

Pilot Study: To Develop Normative Data of Whodas 2.0 (36-Item Version) in Orthopaedic Conditions in Goa, India

Prabhakar Madkaikar, Dr. Parag Adsule

Abstract: ***Background:** The World Health Organization Disability Assessment Schedule (WHODAS) 2.0 is widely used in both research and clinical practice. Aim of this study is: A pilot study to develop WHODAS 2.0 (36-items version) normative data for the orthopaedic conditions in Indian population. **Methods and Materials:** The WHODAS 2.0 consists of six domains (Cognition, Mobility, Self-care, Getting along, Life activities and Participation). A total of 50 patients were invited to fill in the WHODAS2.0. Five age groups (18-24, 25-34, 35-44, 45-54 and 55-64 years) were constructed. Descriptive statistics including mean and standard deviation were calculated used to present the normative data. **Results:** This study shows that we can understand the health status or status of disability with administering WHODAS 2.0 very effectively. All the domains of WHODAS 2.0 are well-defined and understand the problems with orthopaedic conditions. **Conclusion:** Significant differences in WHODAS 2.0 scores were found between men and women and between different age groups. This WHODAS 2.0 normative data provides as a benchmark of health status for participants with orthopaedic conditions.*

Keywords: Gender, age groups, mean, orthopaedic conditions.

1. Introduction

Knowing what disease a patient has requires application of the fine art and science of diagnosis. This knowledge helps to guide treatment interventions and management strategies; it can also help to predict outcome and prognosis to a certain extent. However, although diagnosis is valuable, on its own, it is not sufficient for understanding the full picture and the lived experience of a patient, the adage “there are no diseases, but patients” applies.

Just as important as the disease label itself is whether a person can work and carry out the routine activities necessary to fulfill his/her roles at home, work, school or in other social areas. Summed up by the phrase “what people cannot do when they are ill”, this aspect differs greatly, independently of the disease concerned. Information on functioning (i. e. an objective performance in a given life domain) and disability is taken into account by professionals.

Disability is a major health issue. When global assessments are made for burden of disease, more than half of the burden of premature mortality is due to overall disability (1). People generally seek health services because a disease makes it difficult for them to do what they used to do beforehand (because they are disabled) rather than because they have a disease.

Disability has become a important as mortality. Although health-care advances have reduced mortality, the associated increase in longevity has led to a corresponding increase in chronic conditions that need to be managed lifelong and special needs are emerging for the care of aged population. Health has to move beyond mortality and take into account disability, to set priorities, measure outcomes and evaluate effectiveness and performance of health systems.

It is difficult to define and measure disability, because disability is related to many life areas, and involves

interactions between person and his/her environment. The World Health Organization (WHO) Project on Assessment and Classification of Human Functioning, Disability and Health brought together representatives of more than 100 countries, researchers and consumers in an international collaboration, to produce International Classification of Functioning, Disability and Health (ICF) as a consensus framework (2).

The ICF takes each function of an individual – at body, person or society-and provides a definition for its operational assessment, and defines disability as “a decrement in each functioning domain”

However, the ICF is impractical for measuring disability in daily practice, therefore WHO developed the WHODAS to address this need, and provide a standardized way to measure disability across cultures.

WHODAS 2.0 has 6 domains namely Cognition, Mobility, Self-care, Getting along, Life activities and Participation. The questions do not necessarily and solely refer to the ICF participation component as such, but also include various contextual (personal and environmental) factors affected by the health condition of the respondent. For all six domains, the scale provides a profile and a summary of functioning and disability that is reliable and applicable across cultures, in all adult populations. The items included in WHODAS 2.0 were selected only after exploring the nature and practice of health status assessment in different cultures. This was achieved using linguistic analysis of health related terminology; key informant interviews and focus groups, as well as qualitative methods. It provides a common metric of the impact of any health condition in terms of functioning. Being a generic measure, the instrument does not target a specific disease – it can thus be used to compare disability due to different diseases. WHODAS2.0 was developed specifically to reflect the ICF. It has designed to assess the limitations on activity restrictions on participation experienced by an individual, irrespective of medical diagnosis. WHODAS 2.0 places health and disability as a

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continuum, in addition, it is independent of the background of the disease or previous health conditions. This feature makes it possible to focus directly on functioning and disability, and allows assessment of functioning separately from the disease conditions.

