

# Development of a Survey-based Women Empowerment Index for Afghanistan (SWEIA): An Explanatory Analyses of the Afghanistan Demographic Health Survey 2015

Omid Dadras (✉ [omid.dadras@uib.no](mailto:omid.dadras@uib.no))

University of Bergen

---

## Research Article

**Keywords:** Women empowerment, Afghanistan, index, reliability, construct validity

**Posted Date:** August 15th, 2022

**DOI:** <https://doi.org/10.21203/rs.3.rs-1959917/v1>

**License:** © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

---

## **Abstract**

# **Background**

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. Therefore, in this study, we aimed to develop a country-specific index to measure women's empowerment in Afghanistan.

## **Methods**

The data from the 2015 Afghanistan demographic health survey (ADHS) was used for the analysis. The dataset was randomly divided into two samples—one for exploratory factor analysis (EFA) and the other for confirmatory factor analysis (CFA)—of women aged 15–49 years. The data on 26 variables across different domains (labor force participation, attitude toward violence, decision-making, access to healthcare, literacy, age at critical life events, and property-owning) were used in EFA to probe the underlying domains in the data. CFA examines the structural validity of hypothesized factors in EFA.

## **Results**

The final model included 22 indicators across seven domains including labor force participation, attitude toward violence, decision-making, access to healthcare, literacy, age at critical life events, and property-owning.

## **Discussion**

The index developed in this study shares a common ground for future research concerning Afghan women empowerment and its associated outcomes such as intimate partner violence, reproductive and maternity outcomes, and child health; thus, enhancing the comparability of the results. 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.

## **Introduction**

Gender equality and women empowerment is the cornerstone of the fifth goal of Sustainable Development Goal (SDG). Efforts to promote women's empowerment and gender equality are critical to 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 (1, 2). 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 (3). 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 (2). It is well known that women empowerment not only benefits women but also contributes to the development of the whole society (4). Promoting women's empowerment has been linked to improved men's and women's health and reduced child mortality and morbidity (5). Empowered women are more likely to use modern contraception, and have access to antenatal care, institutional delivery, and skilled birth attendance (6–8). 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 (9).

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 (10, 11). 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 (12). Although women account for approximately half of the Afghanistan population, they remained severely underrepresented economically, socially, and politically (13). 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 (14, 15). 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 (16). 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 (17).

Given this background; in practice, capturing the multidimensional structure of women's empowerment in a specific context requires operationalization of reliable and context-specific variables and seems to be necessary not only to quantify the women's 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's empowerment in Afghanistan using the relevant indicators that have been suggested by previous literature (4, 14, 15, 18–21) 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's empowerment and besides the important policy implications, could enhance the reliability, validity, and comparability of the results across future studies in Afghanistan.

## Methods

# Study setting

This study used the 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).

## 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=29641) 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. 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.

## Study variables

A total of 26 suggested variables concerning women empowerment (14, 15, 18–22) that were available in ADHS 2015, were included in this analysis. All categorical variables were either recorded 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

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

D1	D2	Indicator	Questions	DHS response categories	Recode used in analysis	
Economic	Labor Force Participation	Occupation	Respondent works for family, others, self	Family member = 1; Someone else = 2; Self-employed = 3	Not working = 0; For family = 1 For others:2, Self-employed = 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	Owens 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	Owens 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	
	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/Someone else/Other = 0, Respondent and husband/partner = 1,
			Large household purchases	Person who usually decides on large household purchases	Husband/partner alone = 4 Someone else = 5	Respondent alone = 2

D1	D2	Indicator	Questions	Other = 6 DHS response categories	Recode used in analysis
		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
<b>Education</b>	Literacy	Literacy	Literacy	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 cahnge
	Education	Educationa level	Highest educational level	0 No education; 1 Primary; 2 Secondary; 3 Higher	No change
<b>Health</b>	Negotiating sex	Can ask partner to use condom	Respondent can ask partner to use a condom	No = 0, Yes = 1  Don't know/not sure/depends = 8	No/ Don't know/not sure/depends = 0  Yes = 1

D1	D2	Indicator	Questions	DHS response categories	Recode used in analysis
		Can say no to sex	Respondent can refuse sex		
	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		

empowerment and those with lower ranks indicate low empowerment (15, 18) [18, 19]. The variables and corresponding domains and dimensions used in this study and the detail of recoded variables are described in Table 1.

