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Psychometric Properties of the Bullying Behaviors Questionnaire among Medical Sciences Students in Clinical Education Settings: A Study in Iran

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Abstract

Introduction:

Bullying behaviors in clinical education settings can adversely affect medical sciences students' learning experiences, academic performance, and well-being. This study aimed to evaluate the psychometric properties of the Bullying Behaviors in Nursing Education (BBNE) questionnaire among medical sciences students in clinical education settings in Iran.

Methods

This cross-sectional study included 739 students from Zanjan University of Medical Sciences, Iran, representing several disciplines, including medicine, nursing, midwifery, operating room technology, and anesthesiology technology. The 18-item Bullying Behaviors in Nursing Education (BBNE) questionnaire was culturally adapted and psychometrically evaluated for use among medical sciences students. Data were analyzed using SPSS and EQS software.

Results

Of the 739 participants, 457 (61.8%) were female, 671 (90.8%) were single, and 692 (93.6%) lived in urban areas. The mean age was 22.93 years (SD = 2.02). Bullying behavior scores differed significantly according to field of study, housing arrangement, and academic semester (all $P < 0.001$). Higher mean scores were observed among students in anesthesiology and medicine, students living in rented housing, and those in semesters 8 or higher. No statistically significant differences were observed according to sex, marital status, ethnicity, urban/rural residence, or employment status (all $P > 0.05$). Confirmatory factor analysis demonstrated an acceptable model fit (CFI = 0.933, RMSEA = 0.070).

Conclusion

The findings indicate that the BBNE questionnaire demonstrates acceptable psychometric properties and an appropriate factorial structure for assessing bullying behaviors among medical sciences students in clinical education settings. Higher bullying behavior scores were associated with field of study, housing arrangement, and more advanced academic semesters. The instrument may be useful for identifying bullying behaviors and informing educational and managerial interventions aimed at promoting a safe and supportive clinical learning environment.

Introduction

Education is one of the fundamental pillars of a country's growth and development (1). In the medical sciences, a substantial proportion of teaching and learning takes place in clinical settings, where

students develop clinical competencies through direct patient care and clinical practice (2). Clinical education provides students with opportunities to translate theoretical knowledge into cognitive, affective, and psychomotor skills that are essential for safe and effective patient care (3).

Various factors can influence the quality of clinical education (4). Previous studies have identified several challenges, including increasing numbers of students in clinical wards, inadequate educational planning, discrepancies between theoretical and clinical courses, and insufficient cooperation among educational authorities (5–7). Other reported challenges include inadequate instructor expertise in clinical teaching, shortages of clinical instructors, insufficient educational facilities, and limited physical space (7–9). Poor cooperation between healthcare staff and students, stressful hospital environments, and limited willingness among experienced instructors to participate in clinical education have also been identified as barriers to effective clinical learning (6, 7, 10). In addition, students' lack of interest in their field of study, insufficient motivation to learn, and fatigue resulting from intensive clinical rotations may negatively affect the quality of clinical education (8, 9, 11). Difficulties in establishing effective communication with instructors, physicians, and healthcare staff, as well as inadequate staff cooperation, represent additional challenges (8, 9, 12).

One of the important factors that may compromise the quality of clinical education is bullying in clinical education settings (10, 13, 14). Bullying may involve direct behaviors such as harassment, ridicule, threats, physical aggression, and theft perpetrated by one or more individuals against another student (15). It may also occur indirectly through behaviors such as intentional exclusion from a peer group, which can result in social isolation (16). Previous studies have shown that bullying may involve repeated threats, intimidation, and other forms of physical or psychological aggression, thereby creating a persistent pattern of harmful interpersonal behavior (17, 18).

A study among medical students found that students encountered several challenges during clinical training, including unmet expectations regarding clinical education, exposure to violence, and unsafe clinical environments. These experiences negatively affected students' learning experiences and overall well-being (10). Similarly, a study conducted among nursing students in Ghana reported experiences of bullying such as shouting, social exclusion, humiliation, and assignment of tasks below students' level of competence. Such experiences were associated with reduced self-confidence and increased stress and anxiety among nursing students (19).

Clinical education settings in the medical sciences are essential for preparing future healthcare professionals. However, their hierarchical structure, high workload, and complex interpersonal interactions may create conditions in which adverse social behaviors, including bullying, can occur (20). Bullying behaviors in these settings may not only adversely affect students' psychological well-being but may also interfere with the clinical learning process and potentially compromise the quality of patient care (21, 22).