The WHODAS 2.0 was developed to assess difficulties due to health conditions including diseases, illnesses, or injuries, mental or emotional problems, and problems with alcohol or drugs. It does not attempt to determine whether disability is due to physical or psychological disorders

The ICF provides support and reinforcement for Occupational Therapists to specifically address activity and activity limitations faced by persons with disabilities.

Aspects that make WHODAS 2.0 particularly useful are its sound theoretical underpinnings, good psychometric properties, numerous applications in different groups and settings and ease of use.

It has proven useful for assessing disability levels in general as well as specific population. It makes it easier to design health and health-related interventions, and to monitor their impact. Test-retest studies of the 36-item scale in countries across the world and found it to be highly reliable. The Occupational Therapy framework is directed at supporting the client's engagement in meaningful occupation that ultimately affects the health, well-being and life satisfaction of that individual. The domains of WHODAS have a direct correlation with the assessment and rehabilitation of Occupational Therapy.

2. Methodology

2.1 Study design

Univariate descriptive Qualitative study for development of norms

2.2 Study setting

The study will be conducted on the adult population (aged 18-65 years) of Goa, India.

The study will be carried out at the tertiary care premises of Goa, at the Goa Medical College and Hospital, Bambolim, Goa.

2.3 Sample size

The sample size of 50 patients are taken

2.4 Eligibility criteria

2.4 (a) Inclusive criteria

- Minimum age of 18 years
- Informed consent
- Both males and females
- Chronic orthopedic conditions
- Out-patient department (OPD) based

2.4 (b) Exclusive criteria

- Age above 65 years
- Lack of consent
- Major neurological or psychiatric conditions
- Acute in-patient (IPD) based
- Spinal conditions

2.5 Procedure

- 1) Basic demographic characteristics such as age and gender, diagnosis, chief complains, education and occupation will be obtained from patients
- 2) A total of 50 patients with orthopedic conditions and were receiving occupational therapy treatment as per inclusive and exclusive criteria were recruited for this study. This stratified random sampling method will be used to avoid bias because of gender and age differences.
- 3) The sample size will be restricted to 50 participants because of the aim of the study is to develop the pilot normative data.
- 4) We will create five age groups ranging from (18-24, 25-34, 35-44, 45-54, 55-64)
- 5) The subjects will be informed about the study, those who agree to participate, they will sign the given consent forms.
- 6) Domain 1: Cognition-assesses communication and thinking activities, specific areas assessed include concentrating, remembering, problem solving and learning.
Domain 2: Mobility-assesses activities such as standing, moving around inside home, getting out of the home and walking a long distance.
Domain 3: Self-care-assesses hygiene, dressing, eating and staying alone.
Domain 4: Getting along-assesses interactions with other people and difficulties that might be encountered with this domain due to a health condition, in this context, "other people" includes those known intimately or well (e. g. spouse or partner, family members or close friends) and those not known well (e. g. strangers).
Domain 5: Life activities-assesses difficulty with day-to-day activities (i. e. those that people do on most days, including those associated with domestic responsibilities, leisure, work and school).
Domain 6: Participation-assesses social dimensions, such as community activities, barriers and hindrances in the world around the respondent, and problems with other issues, such as maintaining personal dignity.
Each item is scored on a scale of 1 to 5, where "none" (1), "mild" (2), "moderate" (3), "severe" (4) and "extreme" (5).
- 7) Handling of missing data:
The simplest approach, when only one item is missing a value, is to use the mean of the other items to assign a score to the missing item. If the respondent is not working and has given responses to the 32-item version, the score is used as it is, and will be comparable to that of the 36-item version.
- 8) Establishing normative data is univariate descriptive qualitative studies, in which data is collected on a single variable or a series of single variables and then characterized with descriptive statistics. To avoid

sampling bias, we used random samples. The descriptive statistics includes means, Standard Deviations (SD) and 95% confidence interval were calculated to present the normative data.

