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ORIGINAL RESEARCH

Survey-based Women Empowerment Index for Afghanistan (SWEI-A): An Explanatory and Confirmatory Factor Analyses

Omid Dadras[1,2] · **Mohammadsediq Hazratzai**[3]

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Abstract

This study aimed to develop a country-specific index to measure women empowerment among married women aged 15–49 years in Afghanistan. The data from the 2015 Afghanistan demographic health survey (ADHS) was used to develop the index. The data on 26 variables across eight hypothesized domains related to women empowerment were used in EFA to probe the underlying domains in the data. CFA examined the structural validity of hypothesized factors in EFA. Four indicators were dropped during the analysis either due to the low and significantly different loading on one factor as compared to other indicators or due to overlap with other indicators loaded on different factors. The final model included 22 indicators across seven domains (labor force participation, attitude toward violence, decision-making, access to healthcare, literacy, age at critical life events, and property-owning) and had Cronbach's alpha = 0.69; indicative of good internal reliability. The goodness-of-fit test represented an acceptable level of construct validity with the likelihood ratio, RMSEA, and SRMR values ≤ 0.05 and CFI and TLI > 0.95. The developed index shares a common ground for future research concerning women empowerment in Afghanistan and can enhance the comparability of the results across future studies. In addition, having a standard index for women empowerment at the individual and country level could help assess the progress and efforts that have been made to achieve gender equality (SDG 5), and guide the direction of future policies and interventions.

Keywords Women empowerment · Afghanistan · Index · Reliability · Validity

Abbreviations

DHS	Demographic and Health Survey
ADHS	Afghanistan Demographic and Health Survey
CSO	Central Statistics Organization
MoPH	Ministry of Public Health
USAID	United States Agency for International Development

✉ Omid Dadras
omid.dadras@uib.no

[1] Department of Global Health and Primary Health Care, University of Bergen, Bergen, Norway

[2] Bergen Addiction Research, Department of Addiction Medicine, Haukland University Hospital, Bergen, Norway

[3] Public Health Institue (PHI), Los Angeles, USA

EFA	Explanatory factor analysis
CFA	Confirmatory factor analysis
CFI	Comparative fit index
GDI	Gender development index
GEI	Gender equality index
KMO	Kaiser–Mayer Olkin
RMSEA	Root mean squared error of approximation
SRMR	Standardized root mean squared residual

1 Introduction

Gender equality and women empowerment is the cornerstone of the fifth goal of sustainable development goal (SDG). Efforts to promote gender equality and empower women play a critical role in fostering health and human development globally. Empowerment has been described as promoting the potential and capability of underprivileged populations by removing the existing obstacles toward individual decision-making and autonomous action to improve overall wellbeing (Kabeer, 2005; Narayan-Parker, 2002). Gender equality could be achieved through equal rights, opportunities, and access to education; health care; decent work; political and economic privileges for both men and women (Duflo, 2005). This could be effectively achieved by empowering the women across three main categories; namely (1) Agency that indicates the decision-making abilities regardless of the existing power structure; (2) Resources that are described as channels through which one exercises agency such as education, health, and physical assets; (3) Achievements that are the product of agency such as economic and socio-political gains (Kabeer, 2005).

Empowering women not only benefits women themselves but also contributes to the development of society as a whole (Charmes & Wieringa, 2003). Promoting women empowerment has been linked to improved men's and women's health and reduced child mortality and morbidity (Yaya et al., 2018). Empowered women are more likely to use modern contraception, and have access to antenatal care, institutional delivery, and skilled birth attendance (Ahmed et al., 2010; Msuya et al., 2014; Tadesse et al., 2013). Besides, it has been shown that the children of empowered women are less likely to suffer from malnutrition and their daughters are more likely to spend longer time in education and receive equal treatment as their sons in inheritance (GUPTA, 1995).

Over the last two decades, a tremendous effort has been made on gender equity, however, the progress has been slow and uneven across different contexts and countries (Lopez-Claros et al., 2005; Unit, 2012). The situation is even worse in some poor-resourced countries such as Afghanistan; in fact, Afghanistan has been listed as the last country on The Global Gender Gap Index 2022, representing the largest gap and continuous poor functioning in terms of gender equality progress (Forum, 2022). Although women account for approximately half of the Afghanistan population, they remained severely underrepresented economically, socially, and politically (Henry, 2020). Despite the multiple benefits of women empowerment and the fact that women in Afghanistan have not been granted this right that they are entitled to, it is necessary to study the determinants and barriers that exist toward Afghan women empowerment. However, it requires country-specific measures and scales that quantify the gaps and determine the direction of future policy and research.

