



RELATIONSHIP AMONG FIVE- POINT, SEVEN- POINT AND NINE-POINT SCALE OF HEALTH ASSESSMENT QUESTIONNAIRE WHEN ADMINISTERED TO FEMALE SPORTSPERSONS (A VALIDATION)

**Manmohan Kaur**

Head of the Department, Jesus and Mary College (JMC), University of Delhi, Bapu Dham, Chanakyapuri, New Delhi, India.

**Sukanya Rawat**

Ph.D. Scholar, Department of Physical Education and Sports Sciences (DPESS), University of New Delhi, India.

**Dhananjay Shaw\***

Head: Department of Physical Education and Sports Sciences (DPESS), University of Delhi, New Delhi, India. \*Corresponding Author

**ABSTRACT**

Currently there are many scales available for the administration of a questionnaire. The approval of five-point and seven-point are well accepted across studies. The author wanted to compare the reliability of the three scales and imply the appropriateness of the scale as a data collected tool. 25 college going females involved in team games participated in this study. The Health Assessment Questionnaire (HQ) was administered to the females at different times (two days apart) using scales namely five-point, seven-point, and nine-point scale. The scores were associated between the three selected scales using the Pearson's coefficient of correlation. The results were found to support the use of nine-point scale for the administration of the HQ.

**KEYWORDS :** Face Validity, Five-Point Scale, Seven-Point Scale, Nine-Point Scale, Test-Retest Reliability, Health Assessment Questionnaire, Team Games

**INTRODUCTION**

Sports activities consisting of individual sports, team sports, and independent physical activity offer health benefits associated with exercise.<sup>[1]</sup> However, team sports participation is different from participation in individual or independent sports activities because the team environment supports increased involvement with peers in a social context.<sup>[2]</sup>

Team sports not merely provides you help to get in correct shape, but also are an appropriate way to associate with people from diverse backgrounds and become part of a larger community.<sup>[3]</sup> Team sports in particular are thought to lead to improved mental health because of their social nature and resulting social support.<sup>[4]</sup> A great number of studies have also shown holistic benefits of taking part in team games and sports.<sup>[5,6]</sup>

In practice, different types of scales are advocated. The recognition of the five-point and seven-point scale is well established whereas the use of nine-point scale is debatable.<sup>[7]</sup>

The use of a particular scale depends largely upon

- Nature and language of the questions
- The population sampled for administering the scale
- Its statistical appropriateness

Many times the researchers stand at defining moment to decide which scale is most reliable and appropriate with regard the aforementioned points. Studies have shown that scales with fewer points are less reliable than scales that are more precise scales such as seven-point scale.<sup>[8]</sup> So we developed a Health Questionnaire (HQ) with nine-point scale, seven-point scale, and five-point scale with possibility to add a finer scale to the repertoire of the scales that are already available to the educators. The objective of the study was to verify the relationship among the three types of scales namely five-point scale, seven-point scale, and nine-point scale which was considered as a process of validation.

**1. METHODOLOGY**

25 females of Jesus and Mary College and Maitreyi College, involved in team games (hockey, football, volleyball, basketball, cricket, handball), age ranged from 17 to 20 years took part in this study. The participants were asked to respond to the health assessment questionnaire on three occasions with three different scales. The participants responded to five-

point point scale, seven-point scale and nine-point scale which were administered at an interval of two days between each test.

The health questionnaire was developed considering seven components namely-

- (1) Sleep and rest
- (2) Diet and nutrition
- (3) Work and study
- (4) Health and Hygiene
- (5) Infections, diseases and different biological cycles related to females
- (6) Sports and recreation
- (7) Cultural and social.

These components were derived with the help of 42 questions and six questions were included for each component. Only 39 questions were included as last 3 questions were related to certain diseases, sickness and infections. The corresponding variables and their codes have been summarized in appendix-1.

The three scales were compared with each other using the Karl Pearson's coefficient of correlation with aim to find out the most appropriate scale for female sportsperson belonging to different team games. The coefficient of correlation of each item on the questionnaire was then rated using Kirkendall et al (1987) reliability rating method (see table-1).