9) The formulae used were:

To calculate the mean

$$X = \sum x/n$$

Where, X = Mean Value

x = Total score

n = Number of variables

To calculate the Standard Deviation (SD)

$$\sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Standard Deviation S. D. =

Here, n - 1 = Degree of Freedom

3. Observations & Results

The data was analysed and the results show descriptive statistics, mean, standard deviation (SD) and the calculation of the percentage of the collected data. The following tables and graphs show statistical analysis of the data as follows.

Table I: Demographic Characteristics of the Respondents

Table 1 (A): Total no. of cases

Gender	n=50	%
Male	26	52
Female	24	48

Table: I. A shows total number of cases male (26) and female (24). Graph I shows the percentage of the gender distribution. Red colour represents male distribution and blue colour represents female distribution. Results show male percentile value more than female (52% >48%)

Table 1 (B): Total no. of respondents as per age

Age group	n=50	%
18-24	9	18
25-34	11	22
35-44	8	16
45-54	8	16
55-65	14	28

Table: I. B shows no. of respondents as per age groups. The respondents were distributed into 5 age groups. It shows more number of respondents in age group 55-65 (n=14) and least number in age groups 35-45 (n=8) and 45-55 (n=8).

Table 1 (C): Respondents with Upper Limb conditions

Joint	Upper Limb, n=29	%
Shoulder	7	24.13
Elbow	10	34.48
Hand	12	41.37

Table I. C shows number of respondents with Upper limb conditions. Upper Limb conditions were further divided into Shoulder, Elbow and Hand. 7 respondents (24.13%) presented with Shoulder conditions, 10 respondents (34.48%) with Elbow conditions and the maximum that is 12 Hand (41.37) respondents.

Table 1 (D): Respondents with Lower Limb conditions

Joint	Lower limb, n= 21	%
Hip	1	4.76
Knee	17	80.75
Ankle	3	14.28

Table I. D shows number of respondents with Lower limb conditions. Lower limb conditions were further divided into Hip, Knee and Ankle. Out of which Hip respondents were the least that is 1 (4.76%) followed by ankle that is 3 (14.28%) and the most with knee conditions that is 17 (80.75%) respondents.

Table 2: WHODAS 2.0 raw score (mean) for males and females

Gender	N	Raw Score (mean)	SD
Male	26	71.38462	19.59199
Female	24	77.625	17.90509

Table II shows the raw scores (mean) for male and female respondents of the WHODAS 2.0 scale. As we can see, the female respondents have a higher mean raw score 77.625 as compared to the male respondents 71.38462.

Table 3: WHODAS 2.0 raw score (mean) for upper and lower limb conditions

Region	N	Raw score (mean)	SD
Upper Limb	29	68.03448	20.88144
Lower Limb	21	83.14286	11.10534

Table III shows the raw scores (mean) for upper and lower limb conditions. As we can see, the Lower Limb condition respondents have a considerably higher mean raw score 83.14286 as compared to that of the Upper limb respondents with mean raw score of 68.03448.

Table 4: WHODAS 2.0 raw score (mean) as per age-wise distribution

Age group	N	Raw score (mean)	SD
18-24	9	72.11111	15.36591
25-34	11	78.09091	17.64344
35-44	8	78.125	20.55263
45-54	8	63.375	17.1792
55-65	14	77.07134	21.57443

Table IV shows raw scores (mean) as per age-wise distribution. The least mean raw score noted was 63.375 of the age group 45-55 years and the highest raw mean score noted was of 78.125 of the age group 35-45.