Although there are several scales to measure women empowerment, the multidimensionality of women empowerment introduced enormous challenges in the quantification

and comparability of the results across different contexts (Huis et al., 2017; Miedema et al., 2018). For instance, the Gender-based Development Index (GDI), the Gender-based Empowerment Measure (GEM), and the Gender-Equality Index (GEI) are composite indices that have been developed to measure the gender-based disparities in terms of basic capabilities; however, the methodological criticisms of such indices concerning data relevance and importance as well as geographical coverage limited their use (Permanyer, 2013). Moreover, the choice of indicators is often limited by what is available at the national level and manifests itself as a disadvantage in low-income countries where the existent indicators are not truly representative of gender-based disparities (Cueva Beteta, 2006).

Given this background; in practice, capturing the multidimensional structure of women empowerment in a specific context requires operationalization of reliable and context-specific variables and seems to be necessary not only to quantify the women empowerment but also to track the temporal changes and accordingly formulate the necessary interventions and policies. Moreover, the context-specific indices could be used by future research to enhance the comparability across the studies. Therefore, in this study, we aimed to develop a country-specific index to measure women empowerment in Afghanistan using the relevant indicators that have been suggested by previous literature (Asaolu et al., 2018; Charmes & Wieringa, 2003; Ewerling et al., 2017; Huis et al., 2017; Kabeer, 1999; Malhotra et al., 2002; Miedema et al., 2018) and the data on them were available in the ADHS 2015. To the best of our knowledge, this is the first composite index that has been developed to measure Afghan women empowerment and besides the important policy implications, could enhance the reliability, validity, and comparability of the results across future studies in Afghanistan.

2 Methods

2.1 Study Setting

This study used cross-sectional data from the 2015 Afghanistan Demographic Health Survey (ADHS, 2015). ADHS 2015 is a nationally representative survey implemented by the Central Statistics Organization (CSO) in collaboration with the Afghanistan Ministry of Public Health (MoPH) and funded by the United States Agency for International Development (USAID).

2.2 Study Design and Population

ADHS 2015 collected data for women aged 15–49 years and their children under 5 years old through a stratified two-stage cluster sampling to estimate the key indicators at the national level, in urban and rural areas, and for each of the 34 provinces in Afghanistan. In the first stage, 950 clusters (enumeration areas from the previous national census) including 260 urban and 690 rural areas were selected. In the second stage, through an equal probability systematic selection process, 25,650 households were selected within 950 clusters. To obtain representative estimates at the national level, sampling weights were calculated and applied. A sample of the women aged 15–49 years ($n = 29{,}641$) who were either permanent residents of the selected households or visitors who stayed in the households the night before the survey were recruited after informed consent. An inclusive description

of survey procedures is available in the final ADHS 2015 report (Central Statistics Organization & ICF, 2017). For the purpose of the present analysis, we restricted our analysis to married women aged 15–49 years old because for some variables the data were only collected for married women.

2.3 Study Variables

A total of 26 suggested variables concerning women empowerment (Asaolu et al., 2018; Ewerling et al., 2017; Huis et al., 2017; Kabeer, 1999; Malhotra et al., 2002; Miedema et al., 2018; Phan, 2016) that were available in ADHS 2015, were included in this analysis. All categorical variables were either recoded or used in their original format based on their suggested direction and influence on women empowerment so that the categories with higher ranks represent higher levels of empowerment and those with lower ranks indicate low empowerment (Asaolu et al., 2018; Miedema et al., 2018). The variables and corresponding domains and dimensions used in this study and the detail of recoded variables are described in Table 1.