## 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 in 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 (23, 24). In the second step, the first sample was used to identify the underlying domains that reflect women’s 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 (25). The suitability of data for EFA was tested using the Kaiser–Meyer–Olkin (KMO) test of sampling adequacy and Bartlett test of sphericity (26) in which, values greater than 0.70 and  $p$ -value  $< 0.05$  are considered favorable, respectively. 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 (22). In the third step, the internal reliability of the overall index and individual domain was examined by Cronbach’s  $\alpha$  test (Table 2) (27, 28) and domains with a Cronbach’s  $\alpha$  value  $< 50\%$  as well as the variables that removing them significantly improve the Cronbach’s  $\alpha$  coefficients, were dropped (29, 30). 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) which represent relative and

absolute fit of the index (31). An index with good construct validity has RMSR and RMSEA < 0.05 and CFI and TLI more than 0.95 (32).

## Results

### 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.

### Explanatory factor analysis (EFA)

To identify the underlying factors, the initial EFA model included 26 variables (Table 1); however, three 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”, more or less contributed to a similar proportion (7.40–9.93%) of the total variation in data.

### 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 both individual indicators and domains: indicating an acceptable level of internal consistency in the final model. No additional variable was dropped in the internal reliability 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	Educationa 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	

Factor	Variables	loading	Variation (%)
<sup>a</sup> Factor/Domain 1: Labor Force Participation			
<sup>b</sup> Factor/Domain 2: Attitudes towards violence			
<sup>c</sup> Factor/Domain 3: Decision-making			
<sup>d</sup> Factor/Domain 4: Access to Healthcare			
<sup>e</sup> Factor/Domain 5: Literacy			
<sup>f</sup> Factor/Domain 6: Age at critical Life events			
<sup>g</sup> Factor/Domain 7: Property-owning			

**Table 3.** The internal reliability of individual items and domains

Domain	Variables	Cronbach's $\alpha$	
		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	Age at cohabitation	0.91	0.91

Factor	Variables	loading	Variation (%)
events	Age at first birth	0.91	
Property-owning	House ownership	0.75	0.75
	Land ownership	0.75	

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

Likelihood ratio (p-value)	RMSEA <sup>1</sup>	CFI <sup>2</sup>	TLI <sup>3</sup>	SRMR <sup>4</sup>
< 0.001	0.045	0.961	0.957	0.056
<sup>1</sup> RMSEA: Root Mean Squared Error of Approximation <sup>2</sup> CFI: Comparative Fit Index <sup>3</sup> TLI: Tucker-Lewis index <sup>4</sup> SRMR: Standardized Root Mean Squared Residual				

## 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 SRNA values  $\leq 0.05$  and CFI and TLI values  $> 0.95$  (Table 3).

## Discussion

This study developed the first country-specific index to measure women's 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 and represents favorable construct validity and internal consistency. The final model is composed of seven domains including labor force participation, attitude toward violence, decision-making, access to healthcare, literacy, age at critical life events, and property-owning. The findings could shed light on and reduce the ambiguity that currently exists in literature concerning the conceptualization and operationalization of women empowerment in Afghanistan and shares a common ground for future research concerning women empowerment and its associated outcomes such as intimate partner violence, reproductive and maternity outcomes, and child health; thus, enhance the comparability of results.

This study contributes to the existent literature by employing a comprehensive list of variables concerning women's empowerment (2, 10, 15, 18, 20–22) to construct a country-specific index measuring women's 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 (33, 34). Although there are similar conceptualizations of women empowerment in studies from other regions such as South-East Asia

(22), Sub-Saharan Africa (18), and East Africa (15), this study mostly builds upon the results from Ewerling et al. study (19) 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. used a list of variables from countries' demographic health surveys (DHS) that relate to women empowerment. However; in our study, based on a thorough literature review, we included a total of 26 relevant variables in EFA analysis which was almost double the number of Ewerling et al. study with 15 variables. Although both studies used the DHS data and there may be some overlap between the SWEPR index and our developed index—i.e. attitude toward violence, education, age at critical life events, and decision-making domains—to measure women's empowerment; the current study is the first to report “access to healthcare”, “labor force participation”, and “property-owning” as additional validated indicators of women empowerment in Afghanistan.

