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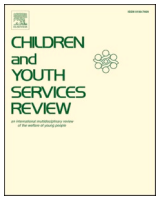

Validating a parental trauma informed approaches scale in Low-Income countries using the Rasch model

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ABSTRACT

Low-income countries, such as Bangladesh, Egypt and Nepal, are experiencing enormous social problems, such as poverty, violence and extremism, which can expose children to trauma. However, the literature on parental awareness of trauma-informed approaches is very limited, possibly due to the lack of a reliable instrument for continuous data collection on parental knowledge regarding the onset of trauma and the best management strategies. The overarching aim of this study was to thoroughly validate the parental trauma identification and management scale (PTIMS), a newly developed tool for trauma-informed approaches, using data collected from parents in three low-income countries. A total of 750 parents from three low-income countries (Bangladesh, n = 300; Egypt, n = 205; Nepal, n = 245) shared experiences of poverty and social problems that could increase their children's vulnerability to trauma. The parents completed the PTIMS, which was translated into the first language of each of the studied countries and subjected to validation using item response theory. Multivariate analysis of variance was computed to understand the differences between participants. Rasch analysis yielded appropriate psychometric properties for the PTIMS. For example, the outfit mean square and infit mean square values of all 33 items ranged from 0.878 to 1.124 and from 0.910 to 1.096, respectively. The multivariate analysis of variance revealed differences between participants in some demographic variables, such as country, age, employment status and school type. The PTIMS is a valid instrument for gathering surveillance data on trauma awareness among parents, who are important stakeholders in efforts to create trauma-informed schools in low-income contexts.

1. Introduction

Around the world, societies are facing problems that can expose children to trauma. Nonwestern countries share common characteristics such as poverty and cultural practices (Alberini et al., 2022; Lin et al., 2025; Shahi, 2023), which could impact the development of children. For example, poverty is prevalent in low-income countries, such as Bangladesh, Egypt and Nepal (Belaïd & Flambard, 2023; Khan et al., 2020; Shahi, 2023). In Nepal, nearly half of the population lives in poverty (Alberini et al., 2022; Ghimire, 2022). Similarly, in Bangladesh, approximately 24 million people live below the poverty line (BSS, 2023; Kamruzzaman, 2021) and struggle to gain access to basic necessities, such as food and shelter (Rezaul Islam et al., 2020). Egypt is experiencing hyperinflation, a high unemployment rate and a rising cost of living (Abdel Ghafar, 2021; Human Rights Watch, 2023). These countries are also experiencing natural disasters (Baniya et al., 2021; Esmaiel et al., 2022; Paudel et al., 2024), civil wars, and ethnic and political tensions (Choucri et al., 2021; Goodhand et al., 2021; Kaiser, 2020; Nandy, 2022). Bangladesh and Nepal experience perennial flooding and landslides (Poudel et al., 2024), which can lead to the destruction of housing and displacement, compounding the hardships that people face (Linkha, 2024; Shrestha et al., 2020; Zaman et al., 2022). Egypt is battling violent extremism and has a history of political instability (Mohiuddin, 2025; Elkhosht et al., 2021). These contextual realities could affect children in the form of abuse, abandonment or malnourishment (Aluğan, 2024; Wickenden et al., n.d.) and thus the

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need for families to be aware of signs of trauma and ways to alleviate the burden or impact on children.

Parents are important stakeholders in the lives of their children. A parent can be a biological parent, an adoptive parent or a caregiver with custody over a child between the ages of 0 and 18 years. Globally, parents are considered primary custodians and are expected to shelter and fulfill the basic needs of their children (Novoa et al., 2022). It has been argued that parents are the first agents of socialization and are expected to facilitate their children's participation in societal activities (Bell, 2020; Ramaekers et al., 2022). In non-Western contexts, there are different societal expectations, norms, customs and practices(Lin, 2020; Novoa et al., 2022). Most importantly, parents are tasked with nurturing their children and raising them in accordance with social norms such as respecting authority (Mogeni, 2025; Nwobodo, 2025). In most instances, a child's waywardness is blamed on their parents, who are accused of not providing them with appropriate upbringing (Farooq & Farhad, 2025; Oduro & Amoah, 2023). In schools, teachers play a crucial role in children's academic development (Gaitas et al., 2025; Wang et al., 2025); however, parents are expected to complement their efforts by providing for their children's basic needs, teaching at home and offering guidance on meeting societal expectations (Kelty & Wakabayashi, 2020; Topping, 2025). Therefore, parental involvement in public health interventions, such as trauma, is crucial for creating a safe environment that is conducive to child development (Eads et al., 2025).

Trauma has been defined as an overwhelming experience that affects one's sense of judgment and can lead to hopelessness, a feeling of insecurity and an inability to focus on a given task (Substance Abuse and Mental Health Services Administration [SAMHSA], 2023). Furthermore, consistent or prolonged physical abuse, violence, assault, discrimination, poverty, bullying and/or intimidation could have a profound effect on the development of individuals or groups subjected to such treatment (SAMHSA, 2014; 2023). An existing body of literature has focused on the training needs of parents in efforts to alleviate trauma among children. Some studies have explored the impact of interventions on parents' knowledge of trauma and ability to support their children (Chang et al., 2024; Guerrero et al., 2022) or have focused on parents raising children experiencing trauma (Konijn et al., 2020; Lotty et al., 2020). National statutory bodies (such as the National Child Traumatic Stress Network) have developed training workshops for parents caring for children who have experienced trauma (Chang et al., 2024) to explore whether acquired skills influence their ability to care for such children (Konijn et al., 2020). The interventions were found to be successful, with many parents acquiring useful skills (Chang et al., 2024; Konijn et al., 2020). This implies that training is a crucial step in equipping parents with the necessary skills to support children who are experiencing trauma or who may be at risk of trauma. However, most of the aforementioned studies were conducted in Western countries, such as Australia, Ireland and the US.

Beyond understanding the efficacy of interventions to improve parental knowledge, there is a need to assess whether parents have the capacity to identify children at risk or who are experiencing trauma and trauma-informed approaches that could be implemented to alleviate the burden on children. However, to the best of our knowledge, almost all non-Western countries do not have a trauma management policy for schools. This may be attributed to a lack of robust instruments that could be adopted in non-Western contexts to measure the extent of trauma awareness among parents raising school-age children. The few survey instruments that exist in the field of trauma management measure the prevalence of trauma (Grau-Gonzalez et al., 2024) or the beliefs of carers (Beehag et al., 2024) without paying attention to the ability of parents to identify or manage trauma experienced by their children. Positioning non-Western contexts within the discourse on trauma necessitates an instrument that has been developed to gather appropriate data from stakeholders such as parents. To close the knowledge and practice gap, there is a need to develop valid instruments that could be used to gather information regarding parental awareness of trauma-informed approaches. The overarching aim of this study was to use Rasch model to validate an instrument that could be adopted in non-Western countries to develop an understanding of parental capacity to identify and manage trauma among children.

