

# Reliability Analysis of a Self-Developed Elderly Well-Being Scale

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## ABSTRACT

**Introduction/Objective:** The well-being of older people needs to be assessed periodically to plan and manage proper care. This study aimed to assess the validity and analyse the reliability of the self-developed Well-being scale to determine the suitability of the scale for identifying the well-being status of older people and evaluating effectiveness of self-structured nursing interventions.

**Methods:** A descriptive cross-sectional study design was used among 31 older people living in a rural community in the Kavrepalanchok district, Nepal in September 2021. A purposive sampling technique was used, and face-to-face interview in home visit was done using Self-structured Elderly Well-being Scale. The internal consistency reliability was assessed by Cronbach's alpha and test re-test on a three and six point Likert scale.

**Results:** Respondents were more female (51.6%) with a mean age of  $66.70 \pm 4.65$ , and 19 (61.29%) were in the age group 60-67 years. There are four domains in the well-being scale. The physical well-being scale was found to be highly reliable in Cronbach's alpha (0.892), the test re-test method (0.9957), and the test re-test reliability was higher than Cronbach's alpha. The psychological well-being scale was also highly reliable in Cronbach's alpha (0.871) and test re-test method (0.9788). Similarly, the reliability of the social and spiritual well-being scale was good in Cronbach's alpha (0.758 & 0.774) and very good in the test re-test (0.9100 & 0.8876), respectively. The inter-item reliability was also found suitable.

**Conclusion:** The elderly well-being scale demonstrated exemplary performance in tests of reliability and validity. It can individually assess physical, psychological, social and spiritual well-being and older people's overall well-being in the community and institutional settings. It is a suitable tool for assessing well-being status and evaluating the effectiveness of nursing interventions.

**Keywords:** Well-being Scale, Reliability, Cronbach's alpha, Persons' Correlation, Older People and Rural Community.

## INTRODUCTION

Reliability is a process of measuring the research instrument for its' consistency, stability and equivalence. Assurance of a quality of a tool is a must for effective research. A stable research tool only can measure the variables correctly. <sup>(1)</sup> So, the reliable scale provides consistent results,

further contributing to the validity of a scale. The stability of a tool is assessed by interviewing the same respondents and using the same scale. <sup>(2)</sup>

Well-being is a functional ability of older people holistically. Measurement of well-being status in the community is a challenging and aggregated task. A

comprehensive scale only can measure well-being status ultimately. Some tools measure people's psychological, social and spiritual health separately, some items are inadequate, and some are overlapped. There are various research on well-being but found a need to incorporate its' complexity and wholeness. (3) In this context, an integrative well-being tool was a demand of health care professionals and researchers. After a thorough literature search, this Elderly Well-being Scale was developed by the researcher. Maintaining the validity and reliability of a new scale is vital before using the scale in research.

The elderly well-being scale is a full scale consisting of four domains of well-being; physical, psychological, social and spiritual well-being, presented separately in different points Likert scales. Physical well-being is measured on three points and psychological, social and spiritual well-being are measured on six points Likert scale.

The ageing population are increasing both in developing as well as developed countries. It will be increased continuously and may reach 15% of worlds' population by only sixty years above people in 2025 and again will be 22% by 2050A.D. It is expected that the number of older people will triple in the Middle East and Asia e.g. in China, 8.3% in 2010 to 23.9% in 2050. Moreover, most of the older people (80%) will live in low and middle-income countries like Nepal. (4) Ageing also affect in basic activities of human life. Older people living at home; may have one or more chronic diseases. So more care is needed than cure. Care and support should be provided based on their well-being status and disease condition. The well-being status of older people needs to be assessed periodically. (5)

This study aimed to assess the validity and analyse the reliability of the self-developed well-being scale to determine the suitability of the scale for identifying the well-being status of older people and evaluating the effectiveness of self-structured nursing interventions.

## **MATERIALS & METHODS**

A descriptive cross-sectional study was conducted to analyse the reliability of a well-being scale among 31 older adults aged 60-75 years, living at home in a rural community in Kavrepalanchok, Nepal. A purposive sampling technique was used to select older adults with Nepali speaking, listening and mobility ability. A face-to-face interview was done by using the Elderly Well-being Scale. The Structured socio-demographic questionnaire, baseline proforma with present health problems and clinical measurement and health-related behaviours, including the self-structured Elderly Well-being Scale were implemented by the researcher during a home visit in September 2021. The time interval between test and re-test was two weeks. The sample mortality rate was 3.23%.