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 was in line with previous studies in Southeast Asia (22) and Sub-Saharan Africa (18). In Afghanistan, women's economic empowerment is hindered by low literacy, culturally sensitive customs, and man-dominant norms which prevent young girls to present at school, burden married women with domestic work and child fostering at home, and prohibit women from having a land- or property; these barriers could limit the educational and economic opportunities that can be achieved otherwise. (33–36). Thus, concerted efforts to promote the access of underprivileged Afghan women to economic and job opportunities are necessary. 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 (37).

Attitude toward violence was 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 (38). 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 (34). It has been shown that violence against Afghan women and girls could compromise the socio-economic development of this vulnerable group (39) and limit their access to adequate reproductive and maternity care and thus increasing the adverse pregnancy outcomes (34). Therefore, women's attitude toward violence could directly influence their empowerment.

The decision-making ability surfaced itself as the third domain in our analysis. According to Kabear'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 (20). Women's decision-making power has been linked to improved nutrition (40), contraceptive uptake (41), and reproductive and maternity services utilization (42, 43) as well as reduced likelihood of spousal violence (34).

Access to healthcare—as described by permission, money, and distance—emerged as the fourth indicator that significantly contributes to Afghan women's 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 (44, 45). 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 (46). The impact reflects itself in high maternal and children under-5 mortality as suggested by WHO (47). 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 (48, 49) 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 (49). Early marriage is strongly associated with early childbirth which could directly influence women's empowerment through reduced opportunities for higher education and contributing to the labor force in post-marital life (50). Therefore, policies must advise against child marriage to enhance women's 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's empowerment (51, 52), some reports linked property-owning to a higher incidence of IPV (53). 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's empowerment in Afghanistan using survey-based variables with strong internal validity, some limitations should be considered in the interpretation of the results. First, the social desirable bias that 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's 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.

## **Conclusion**

This research developed the first country-specific index to measure women's empowerment in Afghanistan. The final model is composed of seven domains including labor force participation, attitude toward violence, decision-making, access to healthcare, literacy, age at critical life events, and property-owning. The findings could reduce the existent ambiguity in conceptualizing women empowerment in Afghanistan and share a common ground for future research concerning Afghan women empowerment and its associated outcomes such as intimate partner violence, reproductive and maternity outcomes, and child health; thus, enhancing the comparability of results. In addition, using 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 in Afghanistan.

# Abbreviations

## **DHS**

Demographic and Health Survey

## **ADHS**

Afghanistan Demographic and Health Survey

## **CSO**

Central Statistics Organization (CSO)

## **MoPH**

Ministry of Public Health

## **USAID**

United States Agency for International Development

## **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

# Declarations

## **Ethics approval and consent to participate**

DHS conforms to the US. Department of Health and Human Service regulations concerning human rights. In addition, this survey was approved by the Institutional Review Board (IRB) of the Afghanistan Ministry of Health (MoH). We also sought permission from the DHS website and filled out a request to access and download the data.

## **Consent for publication**

Not Applicable

## **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://www.dhsprogram.com>). The dataset (ADHS 2015) that was used in this study could be available upon a reasonable request and with permission from the DHS website.

### **Competing interests**

Not applicable

### **Funding**

None

### **Authors' contribution**

OD wrote the research protocol, performed the data analysis, and wrote the manuscript.

### **Acknowledgment**

We would like to express our utmost gratitude to the librarians at the library of the University of Bergen for providing technical support to prepare and submit this manuscript.

## **References**

1. Narayan D. Empowerment and Poverty Reduction: A Sourcebook. Washington, DC: World Bank.© World Bank. 2002.
2. Kabeer N. Gender equality and women's empowerment: A critical analysis of the third millennium development goal 1. *Gender & development*. 2005;13(1):13-24.
3. Duflo E. Gender equality in development. *BREAD Policy Paper*. 2005;11(4).
4. Charmes J, Wieringa S. Measuring women's empowerment: an assessment of the gender-related development index and the gender empowerment measure. *Journal of human development*. 2003;4(3):419-35.
5. Yaya S, Uthman OA, Ekholuenetale M, Bishwajit G. Women empowerment as an enabling factor of contraceptive use in sub-Saharan Africa: a multilevel analysis of cross-sectional surveys of 32 countries. *Reproductive health*. 2018;15(1):1-12.
6. Tadesse M, Teklie H, Yazew G, Gebreselassie T. Women's empowerment as a determinant of contraceptive use in Ethiopia further analysis of the 2011 Ethiopia demographic and health survey. *DHS Further Analysis Reports*. 2013;82.
7. Ahmed S, Creanga AA, Gillespie DG, Tsui AO. Economic status, education and empowerment: implications for maternal health service utilization in developing countries. *PloS one*. 2010;5(6):e111190.