Timely identification, prevention, and management of bullying require standardized, accurate, and sensitive assessment instruments. However, existing instruments may not adequately reflect the

specific characteristics of clinical education environments or the diverse populations of medical sciences students. Therefore, establishing the validity and reliability of instruments before their use in broader research is essential.

Because bullying behaviors in clinical education settings may occur repeatedly and take different forms across medical sciences disciplines, there is a need for a valid and reliable instrument capable of identifying and assessing these behaviors in diverse clinical education contexts. In particular, an instrument adapted to the Iranian educational and cultural context could facilitate the assessment of bullying among medical sciences students in Iran.

Therefore, this study aimed to evaluate the psychometric properties of the Bullying Behaviors in Nursing Education (BBNE) questionnaire among medical sciences students in clinical education settings in Iran.

Methods

Study Design and Setting

This cross-sectional study was conducted from September 2021 to August 2022 at Zanjan University of Medical Sciences, Iran.

Participants and Sampling

A total of 739 students from the following educational programs participated in the study: general medicine, nursing, midwifery, operating room technology, and anesthesiology technology. The inclusion criteria were willingness to participate in the study, current participation in clinical rotations in a hospital setting, and at least one year of clinical training experience. Students who were unwilling to participate or who submitted incomplete questionnaires were excluded.

The study was conducted in teaching hospitals affiliated with Zanjan University of Medical Sciences, including Ayatollah Mousavi Hospital, Hazrat Vali Asr Hospital, and Shahid Beheshti Hospital. Each hospital was considered a separate stratum to account for potential differences in the clinical learning environment.

These hospitals were selected because of their extensive clinical interactions and the substantial presence of medical sciences students in their educational environments, making them appropriate settings for assessing bullying behaviors and evaluating the psychometric properties of the instrument.

Sampling Method

Stratified random sampling was used to ensure adequate representation of the target population and reduce potential selection bias. Students in each of the participating hospitals were considered a

separate stratum, and participants were randomly selected from each stratum.

This approach helped account for potential differences in educational environments and variations in the number of students across hospitals, thereby improving the representativeness of the sample.

Study Instruments

Demographic Information Questionnaire

The demographic questionnaire collected information on age, sex, field of study, academic semester, marital status, housing arrangement, place of residence, ethnicity, number of children, living arrangement, and employment status.

Bullying Behaviors in Nursing Education (BBNE) Questionnaire

Data collection was performed using the BBNE questionnaire 18-item scale. This is a previously validated and published instrument, originally developed by Dilek and Aytolan in 2008. Further details regarding its psychometric properties and scoring can be found in the original publication (23). The 18-item Bullying Behaviors in Nursing Education (BBNE) questionnaire was used to assess bullying behaviors experienced by medical sciences students in clinical education settings. The original questionnaire demonstrated a reliability coefficient of 0.93(Appendix). The BBNE questionnaire was developed based on the Workplace Psychologically Violent Behaviors (WPVB) scale developed and psychometrically evaluated by Dilek and Aytolan in 2008 (23). In an Iranian study conducted by Dinmohammadi et al. in 2024, the reliability of the questionnaire was reported as 0.92 based on Cronbach's alpha (13)

The BBNE questionnaire consists of 18 items distributed across four subscales: isolation of students from the educational environment (4 items), attack on academic achievement (4 items), attack on personality (6 items), and direct negative behaviors (4 items) (24).

The internal consistency of the questionnaire, assessed using Cronbach's alpha, was reported as 0.93 (25–30).

After obtaining permission from the original instrument developer, the questionnaire was translated into Persian. The translated items were then reviewed by six faculty members at Zanjan University of Medical Sciences to assess content validity using the Content Validity Ratio (CVR) and Content Validity Index (CVI). Based on their comments and recommendations, necessary revisions were made, and the final 18-item questionnaire comprising four subscales was prepared. The Persian version was subsequently back-translated and approved by the original instrument developer.

Each item was rated on a six-point Likert scale according to the frequency of exposure to the behavior: 0 = never experienced, 1 = experienced a few times a year, 2 = experienced a few times a month, 3 = experienced a few times a week, 4 = experienced once a day, and 5 = experienced several times a day. All items were positively worded, and no reverse-scored items were included.