The Elderly Well-being Scale measures older people's functional ability in physical, psychological, social and spiritual domains representing holistically. The physical well-being scale consists of the ability to perform activities of daily living (ADL) and instrumental activities of daily living (IADL), covering household work. The scale of the physical domain uses three possible responses where 1 represents the lowest score, and 3 represents the highest score. The remaining three domains are psychological, social and spiritual, measured in a six points Likert scale. So, it uses six possible responses where 1 (strongly disagree) represents the lowest and 6 (strongly agree) represents the highest score. The total response options are Strongly Disagree (SD), Moderately Disagree (MD), Disagree (D), Agree (A), Moderately Agree (MA) and Strongly Agree (SA). There are 21 items for physical, 23 items for psychological, and 15 items for social and spiritual well-being scale. So, the higher the total score, the better the well-being status.

There are both positively and negatively worded statements in psychological, social and spiritual well-being scales. In the psychological scale, positively worded or

meant items are numbered 1,3,5,6,8,11,12, 14,15,16,17,18,20,21,22 and 23 (sixteen items). Moreover the negatively worded or meant items are numbered 2, 4, 7, 9, 10, 13 and 19 (seven items). In a social scale, positively worded or meant items are numbered 1 to 12 while negatively worded or meant items are numbered 13, 14 and 15. Similarly, in the spiritual well-being scale, positively worded or meant items are numbered 1,2,3,4,5,6,7,9,10,12,13,14 and 15 (a total of 13 items) and the negatively worded or meant items are numbered 8 and 11 (a total of 2 items). All the negatively worded items are scored reversely, like strongly agree (1) and strongly disagree (6). The Well-being Scale was developed in English after a thorough literature search and then translated in to Nepali by the researcher. Then again translated and validated by a language expert in Nepali. The translated Nepali version of the scale was re-translated into English by a language expert in English. Then the scale's validity

was maintained by experts in psychiatry, psychiatric nursing, research, community/public health, statistics and medical-surgical nursing. The modification was done in the scale per experts' feedback and research advisor's suggestions. Only some modifications were done after pre-testing the tool in the field.

## STATISTICAL ANALYSIS

The reliability of the well-being scale was analysed through internal consistency and stability using Cronbach alpha and the test-retest method. Cronbach alpha coefficient showed its internal consistency by considering an alpha value  $>0.7$  as adequate or acceptable. The stability was evaluated from the test re-test score using the same scale. Descriptive (frequency, percentage, mean and standard deviation) and inferential (Pearson correlation) statistics were used in the analysis of data by using SPSS version 20.0.

## RESULTS

Table No. 1 Demographic Characteristics of the Respondents (n=31)

Characteristics	Category	Frequency	Percentage (%)
Age in Years	60-67 years	19	61.29
	68-75 years	12	38.70
Sex	Male	15	48.4
	Female	16	51.6
Ethnicity	Brahmin & Chhetri	20	64.5
	Janajati	11	35.5
Religion	Hindu	29	93.5
	Christian	2	6.5
Educational Status	Literate	22	71.0
	Illiterate	9	29.0
Marital Status	Married	21	67.7
	Widow/widower	10	32.3
Types of House	Kaccha	6	19.4
	Pakka	25	80.0
Types of Family	Nuclear	2	6.57
	Joint	29	93.5
Residing Floor of House	Ground Floor	13	41.9
	Other Floor	18	58.1
Occupation	Service	3	9.7
	Agriculture	3	9.7
	House Work	19	61.3
	Business	6	19.4
Personal Expenditure Managed by	Service/ Earning	14	45.2
	Social Security Fund	12	38.7
	Pension	2	6.5
	Family's Support	3	9.7
Family Income in Rupees	7000-10000	12	38.7
	10001-20000	11	35.5
	20001-30000	8	25.9

The mean age of the respondents was 66.70 ±4.65, and 19 (61.29%) were in the age group 60-67 years. More than half percent of the respondents were female, most of them (93.5%) were Hindu by religion, (71.0%) were literate, (61.3%) of respondents' occupation was housework, (67.7%) were married, and most of them

(93.5%) were living in a joint family. Respondents had multiple sources to manage their personal expenditures, 14 (45.2%) respondents managed by earnings or salary, where as 38.7% had social security funds. Twelve (38.7%) respondents had a monthly family income of NRs 7000-10000.