**Table-1: Reliability Rating by Kirkendall et al (1987)**

Value or Reliability Coefficient	Reliability Grading
0.00 to 0.59	Unacceptable
0.60 to 0.79	Average
0.80 to 0.89	High
0.90 to 1.00	Excellent

**2. Findings**

The results have been documented in table 2.

**Table-2: Relationship among of Five-Point, Seven-Point, and Nine-Point Scales of Health Questionnaire**

S. No.	Vari able	5-Point Vs 7-Point	Reliabil ity Grad ing	7-Point Vs 9-Point	Relia bility Gradin g	5-Point Vs 9-Point	Reliability Grading
1	HQ1	.41	Unacce ptable	.48	Unacce ptable	.41	Unaccept able

2	Hq2	.82	High	.79	Average	.64	Average
3	HQ3	.76	Average	.56	Unacceptable	.45	Unacceptable
4	HQ4	.49	Unacceptable	.77	Average	.51	Unacceptable
5	HQ5	.78	Average	.69	Average	.58	Unacceptable
6	HQ6	.78	Average	.78	Average	.72	Average
7	HQ7	.40	Unacceptable	.49	Unacceptable	.41	Unacceptable
8	HQ8	.60	Average	.67	Average	.60	Average
9	HQ9	.44	Unacceptable	.33	Unacceptable	.18	Unacceptable
10	HQ10	.70	Average	.57	Unacceptable	.53	Unacceptable
11	HQ11	.65	Average	.53	Unacceptable	.62	Average
12	HQ12	.57	Unacceptable	.65	Average	.27	Unacceptable
13	HQ13	.73	Average	.41	Unacceptable	.38	Unacceptable
14	HQ14	.76	Average	.48	Unacceptable	.54	Unacceptable
15	HQ15	.80	High	.90	Excellent	.90	Excellent
16	HQ16	.41	Unacceptable	.41	Unacceptable	.75	Average
17	HQ17	.63	Average	.59	Unacceptable	.66	Average
18	HQ18	.87	High	.67	Average	.65	Average
19	HQ19	.81	High	.40	Unacceptable	.25	Unacceptable
20	HQ20	.76	Average	.59	Unacceptable	.50	Unacceptable
21	HQ21	.68	Average	.41	Unacceptable	.49	Unacceptable
22	HQ22	.67	Average	.73	Average	.74	Average
23	HQ23	.47	Unacceptable	.82	High	.56	Unacceptable
24	HQ24	.59	Unacceptable	.61	Average	.55	Unacceptable
25	Hq25	.81	High	.67	Average	.72	Average
26	HQ26	.66	Average	.70	Average	.56	Unacceptable
27	HQ27	.70	Average	.53	Unacceptable	.52	Unacceptable
28	HQ28	.65	Average	.69	Average	.45	Unacceptable
29	HQ29	.87	High	.41	Unacceptable	.36	Unacceptable
30	HQ30	.77	Average	.56	Unacceptable	.52	Unacceptable
31	HQ31	.75	Average	.77	Average	.53	Unacceptable
32	HQ32	.83	High	.50	Unacceptable	.65	Average
33	HQ33	.82	High	.80	High	.90	Excellent
34	HQ34	.89	High	.74	Average	.71	Average
35	HQ35	.88	High	.66	Average	.65	Excellent
36	HQ36	.77	Average	.72	Average	.54	Unacceptable
37	HQ37	.96	Excellent	.83	High	.80	Excellent
38	HQ38	.73	Average	.46	Unacceptable	.62	Average
39	HQ39	.83	High	.85	High	.86	High

**Five-Point Scale Vs Seven-Point Scale**

According to the above table the reliability of the variable HQ37 was "Excellent". The test-retest reliability was rated "High" for the variable namely HQ2, HQ15, HQ18, HQ19, HQ25, HQ29, HQ32, HQ33, HQ34, HQ35 and HQ39. The variables namely HQ3, HQ5, HQ6, HQ8, HQ10, HQ11, HQ13, HQ14, HQ17, HQ20, HQ21, HQ22, HQ26, HQ27, HQ28, HQ30,

