

Adaptation and Validation of Nomophobia Instrument in the Indonesian Version

Idi Warsah¹, Aprezo Pardodi Maba², Endang Prastuti³, Ruly Morganna¹, Berliani Aslam Alkiromah Warsah⁴, Eko Carles¹

Institut Agama Islam Negeri Curup, Bengkulu, Indonesia¹

Universitas Ma'arif Lampung, Lampung, Indonesia²

Universitas Negeri Malang, Malang, Indonesia³

Universitas Darussalam Gontor, Ponorogo, Indonesia⁴

idiwarsah@iaincurup.ac.id

Abstract

Nomophobia emerges from the prevalence of excessive use of smartphones. The Nomophobia Questionnaire (NMP-Q) has been adapted across several countries and languages. Still, there have been few studies having adapted and tested the psychometric properties of the NMP-Q. Thus, this study aimed to linguistically and culturally adapt and validate the Indonesian version of NMPQ-10 (it is named NMPQ-10 due to 10 as the item number after lingua-cultural adaptation and validation). The original NMPQ had 20 items with the Likert scale format. The adaptation process involved experts in language and psychology. The NMPQ-10 in the Indonesian version was validated by involving 276 college students from public universities in Indonesia aged 17 to 24 years old. The results revealed that empirical data supported the overall measurement model of NMPQ-10. The internal structure of NMPQ-10 in the Indonesian version was similar to that of the original version. The Indonesian version of NMPQ-10 also had high psychometric properties, as indicated by the composite reliability (CR) of 0.932 and a Cronbach Alpha of 0.97. Both were classified as high and evident in internal structure (satisfactory construct validity and convergent validity). This study has important implications for counseling practice, as counselors can use the NMPQ-10 to identify individuals experiencing high levels of nomophobia and guide interventions and treatment plans accordingly. Further studies are needed to include a larger sample to improve the validation of NMPQ-10.

Keywords: nomophobia, lingua-cultural adaptation, instrument validation

Abstrak

Nomophobia muncul dari prevalensi penggunaan smartphone yang berlebihan. Kuesioner Nomophobia (NMP-Q) telah diadaptasi di beberapa negara dan bahasa. Namun, masih sedikit penelitian yang telah mengadaptasi dan menguji sifat psikometrik NMP-Q. Oleh karena itu, penelitian ini bertujuan untuk mengadaptasi secara linguistik dan budaya, serta memvalidasi versi bahasa Indonesia dari NMPQ-10 (diberi nama NMPQ-10 karena terdiri dari 10 item setelah adaptasi linguistik dan budaya). Versi asli NMPQ terdiri dari 20 item dengan format skala Likert. Proses adaptasi melibatkan para ahli dalam bidang bahasa dan psikologi. NMPQ-10 versi Indonesia divalidasi dengan melibatkan 276 mahasiswa dari universitas-universitas negeri di Indonesia yang berusia 17 hingga 24 tahun. Hasil penelitian menunjukkan bahwa data empiris mendukung model pengukuran keseluruhan NMPQ-10. Struktur internal NMPQ-10 versi Indonesia serupa dengan versi aslinya. Versi Indonesia NMPQ-10 juga memiliki sifat psikometrik yang tinggi, seperti ditunjukkan oleh reliabilitas komposit (CR) sebesar 0,932 dan Cronbach Alpha sebesar 0,97. Keduanya diklasifikasikan sebagai tinggi dan jelas dalam struktur internal (validitas konstruk yang memuaskan dan validitas konvergen yang memadai). Penelitian ini memiliki implikasi penting bagi praktik konseling, karena konselor dapat menggunakan NMPQ-10 untuk mengidentifikasi individu yang mengalami tingkat nomophobia yang tinggi dan membimbing intervensi serta rencana perawatan yang sesuai. Penelitian lanjutan diperlukan untuk melibatkan sampel yang lebih besar guna meningkatkan validasi NMPQ-10.

Kata kunci: nomofobia, adaptasi linguistik dan budaya, validasi instrumen

Introduction

The advancement of technology has both positive and negative impacts on human development. In a positive way, technology gives humans opportunities to boost their access to knowledge and skills in all life sectors (Dwivedi et al., 2023). With respect to human competencies in the realms of psycho-social and learning, previous studies have revealed numerous benefits of technology. To mention a few, such studies demonstrated that the advancement of technology paves the way for the ease of collaboration (Warsah et al., 2021), an increase in self-efficacy (Hong et al., 2020), the acquisition of metacognitive awareness (Asha et al., 2022), the acquisition of critical thinking skills (Hamengkubuwono et al., 2022; Hwang & Chen, 2016), the enhancement of cognitive maturity (Oyelekan et al., 2019; Warsah, 2020), the acquisition of intercultural or multicultural competencies (Warsah, 2021; Warsah et al., 2019, 2022), the increase in learning motivation (Alberth, 2019), and the acquisition of other psycho-social and learning competencies. Nonetheless, a number of technological products, if used carelessly, will trap people in disadvantages (McBride et al., 2023). Technological products, such as computers, smartphones, and the like, can change the patterns of human behavior if the users do not use them wisely, leading to a decrease in their psycho-social and learning competencies (Gowthami & Kumar, 2016).

The most familiar technological product owned by almost all people today is smartphone. Every person in the modern era, such as today, cannot be separated from smartphones. The prevalence of smartphone use, which leads to nomophobia, has become a global phenomenon, particularly among tertiary students. Nomophobia is an addiction reflected by one's increase in anxiety when he is away from his smartphone (Anshari et al., 2019). According to research on tertiary students in India, the majority of them suffered from nomophobia at a moderate level with a percentage of 67.2%, and 17.3% of them had severe nomophobia (Bartwal & Nath, 2020). Meanwhile, in Turkey, there were 42.6% of tertiary students (young adults) experienced nomophobia (Yildirim et al., 2016). In Indonesia, data on the prevalence of nomophobia showed that 66% of respondents who aged from 18 to 24 years old admitted that they could not live without their cell phones (Ngafifi, 2014). Also, most tertiary students used smartphones at a high intensity of 49.45% (Fajri, 2017). Subsequently, recent data demonstrated that 50.01% of tertiary students experienced a high level of nomophobia (Rahmania & Prastuti, 2021).