1.1. Conceptual framework

The current study was guided by SAMHSA's trauma-informed approach model. As part of the effort to alleviate the burden of mental health disorders, SAMHSA identified trauma-informed approaches as pivotal for creating a conducive environment for the development of all people. The model is widely used in trauma-informed research (Saleem et al., 2022; Schofield et al., 2021). According to Marshall & Frazier (2019), in contributing to the application of attachment theory to trauma, they argued that individuals who are being threatened would seek support from attachment figures such as parents. However, there are situations where some children may not have attachment figures in their lives. Unfortunately, without formidable attachment figures, children may use secondary mechanisms to deal with trauma (Christie & Sandoval, 2024; Pievani et al., 2024). In some situations, some children may resort to downplaying the severity of the impact, whereas others could use hyperactive strategies (Ahmed, 2025; Kar, 2024). This underscores the need for systems both at home and in schools to help children deal with traumatic experiences. Most importantly, addressing trauma hinges on children having attachment figures who help them cope with traumatic experiences. Indeed, SAMHSA (2023) recognizes the role of parents in dealing with trauma, offers support and management strategies for parents in this situation and emphasizes the importance of a collaborative approach to trauma management.

The SAMHSA's (2023) trauma-informed approaches are made up of 4Rs: recognition, realization, response and retraumatization. However, for the purpose of this study, SAMHSA's (2014) framework for identifying and managing trauma has been categorized into two key concepts: the ability to identify trauma (recognition and realization) and familiarity with trauma-informed practices (TEPs) (response and retraumatization). Identification, the first domain in comprehending trauma (SAMHSA, 2014; 2023), includes a range of events and experiences and their associated effects that can potentially impede child development. In terms of events, physical and psychological situations can have negative effects that ripple through a child's life. Experiences can be singular or ongoing, and both types can have adverse, lingering effects on children. The effects of trauma may manifest as the result of an event or experience, and these effects can be long-lasting or occasional, adversely impacting the daily lives of children and their growth. These effects can take many forms, including attention difficulties, a lack of emotional regulation and psychological maladjustment. From the perspective of attachment theory, there is an urgent need for support from attachment figures who can support individuals in overcoming experiences that hinder their development (Melkman, 2024; Mısırlı & Karakuş, 2024). In many countries, including Bangladesh, Egypt and Nepal, parents play a critical role in understanding and identifying the events, experiences and effects associated with trauma and how these factors can impact children (Beauchamp et al., 2021; Ma et al., 2021; Seleem & Amer, 2020). Attachment figures such as parents should be positioned in such a way that they are able to support their children in coping with traumatic experiences.

The second domain, TIP (which has been used interchangeably with 'practice' in this study), requires individuals involved in the lives of children at risk of trauma to recognize threats, identify symptoms and implement mechanisms to help children overcome trauma (SAMHSA, 2014; 2023). To do so, these individuals must have knowledge of best practices in the TIP. To support trauma management, SAMHSA (2014) created the six-component framework used in this study. The first component, safety, highlights the need to create a safe environment where traumatized children feel supported and welcome and can access the services they need. As agents of socialization, parents must

understand safety measures and commit to creating an environment that promotes the well-being of all children. The second component emphasizes the paramount importance of trustworthiness and transparency. Decision-making processes must be conducted in a manner that is transparent and inclusive, thereby ensuring equitable participation opportunities for all stakeholders.

The third component, peer support, refers to assistance rendered by individuals of the same age group. In the community, the establishment of self-help collectives in which children provide and receive mutual support is imperative. The fourth component underscores the paramount importance of collaboration in child development, placing significant emphasis on the collaborative dynamics between parents and their offspring.

The fifth component focuses on empowerment, voice and choice. This component, which is central to the human rights-based approach, acknowledges children's rights and their capacity to contribute to their own well-being and development. This finding suggests that parents cultivate profound partnerships with their children, facilitate their emotional expression and help them achieve their utmost potential. The sixth component addresses culture, history and gender, emphasizing diversity and recommending that any manifestations of stereotypes be avoided because they undermine individual potential and growth. Furthermore, it states that communities must establish a robust policy that fosters acceptance and denounces all forms of discrimination, especially toward children.

1.2. Current study

The overarching goal of this study was to assess the validity of an instrument that could be used to measure parental knowledge of trauma identification and management. As previously mentioned, the vast majority of research on trauma has been conducted in Western societies (Beehag et al., 2024; Robles et al., 2025; Saggino et al., 2020). The Teacher Trauma Identification and Management Scale (TTIMS), which was recently developed on the basis of the SAMHSA framework to assess trauma identification and management among teachers, has been shown to have satisfactory levels of reliability and validity (Opoku et al., 2024a). To collect data from parents and gain insights into their experiences, this instrument was adapted into a version called the parent trauma identification and management scale (PTIMS; Mustafa et al., 2024). PTIMS requires further validation to ascertain its robustness and support its recommendation as a surveillance tool for examining and understanding parental practices. Therefore, the primary objective of the present study was to adapt the TTIMS for use with parents and examine its psychometric properties. The second purpose was to compare the levels of trauma identification and management among parents from Bangladesh, Egypt and Nepal.

Confirmatory factor analysis (CFA; Li, 2016; Zumbo et al., 2007) was used to assess the underlying factor structure of the PTIMS. Next, multigroup CFA was used to ascertain the validity of the instrument across the three countries. The fit of the model was determined via the following indices: the comparative fit index (CFI), the standardized root mean square root of squared residuals (SRMSR) and the standardized root mean square residual (Maydeu-Olivares, 2013). Moreover, the Rasch measurement framework was used. (deAyala, 2022; Lamprianou, 2020). Rasch analysis is a statistical technique used in modern psychometrics to examine data from instruments and tests (Lamprianou, 2020). Unlike classical test theory, Rasch analysis operates at the item level and transforms Likert scale scores into interval-level measurements, providing a more precise understanding of item difficulty (deAyala, 2022; Lamprianou, 2020). Rasch analysis was conducted via the partial credit model to assess item difficulty (deAyala, 2022; Lamprianou, 2020). Moreover, the local independence estimates leftover associations after all the latent variables have been included in the model (Yen, 1993).

Unlike previous studies, which collected data from a single country, the present study utilized a sample from three countries that have similar systems and face issues related to poverty (Ochi et al., 2024; Wan et al., 2021). Gathering empirical data from a range of cultures can enable cross-cultural comparative studies on trauma and contribute to international discussions on policy and practice transformation.

2. Methods

2.1. Study participants

The study participants were parents of school-age children located in a single city in Bangladesh, Egypt or Nepal. The selection of these countries was primarily due to their shared characteristics, including a history of hardships, natural disasters and prevalent poverty (Ochi et al., 2024; Poudel et al., 2024; Wan et al., 2021). These commonalities provide a solid foundation for conducting comparative analysis of parental knowledge regarding trauma identification and management across these nations. In Nepal, the recruitment of participants was conducted in Kathmandu, the nation's capital. Egyptian participants were solicited from the Mansoura region, and the Bangladeshi cohort was from the capital city of Dhaka. Across all the countries, there is free movement of people. In view of this, there were chances that people from diverse backgrounds would contribute to the current study.

A cross-sectional design guided the recruitment of study participants. According to Wang and Cheng (2020), the adoption of a cross-sectional design helps recruit or include heterogeneous populations for a given study. Additionally, a cross-sectional design enables the gathering of data from a large population at a given point in time (Wang & Cheng, 2020). The study targeted schools and parent groups that convened regularly to deliberate on their children's welfare. For example, there are regular meetings in schools where parents meet to interact with teachers. Schools and parents were identified as essential because they represented organized entities that exchanged ideas and viewpoints on efficacious strategies to bolster child development. Parents who were present at the time of data collection were all invited to participate in this study. This gave all prospective participants the opportunity to participate in this study.