2.4 Data Analysis

Data analysis was performed in STATA software version 16 in four steps. First, the variables were operationalized and prepared for factor analysis (Table 1), and the dataset was randomly split into half; assuming that homogenous samples of married women aged 15–49 years are being generated. The first half was used to extract the underlying domains using EFA and the second half was retained for CFA to examine the construct validity of emerged factors in EFA as recommended in previous literature (Cabrera-Nguyen, 2010; Worthington & Whittaker, 2006). The suitability of data for EFA was tested using the Kaiser–Meyer–Olkin (KMO) test of sampling adequacy and Bartlett test of sphericity (Gaskin & Happell, 2014) in which, values greater than 0.70 and p-value < 0.05 are considered favorable, respectively. In the second step, the first sample was used to identify the underlying domains that reflect women empowerment using exploratory factor analysis (EFA). The decision on which domains to be retained was made based on the eigenvalue (> 1), scree plot (Fig. 1), and the amount of explained variability by each individual domain. The variables with a loading factor < 0.4 and those loaded on more than one domain were dropped in the further analysis as recommended by Stevens, 2009 (Stevens, 2009). To construct the final model and obtain the structural domains-empowerment indices—oblique rotation was adopted over orthogonal rotation to account for the potential correlation between factors (Phan, 2016). In the third step, the internal reliability of the overall index and individual domain was examined by Cronbach's α test (Table 2) (Bland & Altman, 1997, 2002) and domains with a Cronbach's α value $< 50\%$ as well as the variables that removing them significantly improve the Cronbach's α coefficients, were dropped (Lyne et al., 2013; Raine et al., 2021). In the last step, the construct validity of the index was assessed by confirmatory factor analysis (CFA) in the other half of the sample to estimate how well the measured variables represent the number of emerged constructs. The CFA produces the fit statistics based on the covariate structure of observed data (Table 3) to determine the appropriateness of the model such as the Root Mean Squared Error of approximation (RMSEA) which represent the parsimony of an index; the Comparative Fit Index (CFI), Tucker-Lewis index (TLI), and Standardized Root Mean Squared Residual (SRMR)

Table 1 Dimension (D1), Domains (D2), and variables used in describing women empowerment

D1	D2	Indicator	Questions	DHS response categories	Recode used in analysis
Economic	Labor force participation	Occupation	Type of work	Not working = 0; professional/technical/managerial = 1; clerical = 2; sales = 3; agricultural—self employed = 4; services = 7; skilled manual = 8; unskilled manual = 9	Not working = 0; non-skilled (unskilled manual/clerical/ services) = 1; agriculture self-employed = 2; skilled worker (professional/technical/managerial/ skilled manual) = 3
		Earning	Type of earnings from respondent's work	Not paid = 0 Cash only = 1 Cash and in-kind = 2 In-kind only = 1	Not working = 0, Not-paid = 1, In-kind only = 2, Cash and in-kind only = 3, Cash only = 4
		Seasonality	Respondent employed all year/seasonal	All year = 1, Seasonal = 2, Occasional = 3	Not working = 0, Occasional = 1, Seasonal = 2, All year = 3
		Income ratio	Respondent earns more than husband/partner	More than him = 1, Less than him = 2, About the same = 3 Husband/partner has no income = 4 Don't know = 8	Not working = 0, Husband/ partner has no income/ don't know/Less than him = 1, About the same = 2, More than him = 3
		Work autonomy	Who do you work for?	Family member = 1, Someone else = 2, self-employed = 3	Not working = 0, Family member = 1, Someone else = 2, Self-employed = 3
	Property-owning	Land ownership	Owns land alone or jointly	Does not own = 0, Alone only = 1, Jointly only = 2, Both alone and jointly = 3	Does not own = 0, Jointly only = 1, Alone only = 2, Both alone and jointly = 3
		House ownership	Owns a house alone or jointly	Does not own = 0, Alone only = 1, Jointly only = 2, Both alone and jointly = 3	Does not own = 0, Jointly only = 1, Alone only = 2, Both alone and jointly = 3

Table 1 (continued)