It is predicted that the increasing use of smartphones will have positive or negative impacts. It is suspected that the negative impacts of smartphone use cover the aspects of psychology, social, and health (Badwilan et al., 2004). Studies confirmed that nomophobia is the impact of smartphone addiction (Alkhunaizan, 2019; Durak, 2018), meaning that nomophobia has a strong correlation with the use of mobile phones (González-Cabrera et al., 2017; Yildirim & Correia, 2015). Nomophobia is considered a modern anxiety disorder, characterized by (a) using cell phones regularly and in a way that spends a lot of time using them, (b) worrying and getting nervous about losing one's cell phone when it is not available nearby, (c) keeping the phone active, (d) having few face-to-face social interactions with humans that will cause anxiety as well as stress and choosing to communicate using new technologies, and (e) spending larger costs due to using cell phones (Bragazzi & Del Puente, 2014).

When one is away from his smartphone, nomophobia causes anxiety, loneliness, panic, sadness, sweating, and shaking (Bragazzi & Del Puente, 2014). Nomophobia is associated with other forms of psychological distress (Lin et al., 2018), including impaired memory, anxiety, and depression (Aarthi et al., 2020). Furthermore, nomophobia has a negative impact on personality, self-esteem, anxiety, stress, academic performance, and other physical and mental health problems (Rodríguez-García et al., 2020). Also, nomophobia contributes to lower psychological well-being (Tangmunkongvorakul et al., 2019).

Given the prevalence of nomophobia among adolescents and students, the diagnosis of nomophobia *per se* needs to be done accurately. With the absence of an accurate instrument for assessing nomophobia

in the Indonesian context, it is critical to adapt or develop a nomophobia instrument alongside examining it to pursue its valid and reliable psychometric qualities. With proper assessment, interventions to reduce nomophobia can be designed. Instruments to measure nomophobia are desperately needed. To date, research has used the nomophobia Questionnaire (NMP-Q) to assess nomophobia (Rodríguez-García et al., 2020). NMP-Q was developed using exploratory analysis. It consists of four dimensions: (1) not being able to communicate, (2) losing connectedness, (3) not being able to access information, and (4) giving up convenience (Yildirim & Correia, 2015). However, psychometric testing of the NMP-Q is insufficient; therefore, testing on its validity and reliability is required (Crocker et al., 2008).

The NMP-Q nomophobia instrument (Yildirim & Correia, 2015) has been validated and adapted across countries, cultures, languages, and respondents, such as the Persian version on adolescent respondents (Lin et al., 2018), Arabic version (Al-Balhan et al., 2018), Spanish version on the adolescent samples of 13-19 years old (González-Cabrera et al., 2017), Spanish version on the samples of nursing students (Puertas, 2016), and Italian version (Adawi et al., 2018). However, to date, few studies have been conducted on lingua-cultural adaptation followed by testing the psychometric properties of the Indonesian lingua-cultural versions of NMP-Q. Also, studies on the lingua-cultural adaptation and validation of NMP-Q have not been conducted in the context of Islamic guidance and counseling students. In the meantime, such students represent those who are sufficiently knowledgeable about issues associated with nomophobia because their major is within the coverage of psychology. Contextually, grounded in this study's demography as it has been conducted in two Islamic universities in Bengkulu, these universities do not have other departments specific to psychology instead of the Islamic guidance and counseling department. Hence, Islamic guidance and counseling students are involved as the relatable participants considering that they could negotiate more appropriate responses during data collection compared to those of other majors. Accordingly, the aims of this study are: (1) to adapt NMP-Q to the Indonesian language and culture, and (2) to validate NMP-Q using the samples of tertiary students from Islamic guidance and counseling majors.

Methods

Stage 1 of the Study: Lingua-Cultural Adaptation of NMP-Q

Participants

The study's participants involved in the lingua-cultural adaptation stage consisted of two translators with academic qualification of master in English education and two psychologists with doctoral academic qualifications having competencies related to the measurement and constructs of nomophobia. In addition, 10 students from the Islamic guidance and counseling major were incorporated at the pre-trial stage to provide an assessment of the Indonesian version of NMP-Q, especially in terms of the comprehensibility of items and directions contained in the NMP-Q scale.

Instrument

The nomophobia instrument adopted and validated in this study was the nomophobia Questionnaire (NMP-Q) developed by Yildirim and Correia, (2015). NMP-Q consisted of four aspects, namely (1) not being able to communicate, consisting of 8 items; (2) losing connectedness, comprising 3 items; (3) not being able to access information, containing 5 items; and (4) giving up convenience, consisting of 4 items. Accordingly, the total number of NMP-Q items was 20.

The following are some examples of items resting upon the aspects of NMP-Q. One item that measures (1) the aspect of not being able to communicate, which reads "If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends" is lingua-culturally translated into "*Jika saya tidak membawa ponsel pintar saya, saya merasa cemas karena saya tidak*

bisa segera berkomunikasi dengan keluarga dan/atau teman-teman saya". Another item that measures (2) losing connectedness which reads "If I could not use my smartphone, I would be afraid of getting stranded somewhere" is lingua-culturally translated into "*Jika saya tidak bisa menggunakan ponsel pintar saya, saya takut akan tersesat di suatu tempat*". The other item which measures (3) not being able to access information, which reads "Being unable to get the news (e.g., happening, weather, and etc.) on my smartphone would make me nervous" is lingua-culturally translated into "*Tidak dapat mengakses berita (contoh: peristiwa, cuaca, dll) melalui ponsel pintar saya membuat saya gelisah*". One item which measures (4) giving up convenience, which reads "If I did not have my smartphone with me, I would be worried because my family and/or friends could not reach me" is lingua-culturally translated into "*Jika saya tidak membawa ponsel pintar, saya akan merasa khawatir karena keluarga dan/atau teman-teman saya tidak dapat menghubungi saya*".

Procedures of the Study

The NMP-Q lingua-cultural adaptation procedure comprised five stages: forward translation, synthesis, back translation, expert committee review, and pre-testing (Beaton et al., 2000). The original NMP-Q items were translated from English into Indonesian during the forward translation stage. In this study, the translation stage was handled by two different translators. Both translators had good competencies in English with the academic qualification of master's degrees in English education.