The total score ranged from 0 to 90, with higher scores indicating more frequent exposure to bullying behaviors. Participants were asked to report the frequency with which they had experienced bullying behaviors in clinical education settings during the previous 12 months.

Data Collection

Data collection began after obtaining the necessary ethical and administrative approvals from Zanjan University of Medical Sciences and the management of the participating hospitals.

After obtaining permission from the hospital authorities, the researchers introduced themselves to the participants, explained the objectives of the study, and assured them that their responses would remain anonymous and confidential and would be used solely for research purposes. Participants were also provided with the necessary instructions on how to complete the questionnaire.

After providing informed consent, participants completed the questionnaire. The questionnaires were administered in clinical education settings in accordance with the study's ethical requirements.

Statistical Analysis

Descriptive statistics were used to summarize the study variables. Continuous variables were presented as means and standard deviations (mean ± SD), whereas categorical variables were presented as frequencies and percentages.

The normality of continuous variables was assessed using the Kolmogorov–Smirnov test. Differences in total questionnaire scores between two groups were examined using the independent-samples t-test, whereas one-way analysis of variance (ANOVA) was used for variables with more than two categories. Pearson's correlation coefficient was used to examine associations between continuous variables.

Construct validity was evaluated using confirmatory factor analysis (CFA). Model fit was assessed using several goodness-of-fit indices, including the chi-square statistic (χ^2), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI)/Tucker–Lewis Index (TLI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Standardized Root Mean Square Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA).

A two-sided P value < 0.05 was considered statistically significant. Statistical analyses were performed using SPSS version 26 and EQS version 6.2.

Ethical Considerations

The study was approved by the Research Deputy of Zanjan University of Medical Sciences and received ethical approval from the Ethics Committee of Zanjan University of Medical Sciences (Ethics Code: IR.ZUMS.REC.1398.104). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Strict measures were implemented to ensure the confidentiality and anonymity of all participants, and informed consent was obtained from all individuals prior to their participation.

Before participation, the study objectives and procedures were explained to all participants, and written informed consent was obtained. Participants were informed that participation was voluntary and that participation or non-participation would have no effect on their academic progress. They were also informed that the study findings would be made available upon request.

Participants completed the questionnaire in a single session, after which the completed questionnaires were collected. All participants were assured that their information would be kept strictly confidential.

Results

A total of 739 students participated in the study. Of these, 457 (61.8%) were female, 671 (90.8%) were single, and 692 (93.6%) lived in urban areas. The mean age of the participants was 22.93 years (SD = 2.02). Age showed a weak but statistically significant positive correlation with the mean questionnaire score ($r = 0.12$, $P < 0.001$) (Table 2).

Regarding field of study, the largest groups were students in nursing (38.4%) and medicine (34.4%). Mean questionnaire scores differed significantly across fields of study ($P < 0.001$). Higher mean scores were observed among students in anesthesiology and medicine compared with students in the other disciplines (Table 1).

A statistically significant difference was also observed according to housing arrangement ($P < 0.001$). Students living in rented housing had higher mean questionnaire scores than those living in dormitories or with their families.

Academic semester was also significantly associated with questionnaire scores ($P < 0.001$). Students in semesters 8 or higher had higher mean scores than students in semester 7 or below.

No statistically significant differences in mean questionnaire scores were observed according to sex, marital status, ethnicity, urban/rural residence, or employment status (all $P > 0.05$) (Table 1).

Confirmatory Factor Analysis

The fit of the proposed measurement model was assessed using multiple goodness-of-fit indices. The chi-square statistic was $\chi^2 = 591.36$ with 129 degrees of freedom.

The incremental and comparative fit indices indicated an acceptable model fit. The NFI, NNFI/TLI, CFI, and IFI values were 0.916, 0.920, 0.933, and 0.933, respectively. The GFI was 0.913, while the AGFI was 0.884 (Table 3).

The SRMR was 0.050, which was below the commonly accepted threshold of 0.08. The RMSEA was 0.070, with a 90% confidence interval of 0.064–0.075, indicating an acceptable level of approximation error (Table 3).

Overall, the findings indicated that the proposed measurement model demonstrated an acceptable to good fit with the observed data. The final measurement model with standardized factor loadings is presented in Fig. 1.