Table 5: WHODAS 2.0 raw score (mean) Domain wise distribution

Domain	Mean	SD
Domain 1	8.3	3.424104
Domain 2	12.44	6.068184
Domain 3	8.76	2.825251
Domain 4	6.54	3.031872
Domain 5	17.64	8.847368
Domain 6	20.64	5.882385

Table V shows raw score (mean) as per WHODAS 2.0 domains. As per the above table, we can see a significantly higher raw mean score of domain 6: Participation that is 20.64, followed by domain 5: Life activities that is 17.64

followed by Domain 2: Mobility that is 12.44, followed by Domain 3: Self-care that is 8.76, followed by Domain 1: Cognition that is 8.3 and the least was found to be in Domain 4: Getting along that is 6.54.

Table 6: WHODAS 2.0 Domain-Wise Distribution

Table 6 (A): Raw score of males for Domain 1: Cognition

Gender	Joint	Domain 1 Mean	SD
Male	Shoulder	8.75	1.707825
Male	Elbow	7.833333	1.32916
Male	Hand	11.75	5.101248
Male	Hip	0	0
Male	Knee	6.5	0.707107
Male	Ankle	6	0
	Mean=	6.8055555	1.906098496

Table 6 (B): Raw score of females for Domain 1: Cognition

Gender	Joint	Domain 1 Mean	SD
Female	Shoulder	7.6666667	2.886751
Female	Elbow	6.5	0.57735
Female	Hand	0	0
Female	Hip	8	0
Female	Knee	6.933333	1.75119
Female	Ankle	6	0
	Mean=	5.84999995	1.200010062

Table VI. A shows male cases mean raw score for Domain 1: Cognition as per joint conditions and Table VI. B shows female cases mean raw score for Domain 1: Cognition as per joint conditions. We can note that there is no Hip case respondent in males and no Hand case in females and the same will be seen in the subsequent tables and graphs. The above tables also represent Standard Deviation (SD). From the above two tables we can see that males have a higher mean value that is 6.8055555 as compared to that of females that is 5.84999995.

Table 6 (C): Raw score of males for Domain 2: Mobility

Gender	Joint	Domain 2 Mean	SD
Male	Shoulder	5.75	1.5
Male	Elbow	7.833333	2.786874
Male	Hand	10	4.431294
Male	Hip	0	0
Male	Knee	15.5	6.363961
Male	Ankle	13.5	4.949747
	Mean=	8.763888833	2.356848977

Table 6 (D): Raw score of females for Domain 2: Mobility

Gender	Joint	Domain 2 Mean	SD
Female	Shoulder	9.333333	3.21455
Female	Elbow	6.5	2.380476
Female	Hand	0	0
Female	Hip	20	0
Female	Knee	18.66667	3.538899
Female	Ankle	20	0
	Mean=	12.41666717	1.709914589

Table VI. C shows male cases mean raw score for Domain 2: Mobility as per joint conditions and Table VI. D shows female cases mean raw score for Domain 2: Mobility as per joint conditions. The above tables also represent Standard Deviation (SD). From the above two tables we can see that females have a higher mean value that is 8.763888833 as compared to that of males that is 12.41666717.

Table 6 (E): Raw score of males for Domain 3: Self-care

Gender	Joint	Domain 3 Mean	SD
Male	Shoulder	8	2.828427
Male	Elbow	8.666667	2.503331
Male	Hand	8.916667	3.449857
Male	Hip	0	0
Male	Knee	6	0
Male	Ankle	5	0
	Mean=	6.097222333	1.631893688

Table 6 (F): Raw score of females for Domain 3: Self-care

Gender	Joint	Domain 3 Mean	SD
Female	Shoulder	11.333333	3.785939
Female	Elbow	8	3.464102
Female	Hand	0	0
Female	Hip	12	0
Female	Knee	9.2	2.042408
Female	Ankle	9	0
	Mean=	8.255555	1.795169397

Table VI. E shows male cases mean raw score for Domain 3: Self-care as per joint conditions and Table VI. F shows female cases mean raw score for Domain 3: Self-care as per joint conditions. The above tables also represent Standard Deviation (SD). From the above two tables we can see that females have a higher mean value that is 8.255555 as compared to that of males that is 6.097222333.