Furthermore, the synthesis stage was carried out to identify NMP-Q items considered to have high equivalence in terms of concepts and language. Three experts in the measured constructs as well as language and culture reviewed the two translated versions of NMP-Q items during the synthesis stage. The review was conducted to determine the equivalence of content, concept, and language between the original NMP-Q items and the translation results of the two translators. The stage of back translation from Indonesian to English was performed by a professional translator with an academic qualification of master in English. The outcomes of the content validity analysis revealed a remarkably high level of agreement (Cohen's Kappa = 0.85) among the experts involved in assessing the congruence between the original version and the translated rendition of the NMP-Q items. The interpretation of this agreement score signified an exceptionally robust consistency in their evaluations concerning the content validity of the translation. Consequently, it could be deduced that the translated NMP-Q items had effectively maintained conceptual and linguistic equivalence with the original version. This content validity attestation ensured that the translated instrument held substantial potential for utilization in other studies aiming to gauge the same constructs as those encompassed by the original NMP-Q items. The foregoing result instilled confidence in the translation's quality.

The expert committee review stage of the adaptation process compared the results of back translation to the original items of English NMP-Q. The goal of this stage was to re-test the meaning's suitability by comparing the results of the translation with the original instrument after being retranslated by the language experts. Furthermore, the items of Indonesian NMP-Q were modified to fit an ideal Indonesian style. The final draft of Indonesian NMP-Q was produced as the result of this stage.

The final stage was the pre-testing (or pre-try out) stage, which aimed to verify the accuracy of items having been translated into the initial NMP-Q version in terms of test instructions clarity, item comprehension, and ease of administration. Ten readers were given the draft of the NMP-Q instrument. Following the feedback from the test participants, the manual was rewritten, changing the use of words that were better and more precise according to Indonesian speakers in common. There were some items revised in terms of words and phrases. For instance, item 1 (I would feel uncomfortable without constant access to information through my smartphone) having previously been translated into (*Saya akan merasa tidak nyaman tanpa adanya akses konstan informasi melalui ponsel pintar saya*) was revised into (*Saya akan merasa tidak nyaman tanpa adanya akses konstan informasi melalui ponsel pintar saya*). Item 6 (If I were to run out of credits or hit my monthly data limit, I would panic) having previously been translated into (*Jika*

saya akan kehabisan pulsa atau mencapai batas kuota bulanan, saya akan merasa panik) was revised into (*Jika saya kehabisan pulsa atau mencapai batas data bulanan, saya akan cemas*). Item 7 (If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network) having previously been translated into (*Jika saya tidak memiliki sinyal kuota atau tidak dapat tersambung dengan Wi-Fi, saya akan terus menerus memeriksa apakah saya memiliki sinyal atau dapat menemukan jaringan Wi-Fi*) was revised into (*Jika tidak ada sinyal data atau tidak bisa terhubung ke Wi-Fi, maka saya akan terus-menerus memeriksa apakah ada sinyal atau bisa menemukan jaringan Wi-Fi*). Also, Item 20 (If I did not have my smartphone with me, I would feel weird because I would not know what to do) having previously been translated into (*Jika saya tidak membawa ponsel pintar saya, saya akan merasa aneh karena saya tidak tahu apa yang saya lakukan*) was revised into (*Apabila saya tidak membawa ponsel pintar, saya akan merasa aneh karena tidak tahu apa yang harus dilakukan*).

After revision, the Indonesian version of the NMP-Q was complete and ready for use. After the pilot study revealed that respondents had no difficulty understanding the NMP-Q items, the next step was to create the final draft of the Indonesian version of NMP-Q, followed by field trials with larger samples. The goal of the field trial was to collect empirical evidence of the psychometric properties of NMP-Q in the Indonesian version.

Stage 2 of the Study: Validation of NMP-Q in the Indonesian Version

Participants

This stage involved 276 college students from two universities in Bengkulu, Indonesia. The names of the two universities were intentionally made anonymous because some parties of the universities did not allow the researchers to reveal the universities' official names. The number of participants was ideal because it was within the range of psychometric samples from 100 to 1000 individuals as suggested by Mundfrom et al. (2005). The Islamic guidance and counseling students were recruited as the participants using a convenient sampling technique. It meant that the students, who had voluntarily filled in the online consent letter and questionnaires, were officially regarded as the participants. As a result, 276 Islamic guidance and counseling students were officially taken as participants. The participants' criteria in this study fell into the following points: the students had smartphones, and they had been using smartphones for more than or equal to two years. All participants already stated their willingness to be officially engaged in this study, as evidenced by filling out the statement of willingness distributed online in the form of a consent letter. The foregoing aimed at providing protection related to the confidentiality of the participants' data (Nevid et al., 2005). A detailed description of the participants can be seen in Table 1.

Table 1. Description of Participants' Characteristics

Characteristics	Categories	Frequencies	%
Gender	Male	79	28.6
	Female	197	71.4
Age	17-18 years old	51	18.5
	19-20 years old	163	59.1
	21-22 years old	58	21.0
	23-24 years old	4	1.5
University	University 1	142	52
	University 2	134	48

Instrument

The study's instrument adapted to the Indonesian version was the nomophobia scale (NMP-Q) (Yildirim & Correia, 2015). NMP-Q consisted of four aspects, namely (1) not being able to communicate, consisting of 8 items, (2) losing connectedness, comprising 3 items, (3) not being able to access

information, containing 5 items, and (4) giving up convenience, consisting of 4 items. Thus, the total number of NMP-Q items was 20. Each item was followed by 7-scaled response categories, namely “strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, and strongly agree”.