D1	D2	Indicator	Questions	DHS response categories	Recode used in analysis
Socio-cultural	Household decision-making	Women's health	Person who usually decides on respondent's healthcare	Respondent alone = 1 Respondent and husband/partner = 2 Husband/partner alone = 4 Someone else = 5 Other = 6	Husband/partner alone/Someone else/Other = 0, Respondent and husband/partner = 1, Respondent alone = 2
		Large household purchases	Person who usually decides on large household purchases		
		Visiting relatives/family	Person who usually decides on visits to family or relatives		
	Attitudes towards violence	Goes out without telling husband	Beating justified if wife goes out without telling husband	No = 0, Yes = 1, Don't know = 8	No = 1, Yes = 0, Don't know = 0
		Neglects children	Beating justified if wife neglects the children		
		Argues with husband	Beating justified if wife argues with husband		
		Refuses sex	Beating justified if wife refuses to have sex with husband		
		Burns food	Beating justified if wife burns the food		
	Age at critical life event	Age at first birth	Age of respondent at first birth	Age in years	No change
		Age at cohabitation	Age at first cohabitation	Age in years	No change

Table 1 (continued)

D1	D2	Indicator	Questions	DHS response categories	Recode used in analysis
Education	Literacy	Literacy	Reading abilities	Cannot read at all = 0, Able to read only parts of sentence = 1, Able to read whole sentence = 2	No change
			Frequency of reading newspaper	Not at all = 0, Less than once a week = 1, At least once a week = 2	No change
		Educational level	Highest educational level	0 No education; 1 Primary; 2 Secondary; 3 Higher	No change
Health	Negotiating sex	Can ask partner to use condom	Respondent can ask partner to use a condom	No = 0, Yes = 1	No/ Don't know/not sure/ depends = 0
		Can say no to sex	Respondent can refuse sex	Don't know/not sure/ depends = 8	Yes = 1
	Access to Healthcare	Permission	Getting permission to go	Not a big problem = 1; Big problem = 2	No change
		Money	Getting money needed for treatment		
		Distance	Distance to health facility		
		Going Alone	Not wanting to go alone		

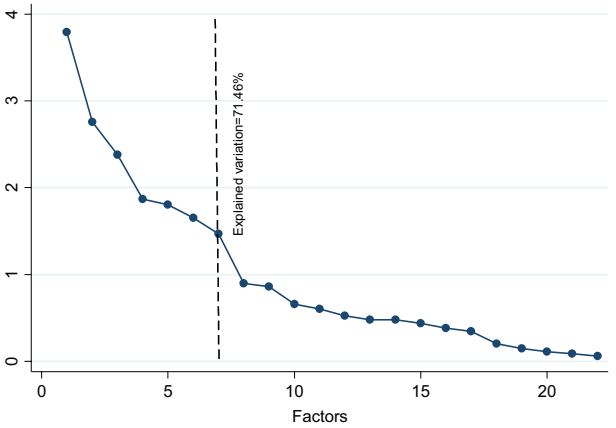

Fig. 1 Scree plot of eigenvalues plotted against factors for the initial 26 variables used for exploratory factor analysis

Table 2 Factor loading values for individual variables and explained variation by each domain

Factor	Variables	Loading	Variation (%)
[a]F1	Occupation	0.97	16.58
	Earning	0.95	
	Work autonomy	0.92	
	Seasonality	0.95	
[b]F2	Justified if goes out without telling husband	0.66	11.04
	Justified if neglects children	0.74	
	Justified if argues with husband	0.73	
	Justified if refuses sex	0.68	
	Justified if burns food	0.66	
[c]F3	Women's health	0.84	9.93
	Large household purchases	0.87	
	Visiting relatives/family	0.82	
[d]F4	Permission	0.65	9.24
	Money	0.66	
	Distance	0.76	
	Going Alone	0.75	
[e]F5	Educational level	0.97	8.84
	Literacy	0.97	
[f]F6	Age at cohabitation	0.96	8.43
	Age at first birth	0.96	
[g] F7	House ownership	0.89	7.40
	Land ownership	0.89	

