intervention group. Consistent with our results, Torknejad et al.'s study found that an educational intervention based on the BASNEF model was effective in influencing behavioral intention in patients after coronary artery bypass surgery [28]. Likewise, Sarayloo et al.'s study demonstrated that an interventional program grounded in the BASNEF model led to an increase in behavioral intention scores within the intervention group [5]. Hazavehei et al.'s study, which aimed to apply the BASNEF model to educate large populations about Cutaneous Leishmaniasis, also showed that mean scores of behavioral intention significantly increased in the experimental groups after the educational intervention [32]. These studies demonstrate the effectiveness of the BASNEF model in changing behavioral intention and promoting desired behaviors. Behavioral intention is a critical component of the BASNEF model and plays a key role in predicting behavior change.

Although our investigation offers valuable insights, it also has certain limitations. The use of self-report questionnaires introduces the possibility of biased results, such as recall bias, which may affect the accuracy of our findings. Furthermore, the three-month follow-up period may

not be representative of long-term outcomes, and future studies should consider longer-term assessments.

Additionally, our study was limited to a specific demographic or population group, which may restrict the generalizability of our results to other settings. It is also worth noting that no previous studies were found that applied the BASNEF model specifically to university students with the goal of improving health-related quality of life. As a result, our discussion section compared our findings to studies that utilized the BASNEF model in other contexts or with different populations.

The lack of similar studies in this specific area is acknowledged as a limitation of our investigation. However, by addressing this gap in research, our study contributes to the existing body of knowledge on health education interventions aimed at improving health-related quality of life and management. Future studies can build upon our findings to explore the applicability and effectiveness of the BASNEF model in various settings and populations.

Despite the limitations of the present study, we believe that our findings are significant, as they likely represent the first report to demonstrate the impact of the BASNEF model on improving various aspects of quality of life in students. This study's results suggest that health educators and healthcare professionals can use the BASNEF model as a practical and cost-effective approach to modify lifestyle behaviors and promote positive changes. One of the major strengths of this study is the use of the BASNEF model as a theoretical framework and comprehensive behavior modification model for patients with hypertension. This approach has the potential to enhance the outcomes of educational interventions aimed at improving health-related quality of life. By utilizing this model, healthcare professionals can create tailored interventions that cater to the specific needs and motivations of individuals, ultimately resulting in more effective behavior change.

5 Conclusion

The current investigation revealed that, following the intervention, the mean scores for most dimensions of quality of life—excluding vitality and emotional role functioning—showed significant changes between pre- and post-intervention measurements. Additionally, within the intervention group, notable changes were observed in intention, subjective norms, attitude, and enabling factors between the pre- and post-intervention periods. The findings of this study indicate that health educators and healthcare professionals can effectively utilize the BASNEF model as a practical and cost-effective strategy for modifying lifestyle behaviors and fostering positive changes. This approach has the potential to improve the outcomes of educational interventions aimed at enhancing health-related quality of life. Furthermore, since enabling factors and attitude emerged as the most significant predictors of quality of life, it is essential to focus on these two elements in future health intervention programs.

Ethical considerations

The study was approved by the Mashhad University of Medical Sciences ethics board, Iran (Number: IR.MUMS.FHMPM.REC.1403.064). In this study, the principles of the Declaration of Helsinki have been followed.

Acknowledgements

The authors wish to express their gratitude towards the Social Determinants of Health Research Center and vice president of research in Mashhad University of Medical Sciences.

Authors' contributions

MM helped to edit the manuscript. SM participated in the writing and design of the study, performed the statistical analysis and drafted the manuscript. All authors gave final approval and agreed to be accountable for all aspects of the work, ensuring integrity and accuracy.

Data availability

The data used and analyzed during the current study are available from the corresponding author upon reasonable request.

Consent to participate

A written consent was obtained from all participants after explaining the aim of the study.

Conflict of interests

The authors declare that they have no competing interests.

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