The recruitment of the participants was governed by the following inclusion criteria: a) parents, b) residents of cities (Dhaka, Kathmandu and Mansoura), c) parents of school-age children aged 5 years to 18 years and d) individuals with the capacity to provide informed consent for participation in this study.

In total, 750 study participants were included. The distribution across the countries was as follows: 40 % from Bangladesh, 27 % from Egypt and 33 % from Nepal (Table 1).

2.2. Instrument

A two-segment instrument was developed and administered. The first segment gathered demographic data from the participants (Table 1). The second segment consisted of the PTIMS, which was developed on the basis of SAMHSA's trauma-informed approaches, a widely used framework for guiding research on TIP (e.g., Saleem et al., 2022; Schofield et al., 2021).

The PTIMS is an expansion of the TTIMS, which focuses on teachers' ability to identify and manage trauma among children/children with disabilities (Opoku et al., 2024a; 2024b; 2024c; 2023). In contrast, the PTIMS addresses parents' capacity to identify and manage trauma among all children. The items on the teachers' version were adapted to ensure their appropriateness for completion by parents. For example, items related to phrasing, such as 'teaching/teaching', were changed to 'parenting/children' to ensure their suitability for parents.

The instrument's content was subjected to rigorous face validation by three experts in the field of educational psychology. The draft instrument was shared with them for their review. They were given a rubric to rate the suitability of each of the items. They were also asked to

Table 1
Demographic characteristics of the study participants.

Categories (N = 750)	Frequency (%)
Country	
Bangladesh	300 (40 %)
Egypt	205 (27 %)
Nepal	245 (33 %)
Gender	
Male	324 (43 %)
Female	426 (57 %)
Age	
20–30 years	243 (32 %)
31–40 years	235 (31 %)
41 years or more	272 (36 %)
Education	
Secondary or below	95 (12 %)
Diploma	112 (15 %)
Bachelor Degree	231 (31 %)
Graduate degree	238 (32 %)
Other	74 (10 %)
School type	
Public school	365 (49 %)
Private school	258 (34 %
Both	127 (17 %)
Employment status	
Public sector	184 (25 %)
Private sector	292 (39 %)
Unemployed	274 (37 %)
Income status	
High income	159 (21 %)
Middle income	464 (62 %)
Low income	127 (17 %)

provide written feedback on the items and their suitability for data collection from parents. After the initial review by the experts, a meeting was held to discuss their feedback. Disagreements were resolved through consensus.

In addition, the instrument was piloted with 50 parents in the UAE. The feedback from some parents was considered when the final draft used for data collection was revised. Additionally, the reliability of the instrument computed via Cronbach's alpha was as follows: trauma identification (0.72) and TIP (0.71). Overall, the instrument was deemed appropriate for data collection.

The PTIMS comprises 33 items distributed as follows: trauma identification (n = 15) and TIP (n = 18). See the Appendix for the instrument completed by parents. The PTIMS uses a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

2.3. Procedure

The Social Science Ethics Review Committee at X University approved the current study and its protocols (XXX). Data collection took place between January 2023 and April 2023. Schools and parent groups were contacted for data collection. In each of the cities, ten schools each were invited to participate in this study. The research team included the first five schools, which responded favorably to our invitation. The decision to include equal numbers was made to ensure quality in the recruitment process. Additionally, two parental groups were contacted to contribute to the study. The recruitment processes continued until the target number of schools and parental groups were identified.

A paper/pen and digital platform was used for data collection. In Egypt, the Google form was used for data collection, whereas in Bangladesh and Nepal, printed questionnaires were distributed to parents. The researchers clearly informed potential participants about the study's aims and objectives as well as ethical concerns, including the rights of participants and the confidentiality of the information collected. While collecting data in their respective contexts, the researchers addressed any questions raised by the potential participants. Each participant's consent was obtained before completing the survey questionnaire. In Egypt, consent was implied by participants clicking on the link to complete the online question. However, in Bangladesh and Nepal, written informed consent was obtained from the participants. The participants did not receive any compensation, and they were assured that declining to participate or withdrawing from the study would not affect their relationship with the research team. They were informed that the data collected would be made available to anyone outside the research team. They were assured that the data would be password protected and stored on the university's OneDrive. Additionally, the participants' credentials were anonymized.

2.4. Data analysis

The dimensionality of the participants' PTIMS responses was examined using CFA. The instrument was assumed to be normally distributed because of the sample size. As argued by Field (2013), when the event sample size is large, the data are deemed to be normally distributed on the basis of central tendency theory.

Because the instrument items are ordinal (Likert-type), CFA was estimated on a polychoric correlation matrix with a limited-information estimator (WLSMV). Polychoric correlations estimate the association between the unobserved continuous latent responses that underlie observed ordinal categories and are recommended for CFA with ordinal indicators because they reduce attenuation and bias that can arise when ordinal responses are treated as continuous (Flora & Curran, 2004; Li, 2016; Zumbo et al., 2007).

To examine whether PTIMS exhibits a comparable factor structure across the three countries, a multigroup CFA was conducted. In particular, three increasingly constrained models were evaluated: a configural model (same form without any equality constraints), a metric model (equal item loadings), and a scalar model (equal item loadings and equal intercepts/thresholds). In the study by Cheung and Rensvold (2002), measurement invariance is assessed via changes in approximate fit indices, with cutoff values of $\Delta CFI \leq 0.01$, $\Delta RMSEA \geq 0.015$, and $\Delta SRMR \geq 0.020$ for metric invariance and ≥ 0.025 for scalar invariance (Cheung & Rensvold, 2002).

The partial credit (PC) model (Masters, 1982) was used to conduct a Rasch analysis of the psychometric properties of the PTIMS. The PC model is recommended for polytomus data derived from responses on Likert scales (deAyala, 2022; Lamprianou, 2020). Consistent with the Rasch measurement framework, all the items in the PC model share the same discrimination value, which is set to 1. Therefore, the only difference among the items concerns their level of difficulty. In the PC model, *m*-1 thresholds or transition location points are estimated, where *m* is the number of options on the Likert scale. A threshold represents a value on the latent trait continuum at which the probability of selecting two adjacent points is equal. Moreover, in the PC model, the rating scale structure is not assumed to be the same across all items; it can be different for each item. Before finalizing the use of the PCM, we compared it with the generalized partial credit model (GPCM) to assess whether the assumption of equal item discrimination was tenable. The GPCM permits each item to have its own discrimination parameter. The PCM demonstrated a comparable fit (AIC = 56610.42) to the GPCM (AIC = 56608.29), supporting the equal discrimination assumption and justifying the selection of the PCM for the final analyses.

In the present study, the fit of the empirical data to the model was checked at the global and item levels. At the global level, MADaQ3, the standardized root mean square root of squared residuals (SRMSR) and the standardized root mean square residual (SRMR; Maydeu-Olivares, 2013)) were examined. MADaQ3 is derived from the adjusted Q3 residuals, which represent the correlation between item-pair residuals after accounting for the latent trait. MADaQ3 summarizes the dispersion of these residuals, offering a robust measure of misfit that is less influenced by extreme values than traditional variance-based metrics are. Values close to zero suggest a good model-data fit (Maydeu-Olivares, 2013). SRMSR quantifies the average standardized discrepancy between observed and model-implied item−pair correlations, offering a direct

measure of residual misfit. A key advantage of SRMSR lies in its scale-free nature, which facilitates interpretation across varying model sizes and item sets. SRMSR values less than or equal to 0.05 indicate acceptable model fit. At the item level, outfit and infit mean square measures and corresponding standardized statistics were used. The expected values were approximately unity. Although various cutoff points exist in the literature, deAyala (2022) suggested that outfit and infit values between 0.500 and 1.500 are acceptable.