HQ31, HQ36 and HQ38 were rated "Average". The variables namely HQ1, HQ4, HQ7, HQ9, HQ12, HQ16, HQ23 and HQ24 were deemed "Unacceptable". Conclusively, the relationship between Five-Point Vs Seven-Point Scale had one HQ which was categorized as excellent, eleven HQs as high, nineteen HQs as average and eight HQs as unacceptable. Collectively the mean reliability was  $\sum r=0.70$  (Average) for Five-Point Vs Seven-Point Scale.

**Seven-Point Scale Vs Nine-Point Scale**

The reliability of the variable HQ15 was "Excellent". The test-retest reliability was "High" for the variable namely HQ23, HQ33, HQ37 and HQ39. The reliability of the variables was rated "Average" for the variables namely HQ2, HQ4, HQ5, HQ6, HQ8, HQ12, HQ18, HQ22, HQ24, HQ25, HQ26, HQ28, HQ31, HQ34, HQ35 and HQ36. The variables namely HQ1, HQ3, HQ7, HQ9, HQ10, HQ11, HQ13 and HQ14, HQ 16, HQ 17, HQ19, HQ20, HQ21, HQ27, HQ29, HQ30, HQ32 and HQ38 were deemed "Unacceptable". Conclusively, the relationship between Seven-Point Vs Nine-Point Scale had one HQ which was categorized as excellent, four HQs as high, sixteen HQs as average and eighteen HQs as unacceptable. Collectively the mean reliability was  $\sum r=0.62$  (Average) for Seven-Point Vs Nine-Point scale.

**Five-Point Scale Vs Nine-Point Scale**

The comparative reliability of the HQ with variables namely HQ15 and HQ33 rated as "Excellent". The variable namely HQ37 and HQ39 rated as "High". The reliability of the variables was "Average" for the variables namely HQ2, HQ6, HQ8, HQ11, HQ16, HQ17, HQ18, HQ22, HQ25, HQ32, HQ34, HQ35 and HQ38. The variables HQ1, HQ3, HQ4, HQ5, HQ7, HQ9, HQ10, HQ12, HQ13, HQ14, HQ19, HQ20, HQ21, HQ23, HQ24, HQ26, HQ27, HQ28, HQ29, HQ30, HQ31 and HQ36 were deemed "Unacceptable". Conclusively, the relationship between Five-Point Vs Nine-Point Scale had two HQs which were categorized as excellent, two HQs as high, thirteen HQs as average and twenty two HQs as unacceptable. Collectively the mean reliability was  $\sum r=0.57$  (Unacceptable) for Five-Point Vs Nine-Point scale.

**Validation of the Nine-Point Scale**

Three relationships were evaluated Five-Point Vs Seven-Point (C), Seven-Point Vs Nine-Point (B) and Five-Point Scale Vs Nine-Point Scale (A). The mean reliability for relationship (C) was  $\sum R=0.70$ , for relationship (B) was  $\sum R=0.62$  and for relationship (A) was  $\sum r=0.57$ .

In order to validate the Nine-Point Scale the below mentioned logic was set- As the relationship between the Five-Point Scale and Seven Point Scale is already validated and available in the research literature (David, 2009), now the research problem is to find out the relationship between Five-Point and Nine-Point Scale and between Seven-Point and Nine Point Scale, which is highly important for interpretation and validation. This can be provided as follows-

$$A+B/2 = 0.59$$

$$A+C/2 = 0.63$$

$$B+C/2 = 0.66$$

**DISCUSSION**

The Kirkendall (1987) grading system was incorporated to evaluate the validity of each item on the HQ of three scales namely five-point, seven-point and nine- point scales. According to the findings the HQ1 is having Unacceptable validity (.41 to .48) among the developed scales namely five-point, seven- point and nine- point scales. In regard to the HQ2 the validity was found to range from High to Average (.64 to .82). The HQ3 was found to have Average to Unacceptable validity (.45 to .76). The HQ4 had a validity range from Average to Unacceptable (.53 to .78). For the HQ5 the validity was from Average to Unacceptable (.58 to .78) between the developed