The examinations of validity and reliability of NMP-Q had been done by a couple of studies across different languages and cultures. For example, Elyasi et al. (2018) conducted a study by translating NMP-Q into Persian. Their study reconstructed the factors of NMP-Q into three: the hours spent with mobile phones, the years of using them, and the age. Concerning the validity and reliability results, their study demonstrated that eigenvalues and the scree-plot provided evidence for the tridimensional structure of the translated instrument. The NMP-Q exhibited a Cronbach's alpha coefficient of 0.93 overall (with coefficients of 0.90, 0.77, and 0.71 for the respective three factors). The initial, second, and third factors accounted for 26.30%, 20.84%, and 17.60% of the variance, sequentially. The cumulative NMP-Q score demonstrated correlations with mobile phone usage duration, the duration of usage in years, and the participant's age. Jahrami et al. (2023) conducted a study to reevaluate NMP-Q and revealed that the amalgamated reliability of internal consistency surfaced at 0.93 [0.91; 0.95], whereas within the subdomains, it extended from 0.83 to 0.91. To delve deeper, the precise figures stood at 0.91 [0.88; 0.93], 0.84 [0.80; 0.88], 0.83 [0.78; 0.88], and 0.83 [0.80; 0.85] for the respective subdimensions. Subdimension 1 encapsulated the concept of inability to effectively communicate; subdimension 2 encompassed the notion of diminished connectedness; subdimension 3 related to the challenge of accessing information; and subdimension 4 encapsulated the willingness to sacrifice convenience. All the effect sizes cited find their origin in Cronbach's alphas. Coenen and Görlich (2022) in Germany confirmed the reevaluation results of NMP-Q by exhibiting a Cronbach's alpha coefficient of 0.92, accompanied by a test-retest reliability of 0.80. The aforesaid studies indicated that NMP-Q had been translated and reevaluated across different lingua-cultural domains. Conducting such studies in the context of Indonesian lingua-culture is critical.

After lingua-cultural adaptation of NMP-Q in the Indonesian version had been done, a validation test was carried out, to test the psychometric properties of NMP-Q in the Indonesian version.

Data Analysis

The data were analyzed using a confirmatory factor analysis (CFA), which aimed to obtain the psychometric properties of NMP-Q, by testing the validity of internal structures. The analysis fell into three stages: (1) the initial item selection with the consideration of the loading factor value, (2) further item selection by considering the value of standardized residual covariance if the goodness of fit was not yet good, and (3) final item selection with the consideration of getting a CFA model that had good goodness of fit.

Testing the accuracy of the hypothesized model in this study deployed some parameters, namely: goodness fit index (GFI), comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA) (Schumacker & Lomax, 2010). As the foregoing, the Goodness Fit Index (GFI) was considered acceptable when reaching or surpassing a value of 0.90, indicating a favorable fit between the model and the data. The Comparative Fit Index (CFI) was set at a threshold of 0.95 or higher, signifying a robust alignment between the proposed model and the actual dataset. The Tucker-Lewis Index (TLI) was deemed satisfactory when attaining a value of 0.90 or more, suggesting a positive concurrence between the theoretical model and the observed data. The Root Mean Square Error of Approximation (RMSEA), with a benchmark of 0.08 or lower, indicated a suitable fit between the model and the errors present in the data (Schumacker & Lomax, 2010).

Concerning the pursuance of validity and reliability, the results of the selected items were computed to obtain the convergent reliability based on the Cronbach Alpha coefficient, the composite reliability coefficient (CR), and the average variance extracted (AVE) value. The accuracy of each selected item

was confirmed through the calculation results of the discriminant validity and cross-loading value. It is worth noted that either convergent or discriminant validity in this study's CFA process was computed within the same working constructs of the model in the NMP-Q psychometric properties. The foregoing is slightly different from how convergent validity or discriminant validity is processed in studies other than CFA-based research.

Results and Discussion

Results of the Study's Stage 1

The first phase of the study focused on lingua-culturally translating the nomophobia instrument (NMP-Q) from English to Indonesian. Translation encompassed forward translation, synthesis, back translation, expert reviews, and pilot studies (Beaton et al., 2000). The goal of translation was to test the equivalence of concepts towards words and phrases rather than a literal or word-for-word translation. Expert panels comprised of an original translator and three psychologists with expertise in the field of psychology discussed, questioned, and made suggestions on certain word choices based on the initial translation in Indonesian.

The back translation stage of the initial draft of NMP-Q in the Indonesian version was then undertaken by an independent translator who was unfamiliar with the original version of NMP-Q. Back translation was carried out to emphasize conceptual and cultural equivalence. Following additional discussion from the expert panels, this process resulted in an early version of the NMP-Q instrument. The translation equivalence results of NMP-Q in the Indonesian version were translated into English and compared to the original NMP-Q. The translation equivalence assessment results demonstrated that, in general, there was high equivalence in terms of concepts and language.

Following the expert panels' reviews, the final result was to reach an agreement on the NMP-Q as the first draft of the Indonesian version. The pilot study stage provided information that the final draft of NMP-Q in the Indonesian version, after being given to readers, proved that participants reported no difficulties in understanding the NMP-Q items. Therefore, the final draft of NMP-Q in the Indonesian version could proceed to receive a field trial involving larger participants to test the psychometric properties of the instrument. Table 2 shows the results of the final adaptation process for the Indonesian language and culture of NMP-Q in the Indonesian Version.

Table 2. The Results of Lingua-Cultural Translation of NMP-Q

No	Statements
1	<i>Saya akan merasa tidak nyaman tanpa akses yang konsisten terhadap informasi melalui ponsel pintar saya</i> (I would feel uncomfortable without constant access to information through my smartphone)
2	<i>Saya akan merasa terganggu jika saya tidak dapat mencari informasi melalui ponsel pintar saya saat saya ingin melakukannya.</i> (I would be annoyed if I could not look information up on my smartphone when I wanted to do so)
3	<i>Tidak dapat mengakses berita (contoh: peristiwa, cuaca, dll) melalui ponsel pintar saya membuat saya gelisah.</i> (Being unable to get the news (e.g., happening, weather, etc.) on my smartphone would make me nervous)
4	<i>Saya akan merasa terganggu jika saya tidak dapat menggunakan ponsel pintar saya dan/atau berbagai kegunaannya saat saya ingin melakukannya.</i> (I would be annoyed if I could not use my smartphone and /or its capabilities when I wanted to do so)
5	<i>Kehabisan baterai ponsel pintar merupakan hal yang menakutkan bagi saya</i> (Running out of battery in my smartphone would scare me).
6	<i>Jika saya kehabisan pulsa atau mencapai batas data bulanan, saya akan cemas</i>