8. Msuya SE, Adinan J, Mosha N. Intimate partner violence and empowerment among women in Tanzania: Prevalence and effect on utilization of reproductive and maternal health services: ICF International; 2014.
9. GUPTA MD. Life Course Perspectives on Women's Autonomy and Health Outcomes. *American Anthropologist*. 1995;97(3):481-91.
10. Lopez-Claros A, Zahidi S, mondial Fé, editors. Women's empowerment: Measuring the global gender gap 2005: World Economic Forum Geneva.
11. Unit EI. Women's economic opportunity 2012: a global index and ranking. Washington, DC: Vital Voices Global Partnership. 2012.
12. Forum WE. Global Gender Gap Report 2022. Geneva, Switzerland: World Economic Forum; 2022.
13. H.G. K. Small but steady steps to empower women in Afghanistan. Afghanistan: Worldbank; 2020.
14. Huis MA, Hansen N, Otten S, Lensink R. A three-dimensional model of women's empowerment: Implications in the field of microfinance and future directions. *Frontiers in psychology*. 2017;8:1678.
15. Miedema SS, Haardörfer R, Girard AW, Yount KM. Women's empowerment in East Africa: Development of a cross-country comparable measure. *World Development*. 2018;110:453-64.
16. Permanyer I. A critical assessment of the UNDP's gender inequality index. *Feminist Economics*. 2013;19(2):1-32.
17. Cueva Beteta H. What is missing in measures of women's empowerment? *Journal of human development*. 2006;7(2):221-41.
18. Asaolu IO, Alaofè H, Gunn JK, Adu AK, Monroy AJ, Ehiri JE, et al. Measuring women's Empowerment in sub-Saharan Africa: exploratory and confirmatory factor analyses of the demographic and health surveys. *Frontiers in psychology*. 2018;9:994.
19. Ewerling F, Lynch JW, Victora CG, van Eerdewijk A, Tyszler M, Barros AJ. The SWPER index for women's empowerment in Africa: development and validation of an index based on survey data. *The Lancet Global Health*. 2017;5(9):e916-e23.
20. Kabeer N. Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and change*. 1999;30(3):435-64.
21. Malhotra A, Schuler SR, Boender C, editors. Measuring women's empowerment as a variable in international development. background paper prepared for the World Bank Workshop on Poverty and Gender: New Perspectives; 2002: The World Bank Washington, DC.
22. Phan L. Measuring Women's Empowerment at Household Level Using DHS Data of Four Southeast Asian Countries. *Social Indicators Research*. 2016;126(1):359-78.



23. Worthington RL, Whittaker TA. Scale development research: A content analysis and recommendations for best practices. *The counseling psychologist*. 2006;34(6):806-38.
24. Cabrera-Nguyen P. Author guidelines for reporting scale development and validation results in the *Journal of the Society for Social Work and Research*. *Journal of the Society for Social Work and Research*. 2010;1(2):99-103.
25. Stevens JP. *Applied Multivariate Statistics for the Social Sciences*. 5th Edition ed. New York: Routledge; 2009.
26. Gaskin CJ, Happell B. On exploratory factor analysis: A review of recent evidence, an assessment of current practice, and recommendations for future use. *International Journal of Nursing Studies*. 2014;51(3):511-21.
27. Bland JM, Altman DG. Cronbach's alpha. *Bmj*. 1997;314(7080):572.
28. Bland JM, Altman DG. *Statistics Notes: Validating scales and indexes*. *Bmj*. 2002;324(7337):606-7.
29. Lyne J, Renwick L, Grant T, Kinsella A, McCarthy P, Malone K, et al. Scale for the Assessment of Negative Symptoms structure in first episode psychosis. *Psychiatry Res*. 2013;210(3):1191-7.
30. Raine A, Wong KK, Liu J. The Schizotypal Personality Questionnaire for Children (SPQ-C): Factor Structure, Child Abuse, and Family History of Schizotypy. *Schizophr Bull*. 2021;47(2):323-31.
31. Schreiber JB, Nora A, Stage FK, Barlow EA, King J. Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of educational research*. 2006;99(6):323-38.
32. Brown TA. *Confirmatory factor analysis for applied research*: Guilford publications; 2015.
33. Dadras O, Khampaya T, Nakayama T. Child Marriage, Reproductive Outcomes, and Service Utilization among Young Afghan Women: Findings from a Nationally Representative Survey in Afghanistan. *Studies in Family Planning*.n/a(n/a).
34. Dadras O, Nakayama T, Kihara M, Ono-Kihara M, Dadras F. Intimate partner violence and unmet need for family planning in Afghan women: the implication for policy and practice. *Reproductive Health*. 2022;19(1):52.
35. Dadras O, Nakayama T, Kihara M, Ono-Kihara M, Seyedalinaghi S, Dadras F. The prevalence and associated factors of adverse pregnancy outcomes among Afghan women in Iran; Findings from community-based survey. *PLOS ONE*. 2021;16(1):e0245007.
36. Gibbs A, Jewkes R, Karim F, Marofi F, Corboz J. Understanding how Afghan women utilise a gender transformative and economic empowerment intervention: a qualitative study. *Global public health*. 2018;13(11):1702-12.
37. Hunt A, Samman E. *Women's economic empowerment. Navigating enablers and constraints*, Overseas Development Institute. 2016.