Another index used to determine the suitability of the proposed model was local independence (LI). The LI assumes that there are no leftover associations among the items after any latent traits have been taken into account. Yen's (1993) Q3 statistic was used to identify the existence of any violations of the LI. Q3 values below 0.20 are commonly used to test its tenability. All analyses were conducted in the R environment (R 4.3.3) via the following libraries: *lavaan* (ver. 0.6-17) for CFA and *TAM* (ver. 4.2-21) for Rasch analysis and *mirt* (for multidimensional graphs).

In addition, a one-way multivariate analysis of variance (MANOVA) was computed for each demographic variable to ascertain differences between participants regarding trauma identification and management. MANOVA was appropriate because trauma identification and management have been found to be correlated (Opoku et al., 2024a). The homogeneity of variances was observed to ensure that they were not violated (Pallant, 2020).

3. Results

3.1. Underlying factor structure of the study instrument

On the basis of prior evidence regarding the dimensionality of TTIMS (Opoku et al., 2024a), a two-correlated factor structure was postulated and tested. The WLSMV estimator, which is considered the most appropriate estimator for ordinal data, was employed. The chi-square results were statistically significant ($\chi^2 = 1099.42$, $df = 494$, $p < 0.001$), and the goodness-of-fit indices suggested an acceptable fit of the data to the model (CFI = 0.935, RMSEA = 0.049, SRMR = 0.042). The item loading results were satisfactory, ranging from 0.420 to 0.619. The association between the two factors was statistically significant and yielded a very large value ($r = 0.90$).

On the basis of these results, it seemed rational to examine whether a unidimensional model was also tenable by following the procedures suggested by Anderson and Gerbing (1988). The fit indices for the unidimensional model suggested a reasonable fit ($\chi^2 = 1174.88$, $df = 495$, $p < 0.001$, CFI = 0.927, RMSEA = 0.043, SRMR = 0.051). However, the comparison of the two models in terms of the χ^2 difference clearly revealed the superiority of the multidimensional model ($\Delta\chi^2 = 66.12$, $p < 0.001$). The 95 % confidence interval around the correlation coefficient did not include unity (0.867–0.933), which further supported the two-factor model structure (Anderson & Gerbing, 1988).

The measurement invariance of the PTIMS across the three countries was subsequently examined. As shown in Table 2, the configural model demonstrated an acceptable fit to the data. Constraining the item loadings to be equal did not produce a meaningful decline in model fit, supporting metric invariance. Further constraining the item thresholds also did not significantly worsen the fit, indicating that scalar invariance was achieved. Taken together, these results provide evidence that the PTIMS yielded measurement invariance across the three countries under study.

In light of these findings, the participants' responses were calibrated via the multidimensional PC (MPC) model and the marginal maximum likelihood (MML) estimator. The calibration converged with no issues in 30 iterations (−2*log likelihood = 68333.74, $df = 135$).

A visual examination of the univariate option response function (ORF) revealed some areas of concern among the items. For example, the option curves were not spread equally. Additionally, the option intersections for several items were not ordered; in fact, they were reversed. This tendency was more apparent for the low options on the Likert scale, i.e., 1 and 2 (Fig. 1). Thus, these two options were merged, and the analysis was rerun.

The new analysis results converged in 24 iterations (−2*log likelihood = 56,406.42, $df = 102$). Our decision to merge the two options was justified by the new ORF, which revealed no issues of concern among the items (Fig. 2). Moreover, category thresholds for each item were properly ordered, which is in line with the PCM assumption. The global fit indices yielded low values (MADaQ3 = 0.042, SRMR = 0.039 and SRMSR = 0.048), indicating a satisfactory overall fit of the data to the model. Moreover, the assumption of the LI seemed to hold since the largest observed Q3 value was 0.20.

Table 3 presents the items' fit indices. The outfit mean square values ranged from 0.878 to 1.124, and the infit mean square values ranged from 0.910 to 1.096, suggesting an acceptable fit of all 33 items. The thresholds for each PTIMS item are depicted in Table 4. These values captured a considerable portion of the latent trait, ranging from −2.33 logits below average (#trauma3) to 1.67 logits above average (#trauma2). Moreover, the associated standard errors were relatively small ($M = 0.109$, $SD = 0.022$).

In contrast to classical test theory, in which reliability is represented by a single value, the precision of measurement in the Rasch framework is related to specific levels of ability. Test information curves indicated that the PTIMS estimates with increased accuracy of both dimensions in the latent trait continuum between −2.5 and + 2.5 logits from the average (Fig. 3).

The precision of measurement peaked for individuals with average levels. Beyond this area, precision gradually declined. The same conclusion can be reached from the multidimensional information contour graph (Fig. 4). The latent trait score was calculated via the expected a posteriori estimation (EAP). For the Trauma Identification and Trauma-Informed Practices dimensions, the person reliability was 0.875 and 0.893, the Person Separation Index was 2.646 and 2.889, the item reliability was 0.993 for both dimensions, and the item separation index was 11.91. The above findings suggest sufficient reliability for making confident judgments about individuals. Moreover, the hierarchy of item difficulty on this scale is stable and reproducible.

3.2. Differences between participants

MANOVA was employed to examine whether the PTIMS scores differed across the demographic characteristics of the participants (Table 5). The demographic variables were operationalized as independent variables, and the PTIMS subscales for identification and knowledge were used as dependent variables. The results revealed a nonstatistically significant effect for gender (Wilk's $\Lambda = 0.999$, $p = 0.721$).

Moreover, the country's main effect was significant (Wilk's $\Lambda = 0.957$, $F(4, 1486) = 8.28$, $p < 0.001$, $\eta_p^2 = 0.022$). A follow-up univariate ANOVA revealed statistically significant differences for trauma

Table 2
PTIMS Measurement Invariance Results.