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- (If I were to run out of credits or hit my monthly data limit, I would panic)
- 7 *Jika tidak ada sinyal data atau tidak bisa terhubung ke Wi-Fi, maka saya akan terus-menerus memeriksa apakah ada sinyal atau bisa menemukan jaringan Wi-Fi*
(If did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network)
- 8 *Jika saya tidak dapat menggunakan ponsel pintar saya, saya takut akan tersesat di suatu tempat.*
(If I could not use my smartphone, I would be afraid of getting stranded somewhere)
- 9 *Jika saya tidak bisa memeriksa ponsel pintar saya selama beberapa waktu, saya akan mempunyai keinginan untuk memeriksanya*
(If I could not check my smartphone for a while, I would feel a desire to check it)
- 10 *Jika saya tidak membawa ponsel pintar saya, saya merasa cemas karena saya tidak dapat berkomunikasi dengan segera dengan keluarga dan/atau teman-teman saya.*
(If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends)
- 11 *Jika saya tidak membawa ponsel pintar, saya akan merasa khawatir karena keluarga dan/atau teman-teman saya tidak dapat menghubungi saya.*
(If I did not have my smartphone with me, I would be worried because my family and/or friends could not reach me)
- 12 *Jika saya tidak membawa ponsel pintar saya, saya akan merasa gelisah karena saya tidak akan dapat menerima pesan teks dan panggilan.*
(If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text message and calls)
- 13 *Jika saya tidak membawa ponsel pintar saya, saya akan merasa cemas karena saya tidak dapat menghubungi keluarga dan/atau teman-teman saya.*
(If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends)
- 14 *Jika saya tidak membawa ponsel pintar saya, saya akan merasa gelisah karena saya tidak dapat mengetahui jika seseorang berusaha untuk menghubungi saya*
(If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get a hold of me).
- 15 *Jika saya tidak membawa ponsel pintar saya, saya akan merasa cemas karena hubungan saya dengan keluarga dan teman-teman saya akan terputus*
(If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken).
- 16 *Jika saya tidak membawa ponsel pintar saya, saya akan merasa gugup karena terputus dari identitas daring saya*
(If I did not have my smartphone with me, I would be nervous because I would be disconnected from my online identity).
- 17 *Jika saya tidak membawa ponsel pintar saya, saya akan merasa tidak nyaman karena saya tidak akan dapat mengikuti perkembangan terkini melalui media sosial dan jaringan daring*
(If I did not have my smartphone with me, I would be uncomfortable because I could not stay up to date with social media and online network)
- 18 *Jika saya tidak membawa ponsel pintar saya, saya akan merasa canggung karena saya tidak dapat memeriksa pemberitahuan-pemberitahuan terkini melalui koneksi dan jaringan daring saya*
(If I did not have my smartphone with me, I would feel awkward because I could not check my notification for updates from my connections and online network)
- 19 *Jika saya tidak membawa ponsel pintar saya, saya akan merasa cemas karena saya tidak dapat memeriksa pesan-pesan surat elektronik saya.*
(If I did not have my smartphone with me, I would feel anxious because I could not check my email messages)
- 20 *Apabila saya tidak membawa ponsel pintar, saya akan merasa aneh karena tidak tahu apa yang harus dilakukan*
(If I did not have my smartphone with me, I would feel weird because I would not know what to do)
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Results of the Study's Stage 2

Analysis Stages

The confirmatory factor analysis (CFA) model was used in this study for item selection in each construct. The instrument's items served as a manifest variable (symbolized as a box image). Meanwhile, the aspects of each construct served as a latent variable (symbolized as a circle image). The following are the stages of item selection.

The First Stage

The initial item selection was to take account of the loading factor value. The nomophobia constructs in the NMP-Q were classified into the following four aspects: *not being able to communicate*, *losing connectedness*, *not being able to access information*, and *giving up convenience*. There was a total of 20 items. The initial CFA model results can be seen in Figure 1. The item selection based on the loading factor on the aspects of *not being able to communicate*, *losing connectedness*, and *not being able to access information* demonstrated that all items had loading factors greater than 0.50. Item N4 in the aspect of *giving up convenience* was discarded because its loading factor was 0.48.