38. Central Statistics Organization (CSO) MoPHM, and ICF. Afghanistan Demographic And Health Survey 2015. Kabul, Afghanistan: Central Statistics Organization; 2017.
39. UNICEF. A profile of child marriage in Africa. New York: UNICEF. 2015.
40. Amugsi DA, Lartey A, Kimani-Murage E, Mberu BU. Women's participation in household decision-making and higher dietary diversity: findings from nationally representative data from Ghana. *Journal of Health, Population and Nutrition*. 2016;35(1):1-8.
41. Hameed W, Azmat SK, Ali M, Sheikh MI, Abbas G, Temmerman M, et al. Women's empowerment and contraceptive use: the role of independent versus couples' decision-making, from a lower middle income country perspective. *PloS one*. 2014;9(8):e104633.
42. Shimamoto K, Gipson JD. Examining the mechanisms by which women's status and empowerment affect skilled birth attendant use in Senegal: a structural equation modeling approach. *BMC pregnancy and childbirth*. 2017;17(2):1-11.
43. Tiruneh FN, Chuang K-Y, Chuang Y-C. Women's autonomy and maternal healthcare service utilization in Ethiopia. *BMC health services research*. 2017;17(1):1-12.
44. Dadras O, Dadras F, Taghizade Z, Seyedalinaghi S, Ono-Kihara M, Kihara M, et al. Barriers and associated factors for adequate antenatal care among Afghan women in Iran; findings from a community-based survey. *BMC Pregnancy and Childbirth*. 2020;20(1):427.
45. Dadras O, Taghizade Z, Dadras F, Alizade L, Seyedalinaghi S, Ono-Kihara M, et al. "It is good, but I can't afford it ..." potential barriers to adequate prenatal care among Afghan women in Iran: a qualitative study in South Tehran. *BMC Pregnancy and Childbirth*. 2020;20(1):274.
46. Health. AMo. Afghanistan National Health Accounts 2017. Afghanistan: Afghanistan Ministry of Health. ; 2019.
47. Health. AMoP, General Directorate of Policy P, and International Relations. , Directorate. HEaF. Health Financing Strategy 2019- 2023. Afghanistan: Afghanistan Ministry of Public Health; 2019.
48. Sundaram MS, Sekar M, Subburaj A. Women empowerment: role of education. *International Journal in Management & Social Science*. 2014;2(12):76-85.
49. Yount KM, Crandall A, Cheong YF. WOMEN'S AGE AT FIRST MARRIAGE AND LONG-TERM ECONOMIC EMPOWERMENT IN EGYPT. *World Dev*. 2018;102:124-34.
50. Abera M, Nega A, Tefera Y, Gelagay AA. Early marriage and women's empowerment: the case of child-brides in Amhara National Regional State, Ethiopia. *BMC International Health and Human Rights*. 2020;20(1):30.
51. Ranganathan M, Knight L, Abramsky T, Muvhango L, Polzer Ngwato T, Mbobelatsi M, et al. Associations between women's economic and social empowerment and intimate partner violence: Findings from a

microfinance plus program in rural North West Province, South Africa. Journal of interpersonal violence. 2021;36(15-16):7747-75.