[a]Factor/Domain 1: Labor Force Participation

[b]Factor/Domain 2: Attitudes towards violence

[c]Factor/Domain 3: Decision-making

[d]Factor/Domain 4: Access to Healthcare

[e]Factor/Domain 5: Literacy

[f]Factor/Domain 6: Age at critical Life events

[g]Factor/Domain 7: Property-owning

Table 3 The internal reliability of individual items and domains

Domain	Variables	Cronbach's α	
		Item	Overall
Labor force participation	Occupation	0.92	0.95
	Earning	0.94	
	Work autonomy	0.96	
	Seasonality	0.93	
Attitudes towards violence	Justified if goes out without telling husband	0.70	0.74
	Justified if neglects children	0.67	
	Justified if argues with husband	0.68	
	Justified if refuses sex	0.69	
	Justified if burns food	0.70	
Decision-making	Women's health	0.74	0.80
	Large household purchases	0.69	
	Visiting relatives/family	0.77	
Access to healthcare	Permission	0.65	0.68
	Money	0.64	
	Distance	0.60	
	Going Alone	0.60	
Literacy	Educational level	0.95	0.95
	Literacy	0.95	
Age at critical life events	Age at cohabitation	0.91	0.91
	Age at first birth	0.91	
Property-owning	House ownership	0.75	0.75
	Land ownership	0.75	
Total			0.69

which represent relative and absolute fit of the index (Schreiber et al., 2006). An index with good construct validity has RMSR and RMSEA < 0.05 and CFI and TLI more than 0.95 (Brown, 2015).

3 Results

3.1 Preliminary Analysis

A total of 28,661 married Afghan women aged 15–49 years were included in this study, half of those (14,328) were randomly selected and included in the EFA to explore the latent factors and the other half (14,333) were included in the CFA to examine the construct validity of the index. The preliminary correlation matrix, including all the variables, indicated an acceptable degree of correlation justifying the use of factor analysis. Additionally, the value for KMO measure of sampling adequacy was 0.72, and the Bartlett test of sphericity was significant at a p-value < 0.001; indicating the suitability of data for EFA.

3.2 Explanatory Factor Analysis (EFA)

To identify the underlying factors, the initial EFA model included 26 variables (Table 1); however, four of these variables including the "can ask the partner to use condom", and "can say no to sex" in the "health" domain, "income ratio" in "labor force participation' domain, and "frequency of reading newspaper" in literacy domain were dropped in further analysis either due to the low and significantly different loading on one factor as compared to other indicators which destabilize the model or due to overlap with other indicators loaded on different factors. The final model included 22 variables loaded on seven factors with eigenvalues > 1 (1.63–3.65) and explained 71.46% of the variation in the data. The first (16.58%) and second (11.04%) factors/domains, indicating "labor force participation" and "Attitude toward violence", accounted for the biggest portion of variation explained by the final model: other factors/domains including "decision-making", "literacy", "health", and "property-owning" more or less contributed to a similar proportion (7.40–9.93%) of the total variation in data.

3.3 Internal Reliability

Table 3 describes Cronbach's alpha coefficients for internal consistency of the developed index across 22 indicators and seven domains in the final model. As it has been shown, the value of Cronbach's alpha coefficient is equal to or more than 0.60 for all individual indicators, domains, and overall index: indicating an acceptable level of internal consistency in the final model. No additional variable was dropped in the internal reliability analysis.

3.4 Confirmatory Factor analysis (CFA)

In the last stage, the construct validity of the final model was assessed using CFA, taking into account the covariate components in the model using the structural equation modeling. The results indicated a good fit for the developed model with a Likelihood ratio, RMSEA, and SRMR values ≤ 0.05 and CFI and TLI values > 0.95 (Table 4).

4 Discussion

This study developed the first country-specific index to measure women empowerment in Afghanistan using the data from a nationally representative survey (ADHS, 2015). The analysis yielded a 7-factor model that sufficiently captures the multiple dimensions of women empowerment among Afghan women aged 15–49 years in Afghanistan, demonstrating favorable construct validity and internal consistency. The final model comprised seven domains including labor force participation, attitude toward violence,

Table 4 The goodness of fit tests for confirmatory factor analysis (CFA); Construct validity

Likelihood ratio (*p*-value)	RMSEA	CFI	TLI	SRMR
< 0.001	0.045	0.961	0.957	0.056

RMSEA Root mean squared error of approximation, *CFI* comparative fit index, *TLI* Tucker-Lewis index, *SRMR* standardized root mean squared residual

decision-making, access to healthcare, literacy, age at critical life events, and property-owning. These findings address the existing ambiguity in the literature concerning the conceptualization and operationalization of women's empowerment in Afghanistan and provide a foundation for future research on women's empowerment and its associated outcomes, such as intimate partner violence, reproductive and maternity outcomes, and child health, thus enhancing result comparability.