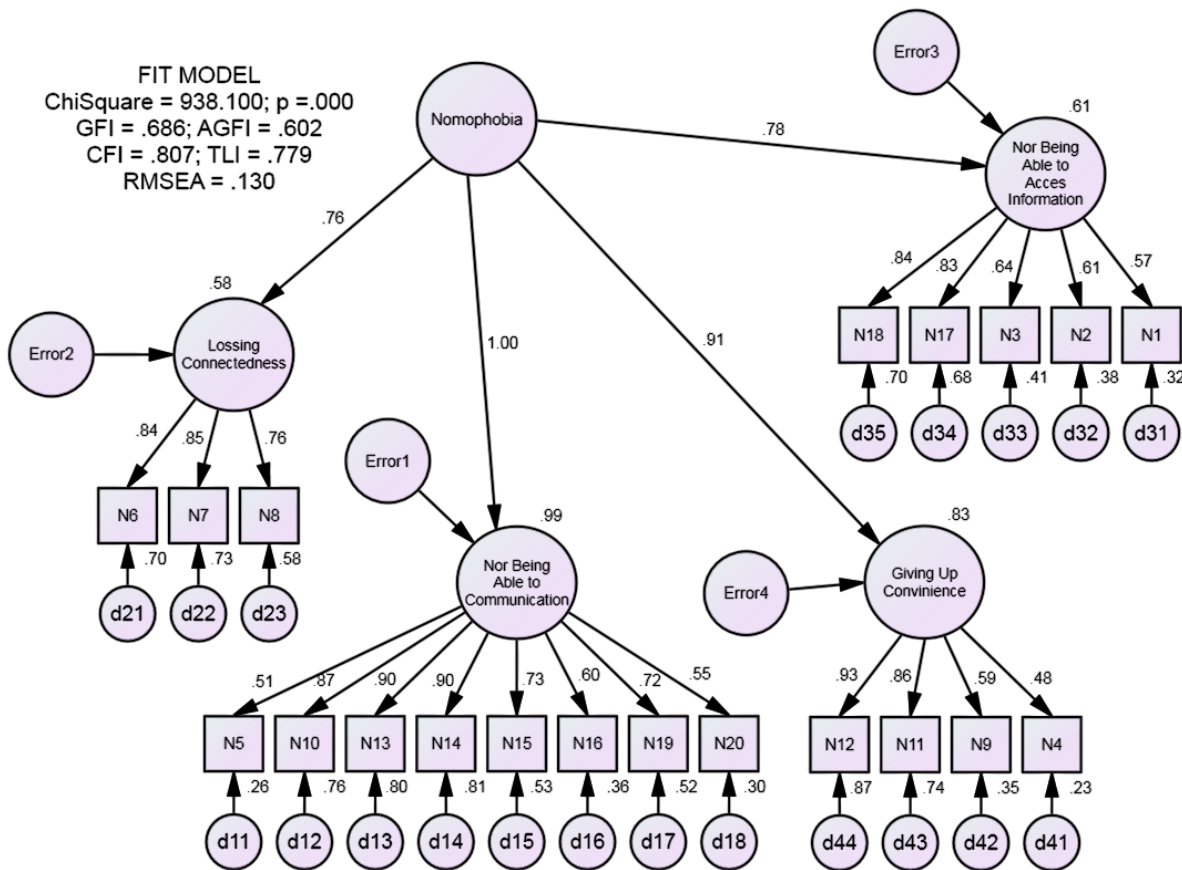


Figure 1. The Preliminary Model of Nomophobia Constructs Measurement

In the initial CFA model (see Figure 1), there was a loading factor that had a value of below 0.50. The foregoing value was 0.48 referring to item 4 codified within the indicator of giving up convenience. The evaluation results of the model fit showcased the chi-square of 938,100 ($p = 0,000$), GFI of 0.686, AGFI of 0.602, CFI of 0.807, TLI of 0.0779, and RMSEA of 0.130. These parameters did not indicate a good goodness of fit (Schumacker & Lomax, 2010).

The Second Stage

Further item selection was undertaken by considering the value of standardized residual covariance if the goodness of fit was not yet good. Item N4 in the aspect of *giving up convenience* was discarded because its loading factor was 0.48. Furthermore, in the second to tenth stages, item selection used standardized residual covariance to achieve good goodness of fit. The final CFA results can be seen in Figure 2 below.

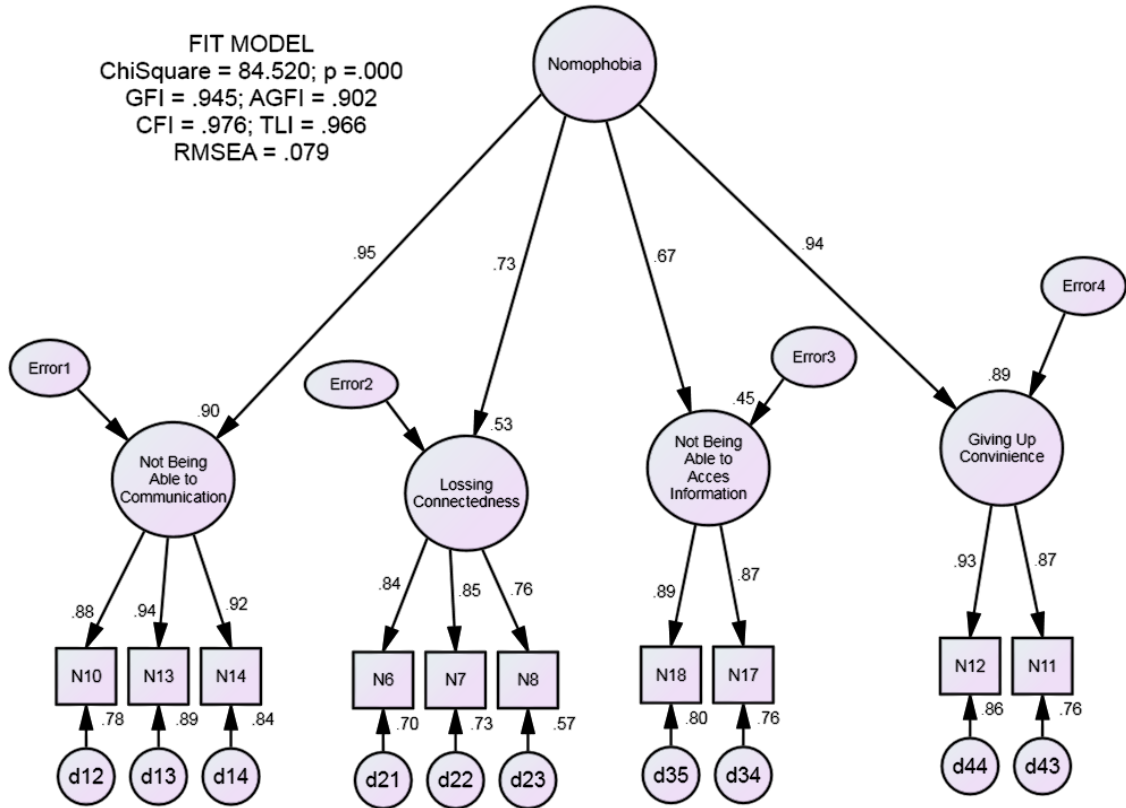


Figure 2. The Final CFA Model

In the final CFA model (see Figure 2), all loading factors were more than 0.50. As shown in Figure 2, the foregoing claim can be seen from the loading factor values under ten boxes of N values. The evaluation results of the model fit indicated the chi-square of 8.742 ($p = 0.557$), GFI of 0.945, AGFI of 0.902, CFI of 0.976, TLI of 0.966, and RMSEA of 0.079. These parameters proved a good goodness of fit. The results of item selection for nomophobia constructs can be seen in Table 3.

Table 3. Results of Item Selection for Nomophobia Constructs

Dimension	No	Statement	M1	M2
Losing Connectiveness	6	<i>Jika saya kehabisan pulsa atau mencapai batas data bulanan, saya akan cemas.</i> (If I were to run out of credits or hit my monthly data limit, I would panic)	0.84	0.84
Losing Connectiveness	7	<i>Jika tidak ada sinyal data atau tidak bisa terhubung ke Wi-Fi, maka saya akan terus-menerus memeriksa apakah ada sinyal atau bisa menemukan jaringan Wi-Fi.</i> (If did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network)	0.85	0.85