scales namely five-point, seven- point and nine- point scales. The HQ6 showed a validity of Average (.72 to .78) between the scales namely five-point, seven- point and nine- point scales. In regard to the HQ7 the validity was Unacceptable (.40 to .49). In regard to the HQ8 the validity was Average (.60 to .67). In regard to the HQ9 the validity was (.18 to .44). For the variable HQ10 the validity was found to be Average to Unacceptable (.53 to .70). In regard to the HQ11, the validity was found to be Average to Unacceptable (.53 to .65). In regard to the HQ12 the validity was found to be Unacceptable to Average (.27 to .65). For the variable HQ13 the validity was Average to Unacceptable (.38 to .73). The variable HQ14 had a validity Average to Unacceptable (.48 to .76). For the variable HQ15 the validity was found to be High to Excellent (.80 to .90). The variable HQ16 had a validity Unacceptable to Average (.41 to .75). The variable HQ17 had the validity from Average to Unacceptable (.59 to .66). The variable HQ18 was found to be High to Average (.65 to .87). In regard to the HQ19, the validity was found to be High to Unacceptable (.25 to .81). The variable HQ20 had the validity from. In regard to the HQ21, the validity was found to be Average to Unacceptable (.50 to .76). The variable HQ22 had the validity from Average (.67 to .74). In regard to the HQ23, the validity was found to be Unacceptable to High (.42 to .82). The variable HQ24 had the validity from Unacceptable to Average (.55 to .61). In regard to the HQ25 the validity was found to range from High to Average (.67 to .81). For the variable HQ26 the validity was found to be Average to Unacceptable (.56 to .70). In regard to the HQ27 the validity was found to range from Average to Unacceptable (.52 to .70). For the variable HQ28 the validity was found to be Average to Unacceptable (.45 to .69). In regard to the HQ29 the validity was found to range from High to Unacceptable (.36 to .87). For the variable HQ30 the validity was found to be Average to Unacceptable (.52 to .77). In regard to the HQ31 the validity was found to range from Average to Unacceptable (.53 to .77). For the variable HQ32 the validity was found to be High to Unacceptable (.050 to .83). In regard to the HQ33 the validity was found to range from High to Excellent (.80 to .90). For the variable HQ34 the validity was found to be High to Average (.71 to .89). In regard to the HQ35, the validity was found to be High to Average (.65 to .88). For the variable HQ36 the validity was found to be Average to Unacceptable (.54 to .77). In regard to the HQ37, the validity was found to be Excellent to High (.80 to .96). For the variable HQ38 the validity was found to be Average to Unacceptable (.46 to .73) In regard to the HQ39, the validity was found to be High (.83 to .86) across the three scales namely five-point, seven-point and nine- point scales.

## CONCLUSIONS

The health assessment questionnaire administered to female sportsperson involved in team games by and large exhibits higher co-efficient of correlation between five-point and seven-point scales as well as between seven-point and nine-point scales than that of between five-point and nine-point scales when evaluated on each independent question using the Kirkendall (1987) grading system. Hence this study approves the use of nine-point scale for the administration of the Health Assessment Questionnaire to be a valid and reliable tool.

The nine-point grading scale is a more precise scale with greater power to differentiate than the more coerce scales (fewer points) (David, 2009). On the down side the scales are more attention demanding and may seem a little time consuming than more coerce scales. Therefore, the appropriateness of the scale should be kept in mind when employing a scale with higher points (nine-point scale).