**Table No. 2 Present Health-related Problems of the Respondents\* n= 31**

SN.	Health Problems	Frequency	Percentage (%)
1.	Asthma	5	16.1
2.	COPD	1	3.2
3.	Obesity	2	6.5
4.	Hypertension	16	51.6
5.	Stroke	1	3.2
6.	Diabetes	3	9.7
7.	Arthritis	7	22.6
8.	Sleep Problem	4	12.9
9.	Depression	1	3.2
10.	Urinary Problem	3	9.7
11.	Gastritis	6	19.4
12.	Thyroid problem	2	6.5
13.	Sore at any place in body	1	3.2
14.	Chronic pain/backache	9	29.0
15.	Sexual issue	1	3.2
16.	Pulmonary Tuberculosis	1	3.2
17.	Others Problem	6	19.4

\*Multiple responses

More than half (51.6%) of the respondents suffered from hypertension, about one-third (29.0%) suffered from chronic body pain especially backache. Approximately one-

fifth of the respondents (19.4%) suffered from gastritis, and another one-fifth from other problems, including high cholesterol levels and hearing defects. Sleep problem was present among four, and asthma among five respondents.

**Table No. 3 Status of MAP, BMI of the Respondents n= 31**

SN.	Different Exam	Label	Frequency	Percentage (%)
1.	Mean Arterial Pressure (MAP)	Normal (65-110)	29	93.5
		Abnormal (>110)	2	6.5
2.	Body Mass Index (BMI)	Under weight	3	9.7
		Healthy weight	13	41.9
		Over weight	13	41.9
		Obesity	2	6.5

Two (6.5%) respondents had abnormal mean arterial pressure (MAP) from the clinical proforma. Similarly, body mass index (BMI) was calculated as per WHO classification and found that noticeable respondents of underweight and obesity 9.7% and 6.5% respectively.

**Table No. 4 Health related Personal Habits of Respondents n=31**

Personal Habits	Frequency	Percentage (%)
Average Water Intake/ day	2-4 glass	18 58.06
	5-7 glass	8 25.80
	8-10 glass	5 16.2
General Food Eating Pattern	2 times/day	9 29.0
	3 times/day	20 64.5
	4 times/day	2 6.5
Types of Food Following	Vegetarian	6 19.4
	Non-vegetarian	25 80.6
Feeling of Anorexia	3	9.7
Following a Special Diet	5	16.1
Fasting Habit	12	38.7
Average Sleeping Hour at Night	5-6 hour	10 32.25
	7-8 hour	21 67.74

Regular Physical Exercise	9	29.0
Unusual Defaecation habit	2	6.4
Regular Health Check-Up	4	12.9
Self-Medication without Prescription	24	77.4
Physical Disability	1	3.2
Sexually Active	20	64.5
Involve in Leisure Time Activities	27	87.1
Substance-taking Behaviour	13	41.93

The eating pattern of most respondents (64.5%) was three times/day, and most (80.6%) were non-vegetarian. Only 16.2% of respondents had an average water intake habit of 8-10 glasses/day. More than one-third (38.7%) of respondents had a fasting habit, and a few had anorexia (9.7%). The majority of the respondents (67.74%) had night sleep for 7-8 hours, and only 45.1% had napped for 1-2 hours. About one third of respondents had a habit of daily physical exercise. Only 12.9% had their regular physical check-up, but the majority (77.4%)

practised self-medication without a prescription. Cent-percent still needed to do screening tests. Only one respondent had a physical disability due to a stroke and used a supportive device. The majority of the respondents (64.5%) were sexually active, and most of the respondents (87.1%) had been involved in any leisure activities. Less than half (41.93%) of the respondents had substance-taking behaviour; the most typical substances were cigarette, tobacco and alcohol.