Losing Connectiveness	8	<i>Jika saya tidak dapat menggunakan ponsel pintar saya, saya takut akan tersesat di suatu tempat.</i> (If I could not use my smartphone, I would be afraid of getting stranded somewhere)	0.76	0.76
Giving Up Convenience	11	<i>Jika saya tidak membawa ponsel pintar saya, saya akan merasa khawatir karena keluarga dan/atau teman-teman saya tidak dapat menghubungi saya.</i> (If I did not have my smartphone with me, I would be worried because my family and/or friends could not reach me)	0.86	0.87
Giving Up Convenience	12	<i>Jika saya tidak membawa ponsel pintar saya, saya akan merasa gelisah karena saya tidak akan dapat menerima pesan teks dan panggilan.</i> (If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text message and calls)	0.93	0.93
Not Being Able to Communicate	10	<i>Jika saya tidak membawa ponsel pintar saya, saya merasa cemas karena saya tidak dapat berkomunikasi dengan segera dengan keluarga dan/atau teman-teman saya.</i> (If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends)	0.87	0.88
Not being able to communicate	13	<i>Jika saya tidak membawa ponsel pintar saya, saya akan merasa cemas karena saya tidak dapat menghubungi keluarga dan/atau teman-teman saya.</i> (If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends)	0.90	0.94
Not being able to communicate	14	<i>Jika saya tidak membawa ponsel pintar saya, saya akan merasa gelisah karena saya tidak dapat mengetahui jika seseorang berusaha untuk menghubungi saya</i> (If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get a hold of me).	0.90	0.92
Not being able to access information	17	<i>Jika saya tidak membawa ponsel pintar saya, saya akan merasa tidak nyaman karena saya tidak akan dapat mengikuti perkembangan terkini melalui media sosial dan jaringan daring</i> (If I did not have my smartphone with me, I would be uncomfortable because I could not stay up to date with social media and online network)	0.83	0.87
Not being able to communicate	18	<i>Jika saya tidak membawa ponsel pintar saya, saya akan merasa canggung karena saya tidak dapat memeriksa pemberitahuan-pemberitahuan terkini melalui koneksi dan jaringan daring saya</i> (If I did not have my smartphone with me, I would feel awkward because I could not check my notification for updates from my connections and online network)	0.84	0.80

*) M1 = Result of the Initial CFA Analysis, M2 = Result of the Final CFA Analysis

Table 3 presents the items that had passed the process of item selection by considering the values of standardized residual covariance. As shown in Table 3, there were 10 items used for the Indonesian version of NMP-Q, namely items 6, 7, 8, 10, 11, 12, 13, 14, 17, and 18. The other 10 items were not used because of being eliminated from the process of item selection. These items subsumed items 1, 2, 3, 4, 5, 8, 15, 16, 19, and 20.

The Third Stage

The third stage was to determine the psychometric properties of NMP-Q, which included final item selection with consideration for obtaining a CFA model with good goodness of fit. The Cronbach Alpha (CA) and Composite Reliability (CR) were used to compute the model's reliability. As the foregoing, CA was used to measure the reliability's lower bound of this study's constructs, or it was used to measure reliability within these constructs. Subsequently, to gain a stronger internal reliability, CR was used so that the reliability in the coverage of detailed indicators was evaluated. This study used both CA and CR to ensure the consistency of computation results. The average variance extracted (AVE) values were used to calculate the convergent validity for the selected items to ensure strong interconnectedness between selected items and constructs underlying the items. The discriminant validity and cross-loading value calculations were used to confirm the accuracy of each selected item. The calculation results of reliability and convergent validity are set out in table 4 below:

Table 4. Validity and Reliability of Nomophobia Constructs

Aspects	Selected Items	Loading Factor	Alpha Cronbach	Composite Reliability	Average Variance Extracted (AVE)
<i>Not being able to communicate</i>	N10	0.88	0.937	0.94	0.835
	N13	0.94			
	N14	0.92			
<i>Losing Connectedness</i>	N6	0.84	0.855	0.86	0.669
	N7	0.85			
	N8	0.76			
<i>Not being able to access information</i>	N17	0.87	0.875	0.87	0.775
	N18	0.89			
<i>Giving up convenience</i>	N11	0.93	0.985	0.90	0.811
	N12	0.87			
Total			0.932	0.97	0.768

The calculation of reliability yielded results based on the CA and CR computations. The CA values ranged from 0.76 to 0.94, exceeding 0.7 as the threshold (Hair et al., 2016). The CR values ranged from 0.86 to 0.94, which were also higher than 0.7 as the threshold (Hair et al., 2016). The foregoing data demonstrated that the model had strong reliability. Subsequently, the construct validity measurement relied on the computation of loading factors, convergent validity, and discriminant validity. As demonstrated in Table 4, loading factors of the values between 0.76 and 0.94 met a good requirement because it was greater than 0.50 as the threshold (Hair et al., 2014). The AVE values of 0.669 - 0.835, which were higher than 0.50 as the threshold (Hair et al., 2014), demonstrated good convergent validity. Concerning the discriminant validity of nomophobia constructs, the data can be viewed in Table 5.

Table 5. Discriminant Validity of Nomophobia Constructs

Aspects	Coefficient Correlation			
	Not being Able to Communication	Losing Connectedness	Not being Able to Access Information	Giving Up Convenience
Not being able to communicate	(0.914)	-	-	-
Losing connectedness	0.687	(0.818)	-	-
Not being able to access information	0.634	0.487	(0.880)	-
Giving up convenience	0.893	0.686	0.632	(0.901)

Note: The numbers in parentheses in the diagonal parts are the AVE roots

The discriminant validity of an aspect was pursued by comparing the root values of AVE with all correlation coefficients among all aspects. Hair et al. (2016) explained that if the root value of AVE of one aspect is greater than the correlation coefficient, then the aspect has good discriminant validity. For example, the discriminant validity of the aspect of *not being able to communicate* was 0.914, which was greater than the correlation coefficient for other aspects which ranged from 0.634-0.687. The results of the analysis in Table 5 explain that all aspects had good discriminant validity.

Discussion

The adaptation stage of the original NMPQ has been carried out (Beaton et al., 2000) involving experts in the fields of language psychology. Its limited trials have also been conducted, finally producing the final draft of the NMP-Q in the Indonesian version. Furthermore, the Indonesian version of NMP-Q, validated to test the psychometric properties of the instrument, was conducted on 276 Islamic guidance and counseling students, who aged 17-24 years old, from two Islamic universities in Bengkulu, Indonesia. NMP-Q consisted of 20 items and contained four aspects, namely (1) not being able to communicate, consisting of 8 items, (2) losing connectedness, comprising 3 items, (3) not being able to access information, containing 5 items, and (4) giving up convenience, consisting of 4 items. After the CFA analysis was carried out, it left 10 items, with high loading factors, which were above 0.05. Based on the confirmatory test using CFA analysis, it was proven that the NMP-Q measurement model had conformity with empirical data, indicated by the evaluation results of the model fit with a chi-square of 8.742 ($p = 0.557$), GFI of 0.976, AGFI of 0.932, CFI of 1,000, TLI of 1.014, and RMSEA of 0,000. Such results of the analysis demonstrated that the measurement model showed good goodness of fit (Schumacker & Lomax, 2010).