This study contributes to the existent literature by employing a comprehensive list of variables concerning women empowerment (Asaolu et al., 2018; Kabeer, 1999, 2005; Lopez-Claros et al., 2005; Malhotra et al., 2002; Miedema et al., 2018; Phan, 2016) to construct a country-specific index measuring women empowerment in one of the poorest countries in the world where the violation of women's rights has been a longstanding rampant issue and barriers toward empowering women are abundant (Dadras, Khampaya, et al., 2022; Dadras, Nakayama, et al., 2022). Although there are similar conceptualizations of women empowerment in studies from other regions such as South-East Asia (Phan, 2016), Sub-Saharan Africa (Asaolu et al., 2018), and East Africa (Miedema et al., 2018), this study mostly builds upon the results from Ewerling et al. study (Ewerling et al., 2017) in which the authors attempted to develop a region-specific index, namely SWEPR, to measure the women empowerment in 34 African countries. Similar to our study, Ewerling et al. (2017) used a list of variables from countries' demographic health surveys (DHS) that relate to women empowerment. However; we included a comprehensive list of relevant variables in EFA analysis which was almost double the number in Ewerling et al. (2017) study. While there may be some overlap between the SWEPR index and our developed index, the current study is the first to report "access to healthcare," "labor force participation," and "property-owning" as additional validated indicators of women's empowerment in Afghanistan. In a similar study in Pakistan, authors developed a similar index (SWEI-P), excluding property-owning, to measure Pakistani women empowerment; reflecting upon the shared religious and cultural norms and values of Afghan and Pakistan societies (Dadras, Dadras, et al., 2022).

Labor force participation was the first domain that emerged in EFA emphasizing women's economic capacity as the most important indicator of women empowerment. This finding aligns with previous studies in Southeast Asia including Cambodia, Indonesia, Philippines, and Timor-Leste (Phan, 2016), Pakistan (Dadras, Dadras, et al., 2022; Jamil & Bukhari, 2020), and Sub-Saharan Africa (Asaolu et al., 2018). In Afghanistan, low literacy, cultural customs, and male-dominated norms restrict women's economic empowerment by preventing girls from attending school and placing domestic responsibilities and child-rearing duties on married women. These barriers limit educational and economic opportunities, necessitating concerted efforts to promote access for underprivileged Afghan women to economic and job opportunities (Dadras, Khampaya, et al., 2022; Dadras, Nakayama, et al., 2022; Dadras et al., 2021; Gibbs et al., 2018). This could be achieved through financing and scaling the small and medium local enterprises operating by poor women and capacity building by introducing more opportunities for training and skill advancement at the community level (Hunt & Samman, 2016).

Attitude toward violence emerged as the second domain of empowerment among Afghan women. It has been shown that a substantial number of Afghan women and men justify violence against women if the woman burns food, neglects the child, argues with or insults, or accuses the partner of infidelity (Central Statistics Organization (CSO), 2017). This could explain the high rate of intimate partner violence among Afghan women; previous studies indicate almost one in two Afghan women has experienced spousal violence at least once in their lifetime (Dadras, Nakayama, et al., 2022). It has been shown that

violence against Afghan women and girls could compromise the socio-economic development of this vulnerable group (UNICEF, 2015) and limit their access to adequate reproductive and maternity care and thus increasing the adverse pregnancy outcomes (Dadras, Nakayama, et al., 2022). Therefore, women's attitude toward violence could directly influence their empowerment.

Decision-making ability surfaced as the third domain in our analysis. According to Kabeer's definition of empowerment, decision-making relates to the women's agency translating into the ability of women to define goals and act upon them (Kabeer, 1999). Women's decision-making power has been linked to improved nutrition (Amugsi et al., 2016), contraceptive uptake (Hameed et al., 2014), and reproductive and maternity services utilization (Shimamoto & Gipson, 2017; Tiruneh et al., 2017) as well as reduced likelihood of spousal violence (Dadras, Nakayama, et al., 2022).