Table 1
Descriptive Statistics of Categorical Variables and Comparison of Total Questionnaire Scores

Variable	Category	n (%)	Mean (SD)	P value
Field of study	Nursing	284 (38.4)	14.88 (12.01)	< 0.001
	Midwifery	98 (13.3)	14.41 (13.46)	
	Operating room technology	45 (6.1)	14.82 (13.51)	
	Anesthesiology	56 (7.6)	21.86 (17.60)	
	Medicine	254 (34.4)	22.69 (15.44)	
Sex	Male	282 (38.2)	18.65 (14.83)	0.354
	Female	457 (61.8)	17.63 (14.38)	
Marital status	Single	671 (90.8)	17.78 (14.25)	0.151
	Married	68 (9.2)	20.43 (16.53)	
Housing arrangement	Dormitory	338 (45.7)	16.03 (13.55)	< 0.001
	Rented housing	150 (20.3)	22.99 (16.42)	
	Living with family	249 (33.7)	17.82 (13.82)	
Ethnicity	Native	345 (46.7)	16.92 (13.85)	0.056
	Non-native	392 (53.0)	19.00 (14.99)	
Place of residence	Urban	692 (93.6)	18.22 (14.57)	0.325
	Rural	37 (5.0)	16.08 (12.59)	
	District	9 (1.2)	12.89 (13.97)	
Employment status	Yes	94 (12.7)	19.69 (16.84)	0.234
	No	644 (87.1)	17.79 (14.12)	
Academic semester	≤ 7	407 (55.1)	14.96 (12.90)	< 0.001
	≥ 8	332 (44.9)	21.77 (15.42)	

Note: P values were obtained using the independent-samples t-test or one-way ANOVA, as appropriate. A P value < 0.05 was considered statistically significant.

Table 2
Pearson Correlation Between Age and Total Questionnaire Score

Variable	Mean (SD)	r	P value
Age	22.93 (2.02)	0.12	< 0.001

Table 3
Model Fit Statistics and Recommended Cutoff Values

Fit index	Value	Recommended criterion
χ^2	591.36	—
Degrees of freedom	129	—
NFI	0.916	> 0.90
NNFI/TLI	0.920	> 0.90
CFI	0.933	> 0.90
IFI	0.933	> 0.90
GFI	0.913	> 0.90
AGFI	0.884	> 0.90*
SRMR	0.050	< 0.08
RMSEA	0.070	< 0.08
90% CI for RMSEA	0.064–0.075	—

*The cutoff value for AGFI should be verified against the criterion used in the statistical analysis.

Discussion

This study aimed to evaluate the psychometric properties of the Bullying Behaviors in Nursing Education (BBNE) questionnaire among medical sciences students in clinical education settings. The findings indicated that the questionnaire demonstrated an acceptable factorial structure and satisfactory model fit, supporting its potential use for assessing bullying behaviors in clinical education environments.

The mean age of the participants was approximately 23 years. Age showed a weak but statistically significant positive correlation with questionnaire scores. This finding may indicate that older students, who generally have greater exposure to educational and clinical environments, may report or perceive bullying behaviors more frequently. Older students may spend more time in clinical settings and encounter more complex interactions with faculty members, healthcare professionals, other students, and patients. Such increased exposure may contribute to greater awareness of inappropriate interpersonal behaviors or greater opportunities to experience them. A study by Zhang et al. (2024) similarly reported an association between clinical experience and reports of bullying or professional mistreatment among nursing students (31).

A significant difference in questionnaire scores was observed across fields of study, with higher scores among students in medicine and anesthesiology. This difference may be related to the characteristics of the educational and clinical environments associated with these disciplines. Fields that involve intensive

interaction with healthcare teams or exposure to high-stress clinical environments may provide greater opportunities for hierarchical interactions and interpersonal tensions. These conditions may influence students' exposure to or perception of bullying behaviors (32). Henning et al. (2024) reported that medical students experienced various forms of mistreatment during clinical placements, including verbal aggression, disrespect, social isolation or exclusion, threats, and physical aggression (33). Similarly, a study by Terkhani et al. (2024) suggested that stressful educational environments and complex interactions among healthcare team members may create conditions conducive to inappropriate professional behaviors, including bullying (13).