	χ^2	df	CFI	ΔCFI	RMSEA	ΔRMSEA	SRMR	ΔSRMR
Configural	1709.5	1482	0.954	–	0.025	–	0.055	–
Metric	1787.9	1544	0.951	−0.003	0.025	0.000	0.063	0+.008
Scalar	1897.0	1606	0.941	−0.010	0.027	0+.002	0.064	0+.001

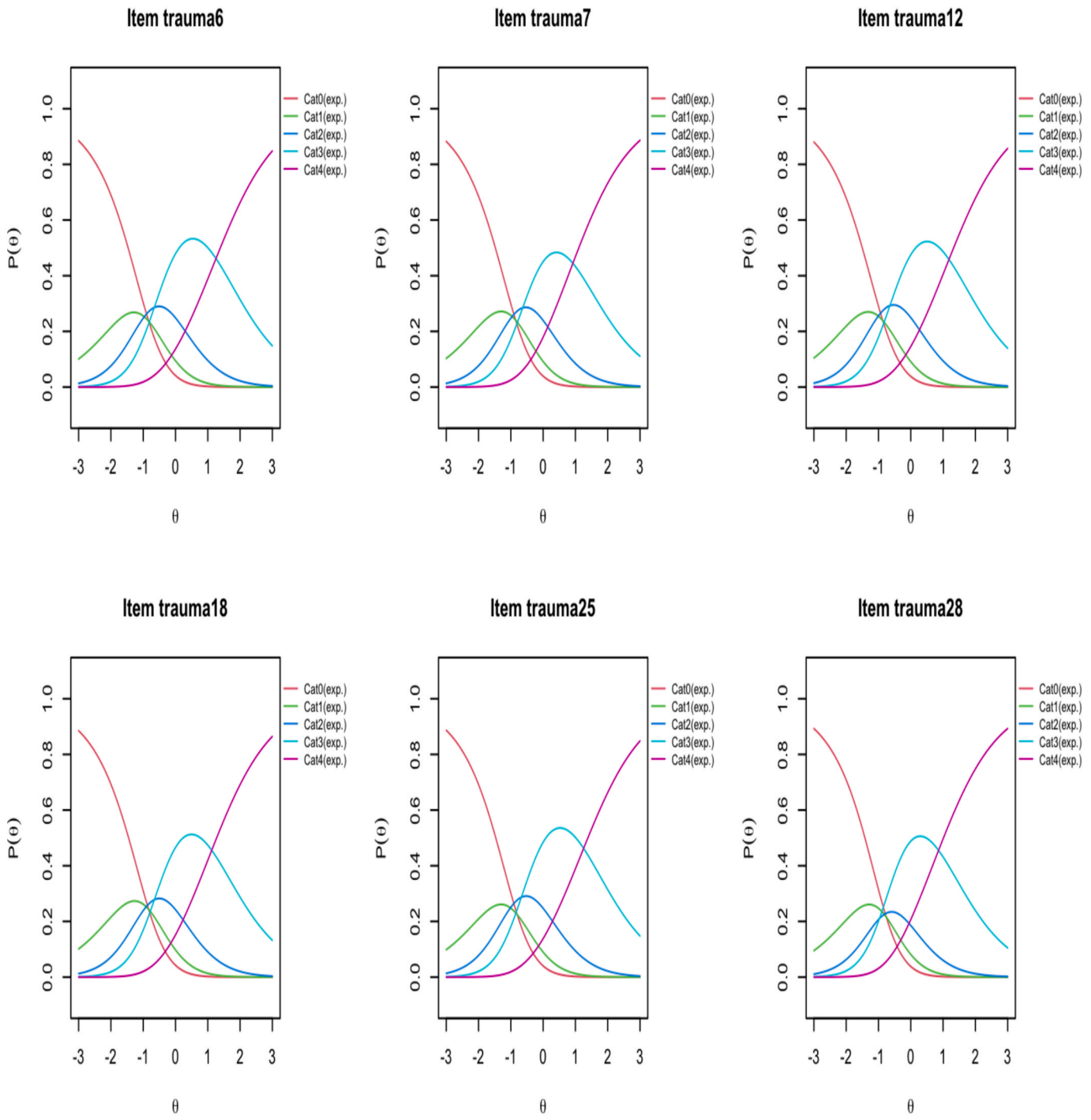

Fig. 1. Option curve function for the PTIMS-selected items via the 5-point response scale (the upper panel selects the trauma identification items, and the lower panel selects the trauma-informed practices items).

identification ($F(2, 744) = 15.22$, $p < 0.001$, $\eta_p^2 = 0.039$) and TIP ($F(2, 744) = 16.28$, $p < 0.001$, $\eta_p^2 = 0.042$). All post hoc comparisons revealed the same pattern of differences across the three countries. The participants from Egypt had the highest average scores for both PTIMS dimensions (Table 5). The mean trauma score for the participants from Nepal was approximately average, whereas the participants from Bangladesh had the lowest mean score.

With respect to age, there was a difference between participants in the combined dependent variables (Wilk's $\Lambda = 0.953$, $F(4, 1492) = 9.05$, $p < 0.001$, $\eta_p^2 = 0.024$). Univariate ANOVA revealed statistically significant differences between participants in terms of trauma identification (F (2, 747) = 12.60, $p < 0.001$, $\eta_p^2 = .033$) and TIP (F (2, 747) = 13.92, $p < 0.001$, $\eta_p^2 = .036$). A post hoc comparison via Tukey's HSD test revealed that, for trauma identification, participants in the 20–30-year-old age group were different from those in the 31–40-year-old age group and those in the 41-year-old and older age groups. However, no differences were observed between the latter two age groups. Similar trends were observed for TIP. These findings suggest that as parents age, their understanding of trauma identification and TIP decreases.

With respect to education, a difference was found between participants in the combined dependent variables (Wilk's $\Lambda = 2.41$, F(8, 1488)