## Appendix

### Appendix-1: Health Variables (Through Questionnaire) and their Coding

S.No.	Variables	Variables Code
1.	Satisfaction with sleep and rest	HQ1
2.	Sound sleep	HQ2
3.	Disturbance in sleep with vague fear/anxiety/and/or bad dreams	HQ3
4.	Intake of sufficient nutrition diet	HQ4
5.	Concerned about diet	HQ5
6.	Weight/diet control	HQ6
7.	Regular/moderate hard physical work	HQ7
8.	Regular moderate exercise	HQ8
9.	Improvement upon study	HQ9
10.	Improvement in health	HQ10
11.	Personal hygiene	HQ11
12.	Cutting and cleaning nails regularly	HQ12
13.	Caring for proper ventilation, study light, correct postures, regular medical check-up etc.	HQ13
14.	Regular bowel movements (Internal cleanliness)	HQ14
15.	Indulging in smoking	HQ15
16.	Indulging in alcoholism	HQ16
17.	Concentration on work	HQ17
18.	Consuming eatables exposed to dust and flies (Food eating habits)	HQ18
19.	Avoiding mental stress and trying to remain cheerful	HQ19
20.	Mixing up with people and sharing feelings (Socialization)	HQ20
21.	Prone to infections/diseases	HQ21
22.	Regular biological cycles (Menstrual cycles)	HQ22
23.	Enjoying sports and recreation	HQ23
24.	Participation in recreational activities and sports	HQ24
25.	Considering sports as a good past time	HQ25
26.	Outings with collegemates and friends	HQ26
27.	Non participation in religious functions	HQ27
28.	Participation in social functions	HQ28
29.	Participation in cultural programs	HQ29
30.	Worshipping in temple, gurudwara, mosque, church etc	HQ30
31.	Treatment from quack	HQ31
32.	Treatment from family doctor	HQ32
33.	No treatment during sickness	HQ33
34.	No. of hours of sleep	HQ34
35.	No. of hours of rest in day time	HQ35
36.	No. of meals per day	HQ36
37.	No. of fasts/skipping meals per week	HQ37
38.	No. of hours devoted for study	HQ38
39.	No. of hours of moderate work	HQ39

## REFERENCES

- Malm, C., Jakobsson, J., & Isaksson, A. (2019). Physical Activity and Sports-Real Health Benefits: A Review with Insight into the Public Health of Sweden. *Sports (Basel, Switzerland)*, 7(5):127.
- Primary Care, Health Benefits, Mental Health, Weight Loss, Women Health / By admin / September 25, 2019. Retrieved from <https://manhattanmedicalarts.com/blog/effect-of-sports-on-general-health/> on 18 may, 2022
- Eime RM, Young JA, Harvey JT, Charity MJ, Payne WR. (2013). A Systematic Review of the Psychological and Social Benefits of Participation in Sport for Children and Adolescents: Informing Development of a Conceptual Model of Health through Sport. *Int J Behav Nutr Phys Act*, 10:98.
- Easterlin MC, Chung PJ, Leng M, Dudovitz R. (2019) Association of Team Sports Participation With Long-term Mental Health Outcomes Among Individuals Exposed to Adverse Childhood Experiences. *JAMA Pediatr*, 73(7):681-688.

5. Malm, C.; Jakobsson, J.; Isaksson, A. (2019). Physical Activity and Sports—Real Health Benefits: A Review with Insight into the Public Health of Sweden. *Sports (Basel, Switzerland)*, 7(5): 127.
6. Oja P, Titze S, Kokko S, et al. (2015). Health Benefits of Different Sport Disciplines for Adults: Systematic Review of Observational and Intervention Studies with Meta-analysis. *British Journal of Sports Medicine*, 49: 434-440.
7. Shaw, D and Andrabi, SMH. (2021). Development of Six sigma scale (Seven Point Grading) of Fitness Level of Female Citizens, *Asian Journal of Physical Education and Computer Science in Sports*, 23(1): 18-22.
8. Cook, D. A., & Beckman, T. J. (2009). Does scale length matter? A comparison of nine- versus five-point rating scales for the mini-CEX. *Advances in health sciences education : theory and practice*, 14(5): 655–664.