Table No. 5 Reliability of Elderly Well-Being Scale

Domain Wise Reliability of Well-Being Scale	Cronbach's Alpha	Test-retest
Physical well-being	0.892	0.9957
Psychological well-being	0.871	0.9788
Social well-being	0.758	0.9100
Spiritual well-being	0.774	0.8876

The reliability of the physical well-being scale was higher (0.9957) in the test re-test method than Cronbach's alpha; it was highly reliable in Cronbach's alpha and test re-test method. The psychological well-being scale was also highly reliable in Cronbach's alpha and test re-test method. Similarly, the reliability of the social and psychological well-being scale was good in Cronbach's alpha and very good in the test re-test method (0.9100 & 0.8876), respectively. The inter-item reliability was also found suitable.

## DISCUSSION

An analysis of the validity and reliability of the elderly well-being scale among older people in the rural community demonstrates a highly reliable scale in Cronbach's alpha and test re-test method. So it provides evidence of solid reliability and further suggests to use for assessment. The physical well-being scale is highly reliable in

Cronbach's alpha (0.892) and tests re-test method (0.9957). This finding is consistent with the previously investigated disability assessment scale, adapted version which reports the reliability of alpha 0.92 to 0.80.<sup>(6)</sup> The difference in alpha value is noticed, which is slightly lower in the re-test than the first test in the previous study but increased in the re-test in this study. Similarly, the reliability study of functional independence measure (FIM) and Barthel activity of daily living (ADL) index (BI) supports the finding of this study, having strong reliability.<sup>(7)</sup> Regarding the socio-demography of the respondents, the majority (61.29%) is from the age group 60-67 years, known as young old. The finding is supported by the study (72.9% in 60-74 years) related to social support and psychological well-being. The finding of literacy level is 71.0% in this study but 51.4% without formal education. The finding of marital status i.e. 32.3%

widow/widower, contrasts with the previous study where 67.9% are widows only. <sup>(9)</sup> The present health problem related finding of circulatory disease (hypertension) in more than fifty percent of respondents is also supported by previous study where 68.7% have circulatory problems. <sup>(10)</sup>

This study showed high reliability of the psychological well-being scale in Cronbach's alpha (0.871) and test re-test method (0.9788). The finding is supported by a previous study on psychological well-being scale (SPWB) showing Cronbach between 0.87 and 0.96. The range of test re-test reliability is 0.78 and 0.97 for sub scales. <sup>(11)</sup> Similar findings are reported in a study in Finland, concluding high internal consistency for the total score and modest reliability for the sub-score of the psychological well-being scale. <sup>(13)</sup> A study in the Persian sample also supports these findings, showing high internal consistency of the psychological scale ( $\alpha = 0.924$  for all). <sup>(14)</sup>

Similarly, the reliability of the social and spiritual well-being scale was good in Cronbach's alpha (0.758 & 0.774) and very good in the test re-test (0.9100 & 0.8876) respectively. A study in the Portuguese context is similar to these reliability findings of the social well-being scale, presenting alpha value from 0.67 to 0.86 in five dimensions of social well-being. The scale has 33 items on a seven-point Likert scale (Keyes, 1998). <sup>(15)</sup>

Spiritual well-being shows strong reliability as this study's findings. The Cronbach's alpha reliability coefficient of the scale is 0.87, and from 0.78 to 0.93 of sub-groups. <sup>(16)</sup> Another study also supports these findings with the acceptable value of alpha (0.76) and strong (0.89) on the overall scale of spiritual well-being. <sup>(17, 18)</sup>

For external validity of the scale, the study can be replicated with a larger sample and in different cultural areas apart from the Nepalese language.

## CONCLUSION

The elderly well-being scale is a valid and reliable instrument for assessing the overall well-being status of older people both in community and institutional settings. The scale demonstrated strong reliability. The scale has four domains of physical, psychological, social and spiritual well-being. It can also be used to assess individual domains of well-being of older people. The score is 1 to 3 in the physical domain, producing final scores varying from 21 to 63, and are 1 to 6 in the psychological, social and spiritual domain, producing final score varying from 23 to 138 in psychological well-being and from 15 to 90 in social and spiritual well-being. The holistic concept of health of an individual can be addressed by this scale. Instructions before the specific well-being scale helped with interview and response collection. Further, the study can be replicated in a more extensive and heterogeneous sample of older people to improve its external validity.

### Declaration by Authors

**Ethical Approval:** Approved by Swami Rama Himalayan University (SRHU) and Nepal Health Research Council (NHRC).

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**Conflict of Interest:** The authors declare no conflict of interest.

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