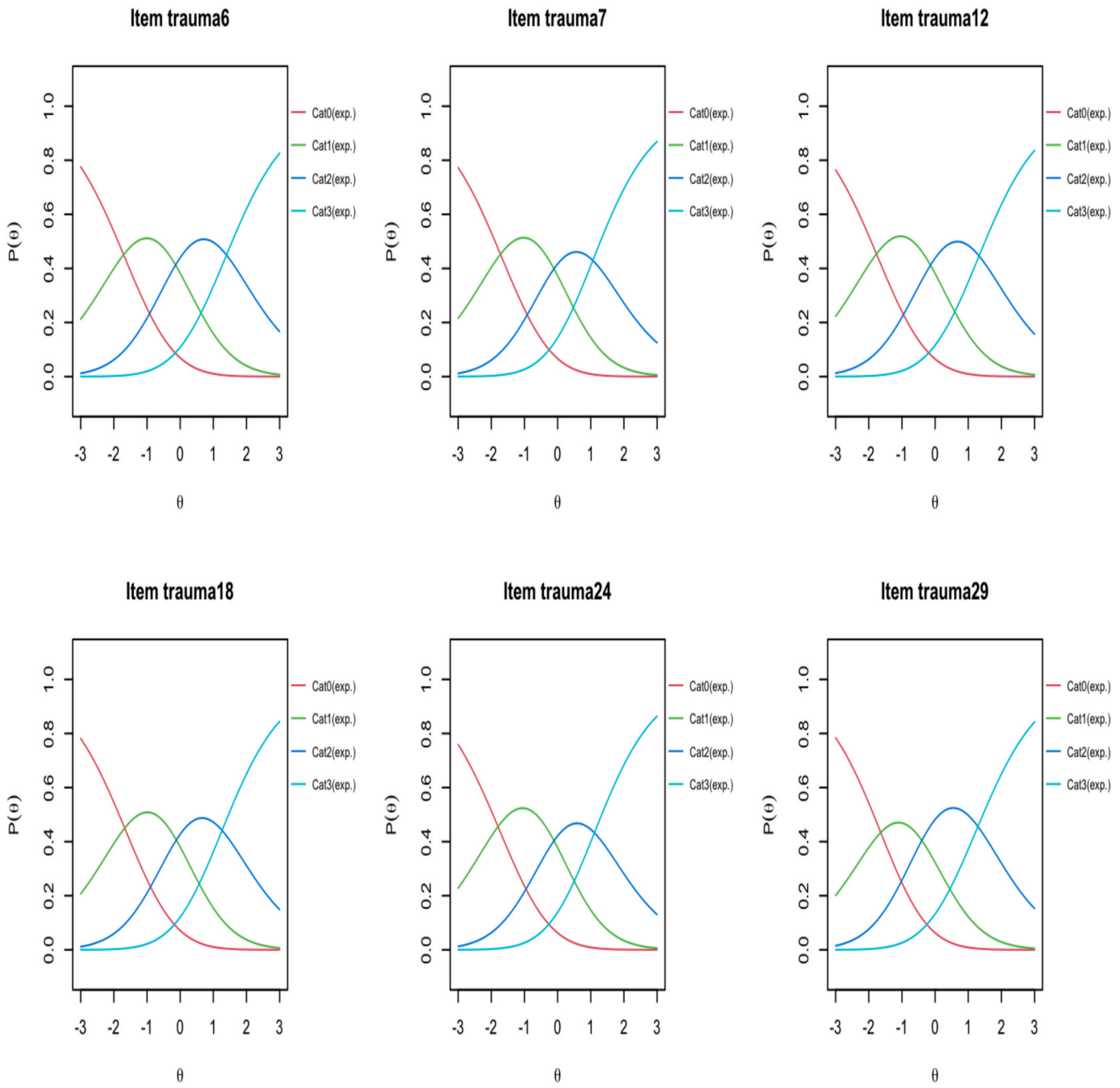

Fig. 2. Option curve function for selected PTIMS items via the 4-point response scale (upper panel selects the trauma identification items; lower panel selects the trauma-informed practices items).

$= 2.41$, $p < 0.001$, $\eta_p^2 = 0.013$). Univariate ANOVA revealed statistically significant differences between participants regarding trauma identification (F (8, 745) = 4.17, $p < 0.002$, $\eta_p^2 = .02$) and TIP (F (8, 745) = 4.67, $p < 0.001$, $\eta_p^2 = .02$). A post hoc comparison revealed that the participants whose highest education level was secondary school differed from those with bachelor's and graduate degrees. However, the participants with a secondary school education did not differ from those who provided a 'other' response for this item. Those without education had the lowest mean scores. Similar trends were observed for TIP.

There was also a difference between participants in the combined dependent variables when the type of school was used as the independent variable (Wilk's $\Lambda = 0.964$, F(4, 1492) = 6.91, $p < 0.001$, $\eta_p^2 = 0.018$). Individual observation revealed statistically significant differences between participants regarding trauma identification (F (2, 747) $= 10.19$, $p < 0.001$, $\eta_p^2 = 0.027$) and TIP (F (2, 747) = 12.65, $p < 0.001$, $\eta_p^2 = 0.033$). A post hoc comparison revealed that, for trauma identification, participants whose children were enrolled in public school differed from those whose children were in private or private school. However, participants whose children were enrolled in private and private schools did not differ from each other. Similar trends were observed for TIP.

Employment status had a significant main effect on the combined dependent variables (Wilk's $\Lambda = 0.987$, F(4, 1492) = 2.51, $p < 0.04$, $\eta_p^2 = 0.007$). Univariate ANOVA revealed a significant difference between participants regarding trauma identification (F (2, 747) = 4.63, $p < 0.01$, $\eta_p^2 = 0.012$) and TIP (F (2, 747) = 3.87, $p < 0.02$, $\eta_p^2 = 0.010$). A post hoc comparison revealed that, for trauma identification and TIP, there was a difference between private sector workers and participants

Table 3
Outfit and Infit Values of the PTIMS Items.

Item	Outfit	Outfit_t	Outfit_p	Infit	Infit_t	Infit_p
trauma1	1.052	1.085	0.278	1.054	1.144	0.253
trauma2	1.036	0.770	0.441	1.048	1.008	0.313
trauma3	1.036	0.740	0.460	1.022	0.467	0.640
trauma4	0.969	−0.657	0.511	0.977	−0.467	0.640
trauma5	0.984	−0.320	0.749	0.999	−0.009	0.993
trauma6	0.979	−0.433	0.665	0.993	−0.133	0.894
trauma7	0.966	−0.720	0.471	0.985	−0.314	0.753
trauma8	0.943	−1.226	0.220	0.957	−0.925	0.355
trauma9	1.015	0.330	0.741	1.023	0.509	0.611
trauma10	0.974	−0.528	0.598	0.992	−0.146	0.884
trauma11	0.972	−0.575	0.565	0.987	−0.254	0.800
trauma12	0.945	−1.186	0.236	0.963	−0.782	0.434
trauma13	1.011	0.250	0.802	1.014	0.319	0.749
trauma14	1.014	0.312	0.755	1.031	0.673	0.501
trauma15	0.968	−0.667	0.505	0.986	−0.289	0.773
trauma16	1.025	0.532	0.595	1.027	0.587	0.557
trauma17	1.107	2.111	0.035	1.080	1.631	0.103
trauma18	0.997	−0.059	0.953	1.011	0.248	0.804
trauma19	1.007	0.171	0.864	1.011	0.246	0.806
trauma20	1.083	1.687	0.092	1.078	1.606	0.108
trauma21	0.979	−0.428	0.669	0.990	−0.188	0.851
trauma22	0.973	−0.559	0.576	0.982	−0.364	0.716
trauma23	0.959	−0.860	0.390	0.966	−0.712	0.476
trauma24	0.950	−1.069	0.285	0.973	−0.577	0.564
trauma25	0.939	−1.309	0.190	0.956	−0.947	0.343
trauma26	1.124	2.460	0.014	1.092	1.892	0.058
trauma27	0.917	−1.818	0.069	0.948	−1.141	0.254
trauma28	0.878	−2.689	0.007	0.910	−1.993	0.046
trauma29	0.914	−1.856	0.063	0.941	−1.261	0.207
trauma30	1.100	2.024	0.043	1.096	1.958	0.050
trauma31	0.988	−0.234	0.815	1.007	0.169	0.866
trauma32	0.975	−0.521	0.602	0.987	−0.264	0.792
trauma33	0.966	−0.725	0.469	0.994	−0.111	0.911

Table 4
Multidimensional partial credit model calibration results for the PTIMS items.

Item	b1	b2	b3
trauma1	−1.981	0.049	1.484
trauma2	−1.939	0.008	1.676
trauma3	−2.327	0.261	1.445
trauma4	−1.929	−0.029	1.460
trauma5	−1.759	−0.014	1.444
trauma6	−1.718	−0.140	1.403
trauma7	−1.736	−0.112	1.067
trauma8	−1.763	0.005	1.383
trauma9	−2.087	0.135	1.409
trauma10	−1.833	−0.140	1.569
trauma11	−1.727	−0.022	1.487
trauma12	−1.781	−0.140	1.332
trauma13	−1.758	0.167	1.520
trauma14	−1.792	−0.013	1.432
trauma15	−1.840	−0.067	1.411
trauma16	−1.810	0.183	1.451
trauma17	−2.088	0.398	1.406
trauma18	−1.705	−0.121	1.289
trauma19	−2.036	0.106	1.360
trauma20	−1.938	0.244	1.564
trauma21	−1.815	0.103	1.501
trauma22	−1.992	0.004	1.626
trauma23	−1.890	0.023	1.325
trauma24	−1.832	−0.116	1.133
trauma25	−1.741	−0.176	1.424
trauma26	−2.084	0.357	1.271
trauma27	−1.601	−0.270	0.935
trauma28	−1.580	−0.399	1.022
trauma29	−1.674	−0.408	1.315
trauma30	−1.880	0.221	1.571
trauma31	−1.602	−0.032	1.270
trauma32	−1.744	0.046	1.508
trauma33	−1.659	−0.334	0.963

who were unemployed.