The findings also showed a significant association between housing arrangement and questionnaire scores. Students living in rented housing reported higher scores than students living in dormitories or with their families. One possible explanation may involve differences in the availability of social support. Previous research has suggested that students' living arrangements may influence their social relationships, sense of belonging, and psychological well-being. Students living with family members or in dormitories may have greater opportunities to access social support, whereas those living independently in rented housing may experience greater loneliness, social isolation, or psychological stress (34, 35). These factors may influence students' perceptions of or experiences with bullying. However, because of the cross-sectional design of the present study, causal relationships cannot be established.

Students in semesters 8 or higher also had significantly higher questionnaire scores than those in semester 7 or below. This finding may be related to the greater amount of clinical exposure associated with progression through the academic program. Students in advanced semesters generally spend more time in clinical settings and interact more extensively with members of healthcare teams. Consequently, they may have greater opportunities to encounter challenging interpersonal situations or inappropriate behaviors. Previous studies have similarly reported associations between greater clinical exposure, advanced stages of training, and reports of bullying or negative interpersonal experiences (10, 13, 31).

In contrast, sex, marital status, ethnicity, urban/rural residence, and employment status were not significantly associated with questionnaire scores. This finding may suggest that bullying behaviors are not restricted to particular demographic groups. Instead, organizational culture, hierarchical relationships, power structures, and characteristics of the clinical learning environment may play important roles in shaping students' experiences of bullying (36).

Regarding the psychometric properties of the instrument, confirmatory factor analysis demonstrated an acceptable fit between the proposed measurement model and the observed data. The NFI, NNFI/TLI, CFI, and IFI values exceeded 0.90, supporting an acceptable level of comparative model fit. The GFI and AGFI also indicated an acceptable level of absolute model fit. Furthermore, the SRMR was below 0.08, and the RMSEA was 0.070 with a 90% confidence interval of 0.064–0.075. Collectively, these findings support the adequacy of the proposed factorial structure of the questionnaire.

Conclusion

The findings indicate that the Bullying Behaviors in Nursing Education questionnaire demonstrates acceptable psychometric properties and an appropriate factorial structure among medical sciences students in clinical education settings.

Higher bullying behavior scores were associated with older age, field of study, housing arrangement, and more advanced academic semesters. In particular, higher scores were observed among students in medicine and anesthesiology, those living in rented housing, and students in more advanced semesters.

The questionnaire may provide a useful tool for identifying bullying behaviors in clinical education settings and may assist educational and managerial authorities in developing interventions to improve the clinical learning environment. Early identification of bullying behaviors may contribute to the development of preventive strategies and supportive policies aimed at promoting a safe, respectful, and supportive educational environment.

Study Limitations

Several limitations should be considered when interpreting the findings. First, the cross-sectional design does not allow causal relationships between the examined variables to be established. Second, the data were based on students' self-reports and may therefore have been influenced by response bias, recall bias, or individual perceptions of bullying behaviors. Third, the participants were recruited from medical sciences programs at a single university; therefore, the generalizability of the findings to students at other universities or educational settings should be considered with caution. Fourth, certain confounding variables, such as individual personality traits or specific instructor-student dynamics, were not accounted for in the current study, which may influence the observed bullying behaviors.

Recommendations

Future studies should evaluate the psychometric properties of the questionnaire in larger and more diverse populations and across multiple universities to improve the generalizability of the findings. Longitudinal studies may also provide a better understanding of changes in bullying behaviors throughout different stages of clinical education.

Future research could additionally examine the relationship between bullying behaviors and other educational and psychological outcomes, as well as evaluate interventions designed to prevent and manage bullying in clinical education settings.

Integrating validated assessment instruments into clinical education quality-assurance programs may facilitate the early identification of bullying behaviors and support the development of educational and managerial interventions aimed at improving the clinical learning environment and promoting students' well-being.

Declarations

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Conflict of Interest

The authors declare that they have no conflicts of interest.

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Consent to Participate

Written informed consent was obtained from all participants included in the study.

Data Availability Statement

The datasets generated and/or analysed during the current study are not publicly available due to ethical restrictions regarding participant confidentiality and privacy. However, the data are available from the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

The study protocol was approved by the Ethics Committee of Zanjan University of Medical Sciences (Ethics Code: IR.ZUMS.REC.1398.104). Written informed consent was obtained from all participants before they participated in the study.