52. Mganga AE, Renju J, Todd J, Mahande MJ, Vyas S. Development of a women's empowerment index for Tanzania from the demographic and health surveys of 2004-05, 2010, and 2015-16. Emerg Themes Epidemiol. 2021;18(1):13.

53. Vyas S, Jansen HA. Unequal power relations and partner violence against women in Tanzania: a cross-sectional analysis. BMC women's health. 2018;18(1):1-12.

## Figures

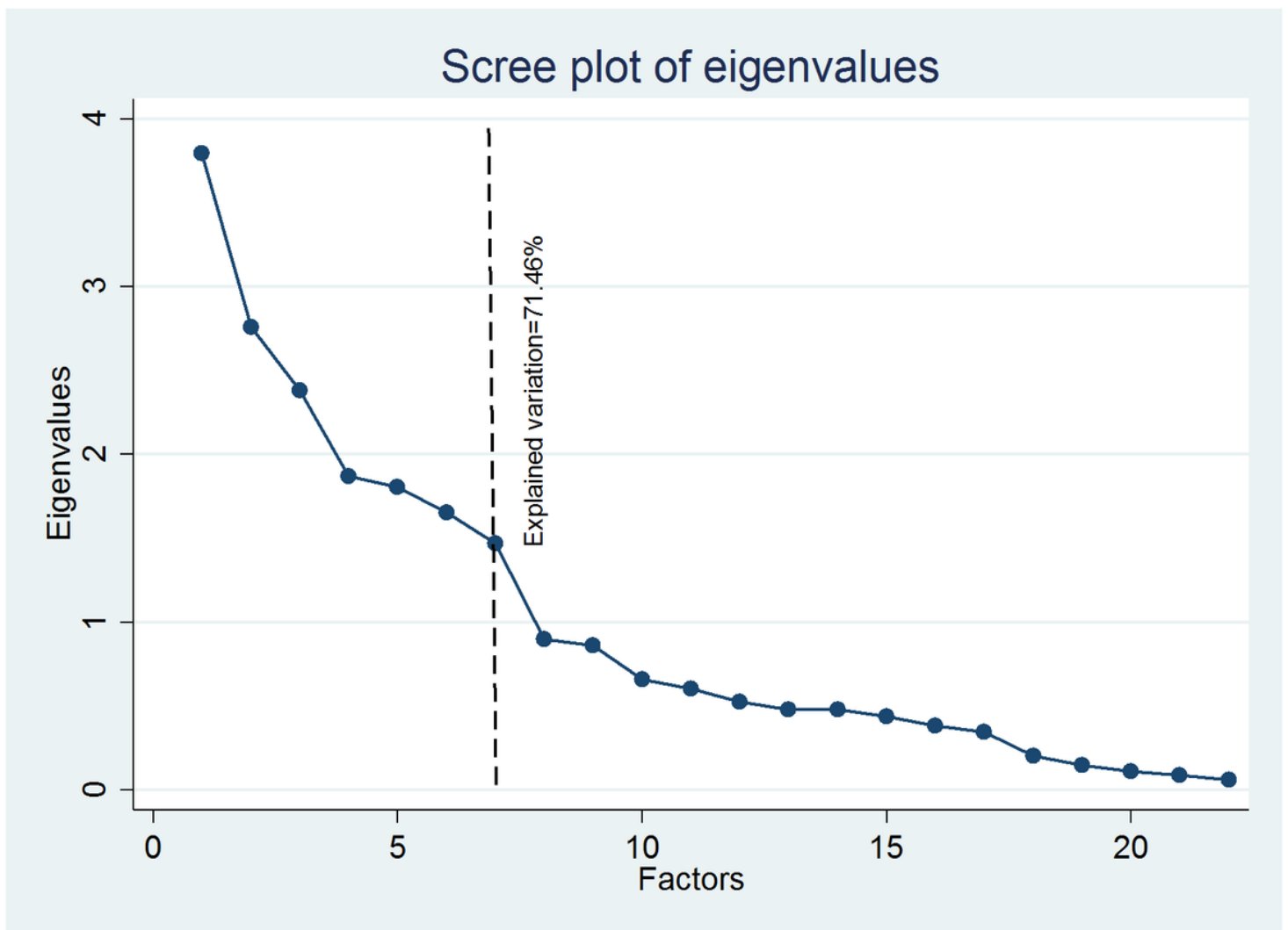


Figure 1

Scree plot of eigenvalues plotted against factors for the initial 25 variables used for exploratory factor analysis