With respect to income status, there were differences between participants in the combined dependent variables (Wilk's $\Lambda = 0.977$, F(4, 1492) = 4.35, $p < 0.001$, $\eta_p^2 = 0.012$). Individually, significant differences were found between the participants regarding trauma identification (F (2, 747) = 7.24, $p < 0.001$, $\eta_p^2 = 0.019$) and TIP (F (2, 747) = 7.822, $p < 0.001$, $\eta_p^2 = 0.021$). A post hoc comparison revealed that, for trauma identification, participants with a high income differed from middle-income earners. However, neither of these groups differed from the participants who were low-income earners. Regarding TIP, middle-income earners differed from high- and low-income earners.

4. Discussion

One notable advantage of the present study over previous studies examining trauma identification and management is the use of the Rasch measurement framework, which enables the analysis of the function of each item and the range of the latent trait being assessed. The results demonstrated the strong psychometric properties of the PTIMS. In particular, after the Likert scales 1 and 2 were merged, the option curve functions behaved as expected, capturing different aspects of the latent trait. This issue is not uncommon when instruments and tests are examined via the Rasch measurement framework, and merging adjacent response options is the recommended strategy for addressing this problem (Lamprianou, 2020). On the basis of improved option curve functions, future scientific endeavors should utilize a four-point Likert scale instead of a five-point scale when assessing parents' trauma identification and management practices. It is unknown whether this finding is specific to parents, as no Rasch analysis has been conducted on teachers' trauma practices via the TTIMS. Thus, additional research is needed to determine whether teachers effectively utilize five-point response options or whether it is preferable to restrict them to a smaller number of options.

Additionally, all reported fit indices yielded satisfactory values, which clearly supported the validity of the PTIMS. Moreover, the range of the thresholds and the information function curves suggested that the PTIMS measures trauma practices with adequate precision not only at average levels but also at low and high levels. Furthermore, the theta scores were estimated with increased reliability levels, enhancing confidence in the derived values and subsequent comparisons.

Differences, especially in terms of trauma management and identification, were found between participants on the basis of their country of origin. Egyptian participants had better mean scores than their counterparts in Bangladesh and Nepal, who had the lowest scores. Although it is not our intention to overstretch the study findings, we found that participants from countries with large populations, i.e., Egypt, with over 100 million people, and Bangladesh, with at least 170 million people, had better mean scores than did participants from Nepal, which has a small population. Furthermore, Nepal (0.40 %) has a poverty headcount for people living on US$2.15 a day compared with Egypt (1.5 %) and Bangladesh (5 %)(World Bank, n.d.). The difference between participants in terms of income level revealed a very complex dynamic. Regarding trauma identification and TIP, middle-income earners differed from high- and low-income earners. This leaves one to wonder whether the economy of a country or the income level might not predict parental capacity to identify and manage trauma. Furthermore, other contextual variables might offer more insights into building a system that could enhance trauma management and development across the studied countries. More empirical evidence may be needed to clarify the factors that could inform trauma awareness among parents raising children in the studied countries in similar contexts.

The participants' ages provided additional insights into their levels of trauma awareness. For example, these findings could indicate that younger parents have a greater capacity to identify and manage trauma than older parents do. This notion is somewhat consistent with previous studies reporting that younger teachers were more competent at TIP

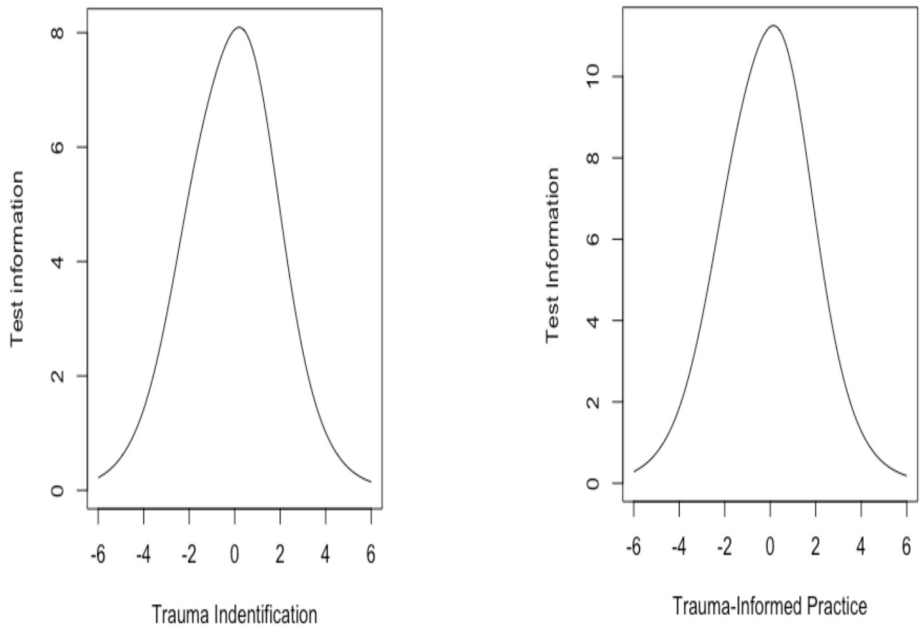

Fig. 3. Test information curves for the two dimensions of the parent trauma identification and management scale.

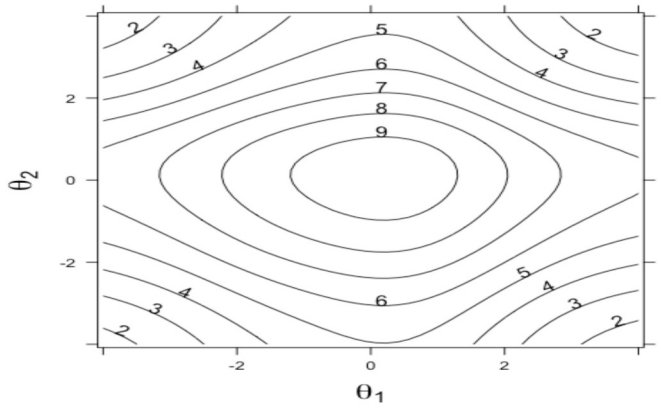

Fig. 4. Test Information Contours for the Two Dimensions of the Parent Trauma Identification and Management Scale Note: θ_1 = Trauma identification, θ_2 = Trauma-informed practices.

than their older counterparts were. This was probably unexpected in the sense that, in the countries where the data were collected, it is widely known that aging is linked to caregiving experiences. For example, older parents are believed to have more parenting experiences that they can leverage to support children exhibiting challenging behaviors. However, on the basis of the findings of this study, younger parents may be much more efficient at identifying and managing trauma than their older counterparts. This trend could be related to younger parents having greater access to education than older parents do. In this context, younger parents could acquire useful knowledge regarding appropriate strategies for identifying and managing trauma. Nevertheless, the study findings seem to have provided guidelines for training certain key stakeholders in trauma identification and management in the future.