Overall, the NMP-Q measurement model is empirically confirmed with empirical data. The Indonesian version of NMP-Q has an internal structure similar to the original NMP-Q (Yildirim & Correia, 2015). NMP-Q in the Indonesian version also has psychometric properties indicated by the following parameters: composite reliability (CR) of 0.932 and a Cronbach Alpha of 0.97. The foregoing values are classified as high and have showcased a good internal structure (the satisfactory construct and convergent validity).

The results of item selection analysis of the NMP-Q in the Indonesian version using Confirmatory Factor Analysis (CFA) demonstrated that all aspects of NMP-Q were represented by quality items with high loading factors for a total of 10 items. Thus, the Indonesian version of NMP-Q can be called NMP-Q-10 (Indo-version). This finding implies that NMP-Q-10 (Indo-version) can be used as an instrument for nomophobia in a sample of tertiary students who aged from 17 to 24 years old. The Indonesian version of NMP-Q has high composite reliability (CR) and Cronbach Alpha, compared to the English version of NMP-Q (Yildirim & Correia, 2015).

As informed by literature reviews (Rodríguez-García et al., 2020), the adaptation of nomophobia instrument using the nomophobia questionnaire (NMP-Q) (Yildirim & Correia, 2015) has been carried out across countries and various languages, such as the Iranian version on Iranian adolescents (Lin et al., 2018), Arabic version (Al-Balhan et al., 2018), and Spanish version (González-Cabrera et al., 2017). As a whole, the aforesaid studies of NMP-Q adaptation showed satisfactory psychometric properties. The results of this study also confirm the results of a study conducted by (González-Cabrera et al., 2017) on the NMP-Q (Spanish-version) which revealed satisfactory results of psychometric analysis, indicating a valid and reliable instrument to measure nomophobia among adolescents at the ages of 13-19 years old. However, the study's results using a confirmatory factor analysis indicated a lack of the goodness of fit related to internal structural evidence, compared to the original NMP-Q (Al-Balhan et al., 2018).

In the context of Indonesia, NMP-Q has been tested for psychometric properties using the RASH model on tertiary student participants. It is proven that NMPQ has high reliability, indicated by items reliability of 0.99 and Pearson reliability of 0.93 (Rangka et al., 2018). Furthermore, this study strengthens the evidence that NMP-Q has an internal structure, and it is confirmed empirically, especially in the context of student participants who aged 17-24 years old based on Indonesian culture. Hereinafter, the instrument produced in the present study is referred to as NMPQ-10 (Indo-version). Thus, the NMPQ-10 (Indo-version) can be used to measure the level of nomophobia among college student participants because it is proven to have good psychometric properties, indicated by high construct and convergent validity as well as high composite reliability (CR).

However, for the improvement of the NMPQ-10 (Indo-Version), it is necessary to carry out further research to obtain evidence of validity from external sources, namely by comparing the NMP-Q-10 (Indo-version) instrument with parallel instruments of nomophobia. Previous studies have proven that NMP-Q has a strong correlation with mobile phone use (González-Cabrera et al., 2017; Yildirim & Correia, 2015). Besides, further studies can correlate NMP-Q-10 (Indo-version) with other variables such as depression, stress, and subjective well-being. Also, the NMPQ-10 (Indo-version) needs to be validated on non-student participants, such as the participants in early and late adolescence (aged 12-18 years old).

The implications of this study for counseling practice are that the NMPQ-10 (Indo-version) can be used as a reliable and valid tool for assessing nomophobia among college students in Indonesia. Counselors can use the instrument to identify individuals who may be experiencing high levels of nomophobia, which is defined as a fear of being without a mobile phone or being unable to use one. Counselors can use the results from the NMPQ-10 (Indo-version) to guide their interventions and treatment plans for individuals experiencing high levels of nomophobia. For example, if an individual scores high on the NMPQ-10 (Indo-version), the counselor may provide psychoeducation on the negative effects of excessive smartphone use and work with the individual to develop strategies for managing their smartphone use. In summary, the NMPQ-10 (Indo-version) can be a valuable tool for counselors working with individuals experiencing high levels of nomophobia and can help guide interventions and treatment plans.

Conclusion

After the adaptation of NMP-Q (Yildirim & Correia, 2015) to the Indonesian version in terms of the language and culture and after testing it using confirmatory factor analysis (CFA), the results of item selection with high loading factors end up with 10 items with high quality. The NMP-Q measurement model is confirmed to have a fit model according to empirical data, therefore the Indonesian version of NMP-Q, hereinafter referred to as NMPQ-10 (Indo-Version), can be used and accepted as a valid and reliable instrument to measure nomophobia in college student participants from the Indonesian population at the ages of 17-24 years old. The adapted instrument can be applied in counseling practice to identify and address excessive smartphone use among college students.

Future research should aim to expand the sample size to improve the generalizability of the findings and to further validate the NMPQ-10 (Indo-Version) in different population groups and settings. Additionally, it would be helpful to explore the relationship between nomophobia and other psychological constructs, such as anxiety, depression, and stress, as well as to investigate the effectiveness of interventions aimed at reducing nomophobia. Furthermore, it would be beneficial to conduct cross-cultural comparison studies to understand the cultural variations in nomophobia and its associated factors.

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Conflict of Interest

The researchers declare that this paper has no conflict of interest.

Authors' Contributions

Idi Warsah together with Aprezo Pardodi Maba carried out an extensive review of relevant literature on nomophobia, designed the research methodology, established collaborative partnerships with professors, psychologists, and translators to facilitate lingua-cultural adaptation, conducted data analysis, and edited the entire study. Endang Prastuti was responsible for crafting the research introduction, data collection, addressing various elements of the research methodology, and composing sections on data discussion and conclusions. Ruly Morganna contributed to the literature review and assisted in drafting data discussions. Berliani Aslam Alkiromah Warsah validated the translated NMP-Q model and conducted statistical analyses, while Eko Carles played a key role in developing the content for the data discussion and editing.

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