Author Contributions

All authors contributed to the design and conduct of the study. FM and MT contributed to the assessment of content and face validity. FM contributed to the statistical analysis. FM, MT, SH A and FM contributed to drafting the manuscript, and all authors contributed to the revision of the manuscript.

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Figures

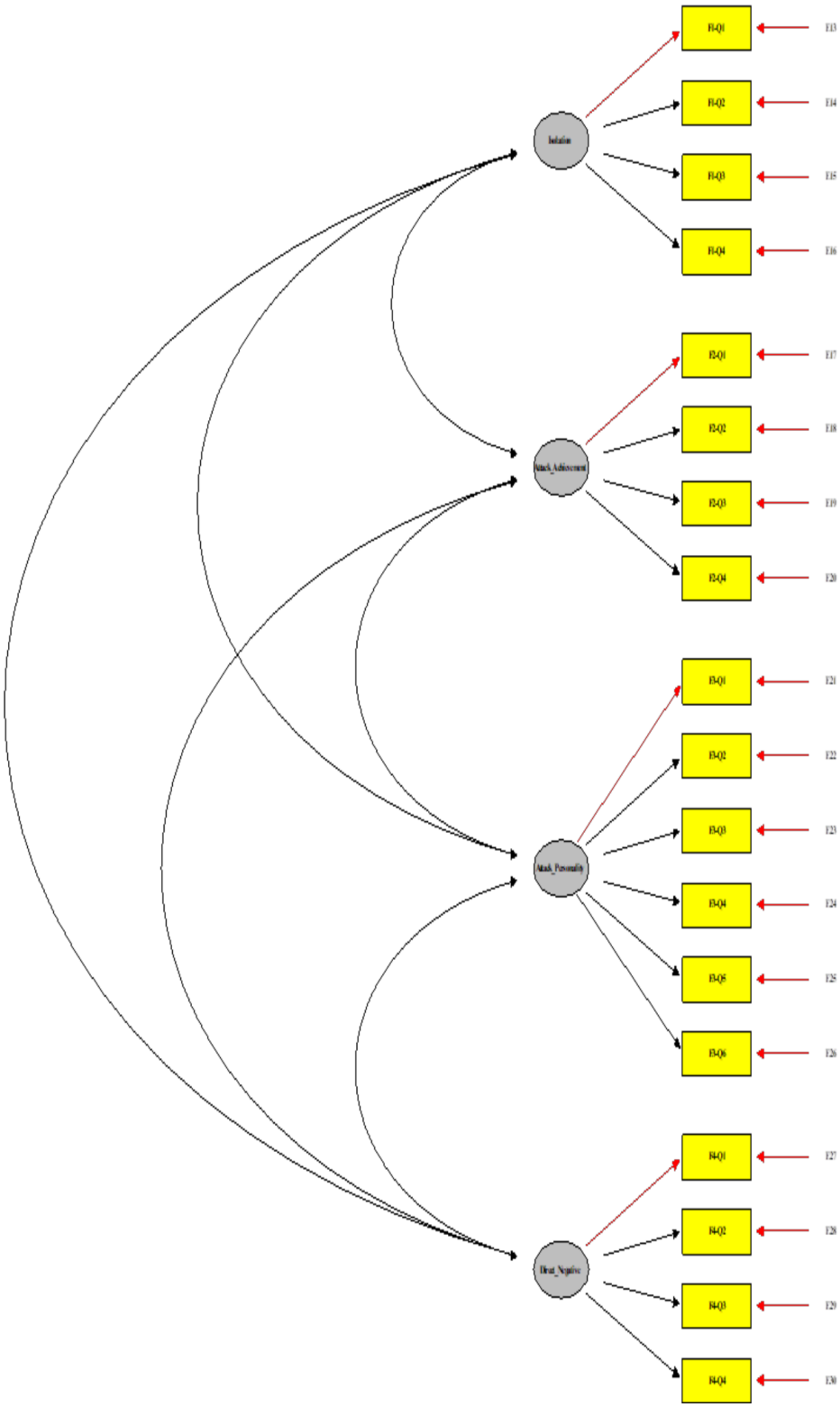


Figure 1

Measurement model of the Persian version of the Bullying Behaviors in Nursing Education (BBNE) questionnaire with standardized factor loadings (n = 739).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Appendix.docx