The participants in the present study also differed in terms of their educational backgrounds. These findings could indicate that parents who have received higher education are more likely to be competent at identifying and managing trauma than those without education. These findings are somewhat inconsistent with Opoku et al.'s (2023), Opoku et al. (2024a), Opoku et al. (2024c) observation that there were no differences in teachers' trauma identification and TIP scores on the basis

Table 5
Descriptive statistics of the PTIMS-estimated latent traits across demographic variables.

	θ_1 M (SD)	θ_2 M (SD)
Country		
Egypt	0.361 (0.652)	0.386 (0.679)
Bangladesh	−0.227 (0.352)	−0.253 (0.377)
Nepal	−0.046 (0.901)	−0.033 (0.930)
Gender		
Male	−0.102 (0.673)	−0.096 (0.738)
Female	−0.065 (0.708)	−0.061 (0.811)
Age		
20–30 years	0.172 (0.71)	0.19 (0.74)
31–40 years	−0.120 (0.74)	−0.108 (0.75)
40 or more years	−0.069 (0.62)	0.097 (0.66)
Education		
None	−0.017 (1.02)	−0.014 (1.04)
At most secondary	−0.254 (0.44)	−0.277 (0.45)
Diploma	−0.046 (0.56)	−0.060 (0.59)
Degree	0.076 (0.65)	0.085 (0.68)
Postgraduate	0.032 (0.74)	0.039 (0.78)
School type		
Public school	0.109 (0.73)	0.128 (0.76)
Private school	−0.108 (0.72)	−0.126 (0.75)
Both	−0.137 (0.44)	−0.152 (0.73)
Employment status		
Public sector worker	−0.030 (0.54)	−0.034 (0.58)
Private sector worker	−0.084 (0.82)	−0.078 (0.85)
Unemployed	0.090 (0.64)	−0.088 (0.67)
Income status		
High income	−0.137 (0.61)	−0.134 (0.64)
Middle income	0.068 (0.75)	0.075 (0.77)
Low income	−0.120 (0.58)	−0.145 (0.60)

Note: θ_1 = Trauma identification, θ_2 = Trauma-informed practices.

of their educational backgrounds. It could be argued that, in previous studies, all teachers had similar educational qualifications, leading to a lack of differences. Moreover, since education is very important in developing a parent's capacity to support trauma identification and TIP (Guerrero et al., 2022), it could be argued that no access or limited access to education could negatively affect a parent's ability to help identify and dettraumatize children who are at risk. In this context, parents with no or few educational qualifications could be targeted in

future training programs to equip them with the requisite trauma identification and TIP techniques.

The present study is not without limitations. For example, this study drew on the self-reported experiences of parents across three countries, and it was beyond the scope of this study to verify their accounts of raising their children. However, the data were collected in the main languages of the participants (Arabic, Bengali and Nepali), and we are confident that the survey responses reflected their caregiving experiences. Future studies could translate the PTIMS into other languages and test its validity.

Second, we did not conduct convergent and divergent validity tests for this study. Instruments such as parental stress (Berry & Jones, 1995), adverse childhood experiences (Schickedanz et al., 2018) and parental knowledge of child development (Reich, 2005) have been developed to assess parental contributions to child development. However, in this study, the sole intention was to develop a robust instrument that could be used to measure the ability of parents to identify and manage trauma among their children. Consequently, we did not include external measures to enable us to assess convergence and divergence validity. In this study, the PTIMS was subjected to face, content, and construct validity, which are appropriate validation methods. Future studies could use external measures such as parental stress and correlate it with the PTMIS to test the convergent and divergent validity of the latter.

Additionally, we did not assess the test–retest reliability of the PTIMS. Specifically, the research team did not have the budget to extend the study to nonurban areas and recruited parents who had enrolled their children in schools and members of parental groups in the three studied cities. Therefore, interpretations of the results should be limited to the experiences of parents with children enrolled in schools in urban areas. Future studies could recruit parents whose children were out of school or from deprived communities to understand the extent of their knowledge and awareness of trauma identification and TIP. Moreover, future studies may use a longitudinal design to ascertain whether parental awareness of trauma or responsiveness to interventions changes over time.

The study findings could be considered in future trauma policies and practices. The current study was guided by the the SAMHSA (2014) model, which provides provisions for trauma identification and TIP. The present study provides a theoretical basis for the conceptual framework, as both subscales (identification and TIP) of the PTIMS were validated in this study. In studies that focused on teachers, the factor structure was supported (Opoku et al., 2024a). The PTIMS could be considered by researchers in non-Western contexts who are interested in developing an inclusive society. For example, researchers in similar contexts could extend the current study to further validate the instrument and contextual information about trauma awareness among parents. Moreover, the findings of the study highlight the need for stakeholders, such as parents, to be trained on trauma identification and offer appropriate detraumatizing strategies to alleviate trauma among children. PTIMS could be used as a surveillance tool by schools to collect information from parents to gather data about children at risk of trauma and support them at home. This could help schools create databases of risky children as well as targeted interventions to enhance their development. Additionally, schools could also develop training modules for parents to identify children who are at risk of trauma and who have the best TIP. School can leverage social media to send short videos to parents on trauma identification and TIP. Additionally, this study could have implications for trauma policy development across countries. These two domains could be featured in future training policies. Policymakers could engage parental groups on core triggers and brainstorm on TIP, which are contextually appropriate or acceptable. Following this, the PTIMS could be used to collect data to ascertain areas where parents may need further training and development. Overall, the current study is novel and adds to the literature as an instrument that could be used to measure trauma awareness among parents in a non-Western context.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix

Parent Trauma Identification and Management Scale.

	1 = strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree
	Trauma identification
1	I have in-depth understanding of events that causes trauma
2	I able to see early warning signs of trauma events or experiences.
3	I know how to get information from children who are being exposed to trauma
4	I am able to identify children who have been exposed to traumatic experience
5	I have the ability to differentiate between children going through traumatic experience from others.
6	I am able to tell if children feel humiliated based on what they have been through
7	I can tell if a child is being abuse by close relatives.
8	I am able to see when children do not trust anyone.
9	I know when children being threatened not to talk about trauma experiences.
10	I am able to determine changes in children when they are being abused or going through difficulties.
11	I am able to identify children who cannot cope with normal stress
12	I am able to identify children who are struggling to develop relationship with peers or others.
13	I am able to identify children who are unable to regulate emotions as result of trauma experiences
14	I am able to identify children who are emotionally affected by traumatic experiences.
15	I understand the emotional needs of children who are traumatized.
	Trauma informed practice
16	I can manage trauma among children at home.

(*continued on next page*)

(*continued*)

	1 = strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree
17	I have support plan for children who are traumatized.
18	I can involve children in decision-making on trauma management.
19	I know how to develop relationship with children who are traumatized.
20	I know to develop trauma management plan for children.
21	I can train children to express and manage their feelings
22	I can invite other parents to be involve in trauma management plans
23	My home environment is trustworthy to work with other families and children on trauma related issues.
24	I can befriend children to manage trauma and difficulties
25	I can encourage other peers to support trauma management for children
26	The community support children and families on the issues of trauma.
27	I can educate children to accept themselves
28	I can empower children to think positively
29	I can give voice to children who are affected by trauma
30	I can contribute to policymaking on discrimination and trauma management
31	I know how to educate others to accept or embrace diversity
32	I can promote the inclusion of traumatized children in all community activities
33	I can promote respect and empower children in the community

Data availability

Data will be made available on request.

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