Access to healthcare—as described by permission, money, and distance—emerged as the fourth indicator that significantly contributes to Afghan women empowerment. Besides the financial constraints that can cause a delay in seeking care, getting to a medical facility, and receiving care; far distances and poor transportation could also result in a delay to receive health care (Dadras, Dadras, et al., 2020; Dadras, Taghizade, et al., 2020). Meanwhile, due to the limited capital and government investment in healthcare, the out-of-pocket expenditure for an Afghan household is approximately 10.03% which could limit the access of millions of poor Afghans to appropriate healthcare (Health., 2019). The impact reflects itself in high maternal and children under-5 mortality as suggested by WHO (Health. et al., 2019). Therefore; to improve access to healthcare, it is recommended to enhance the investment in capacity building through universal health insurance schemes, training health workers engaging both males and females in promoting the health of the community leveraging on the existent potential at the community level; otherwise, high levels of out-of-pocket expenditure are likely to continue harming the women's ability to access quality and timely healthcare.

Literacy and age at critical life events—the age at first cohabitation and age at the first birth—are important indicators of women empowerment (Sundaram et al., 2014; Yount et al., 2018) and emerged as the fifth and sixth domains in our analysis. It has been shown that women's first marriage at 18 years or older is associated with improved long-term post-marital economic empowerment (Yount et al., 2018). Early marriage is strongly associated with early childbirth which could directly influence women empowerment through reduced opportunities for higher education and contributing to the labor force in post-marital life (Abera et al., 2020). Therefore, policies must advise against child marriage to enhance women empowerment in post-marital life.

Property-owning was the last domain that emerged in our analysis. Although some studies have reported property-owning as a protective factor favoring women empowerment (Mganga et al., 2021; Ranganathan et al., 2021), some reports linked property-owning to a higher incidence of IPV (Vyas & Jansen, 2018). Therefore, one should be cautious in translating the results of this study into other contexts and settings.

Although this is the first report that operationalizes women empowerment in Afghanistan using survey-based variables with strong internal validity, some limitations should be considered in the interpretation of the results. First, the socially desirable bias could be introduced due to the self-reported data for included variables. Second, the DHS survey does not account for the cultural difference in perception of women empowerment, and the answers for some variables, particularly the "attitude toward violence" may be biased. Third, the temporal variability of the study variables may be affected by the socioeconomic development of the country and changes in the norms and culture; thus, periodical updates

seem necessary. Fourth, most of the questions concerning women empowerment in DHS were only asked from married women and single, widows, divorced and separated women were excluded; therefore, the indicators in this study are only applicable to married women in Afghanistan.

5 Conclusion

This research developed the first country-specific index to measure women empowerment in Afghanistan. Future policies and human rights advocates should prioritize interventions in the seven domains found to be most instrumental in women's empowerment in Afghanistan. This includes the creation and enforcement of policies that promote labor force participation, changes in attitudes toward violence, inclusion in decision-making, access to healthcare, literacy, proper timing of critical life events, and property ownership rights for women. This study opens the door to exploring the connection between women's empowerment and several critical outcomes. These include, but are not limited to, intimate partner violence, reproductive and maternity outcomes, and child health. Studies investigating these associations can help to further elucidate the positive impacts of women empowerment, bolstering the argument for further investment in women's rights and opportunities. It is also recommended that future research investigates the specific barriers and facilitators in each of the seven domains for women empowerment in Afghanistan, using both quantitative and qualitative methodologies. This will allow for the development of targeted interventions and strategies to address the unique challenges Afghan women face in their path to empowerment.

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Authors' contribution OD wrote the research protocol, performed the data analysis, and wrote the manuscript. MH provided critical comments to the final draft. Both authors read and approved the draft before submission.

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Availability of data and material The DHS questionnaire that collected the data in Afghanistan's demographic and health survey in 2015 could be downloaded from DHS's official website (https://dhsprogram.com/data/available-datasets.cfm). The dataset (ADHS 2015) that was used in this study could be available upon a reasonable request and with permission from the DHS website.

Declarations

Conflict of interest Not applicable.

Ethics approval and consent to participate The study was performed in accordance with relevant guidelines and regulations (U.S. Department of Health and Human Services regulations for the protection of human subjects). In addition, this survey was approved by the Institutional Review Board (IRB) of the Afghanistan Ministry of Health (MoH). An informed verbal and written consent was obtained from all the participants/guardians/parents before the interview. We also sought permission from the DHS website and filled out a request to access and download the data. Therefore, further ethical approval to use the data is not necessary.

Consent for publication Not Applicable.

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