Table 6 (G): Raw score of males for Domain 4: Getting along

Gender	Joint	Domain 4 Mean	SD
Male	Shoulder	6.25	1.5
Male	Elbow	7.166667	3.488075
Male	Hand	8.166667	4.987864
Male	Hip	0	0
Male	Knee	7.5	0.707107
Male	Ankle	5	0
	Mean=	5.680555667	2.03834293

Table 6 (H): Raw score of females for Domain 4: Getting along

Gender	Joint	Domain 4 Mean	SD
Female	Shoulder	6.666667	2.886751
Female	Elbow	5	0
Female	Hand	0	0
Female	Hip	8	0
Female	Knee	5.533333	1.245946
Female	Ankle	5	0
	Mean=	5.033333333	1.186522821

Table VI. G shows male cases mean raw score for Domain 4: Getting along as per joint conditions and Table VI. H shows female cases mean raw score for Domain 4: Getting along as per joint conditions. The above tables also represent Standard Deviation (SD). From the above two tables we can see that males have a slightly higher mean value that is 5.680555667 as compared to that of females that is 5.033333333.

Table 6 (I): Raw score of males for Domain 5: Life activities

Gender	Joint	Domain 5 Mean	SD
Male	Shoulder	11.75	7.041543
Male	Elbow	17.83333	7.960318
Male	Hand	19.16667	7.209001

Male	Hip	0	0
Male	Knee	21.5	7.778175
Male	Ankle	27.5	2.12132
	Mean=	16.29166667	3.408044982

Table 6 (J): Raw score of females for Domain 5: Life activities

Gender	Joint	Domain 5 Mean	SD
Female	Shoulder	17	8.888194
Female	Elbow	8	4.546061
Female	Hand	0	0
Female	Hip	16	0
Female	Knee	18.86667	11.09612
Female	Ankle	18	0
	Mean=	12.97777833	4.9497060788

Table VI. I shows male cases mean raw score for Domain 5: Life activities as per joint conditions and Table VI. J shows female cases mean raw score for Domain 5: Life activities as per joint conditions. The above tables also represent Standard Deviation (SD). From the above two tables we can see that males have a higher mean value that is 16.29166667 as compared to that of females that is 12.97777833.

Table 6 (K): Raw score of males for Domain 6: Participation

Gender	Joint	Domain 6 Mean	SD
Male	Shoulder	21.75	5.965177
Male	Elbow	16.5	2.50998
Male	Hand	17.91667	6.721179
Male	Hip	0	0
Male	Knee	20.5	0.707107
Male	Ankle	16	5.656854
	Mean=	15.444445	2.901143904

Table 6 (L): Raw score of females for Domain 6: Participation

Gender	Joint	Domain 6 Mean	SD
Female	Shoulder	21	4
Female	Elbow	15.75	5.560276
Female	Hand	0	0
Female	Hip	28	0
Female	Knee	25.26667	3.514595
Female	Ankle	25	0
	Mean=	19.169445	2.481008072

Table VI. K shows male cases mean raw score for Domain 6: Participation as per joint conditions and Table VI. L shows female cases mean raw score for Domain 6: Participation as per joint conditions. The above tables also represent Standard Deviation (SD). From the above two tables we can see that females have a considerably higher mean value that is 19.169445 as compared to that of males that is 15.444445.

4. Discussion

WHODAS 2.0 is a practical, generic assessment instrument that measures health and disability in clinical practice. The basic aim of this study was to develop norms of WHODAS 2.0 amongst the common orthopedic conditions that visited the Occupational Therapy department.

WHODAS 2.0 domains match with occupational performance which is usually used by Occupational Therapists. So keeping in mind the basic aim of the study, we collected data of 50 patients as per the demographic criteria. We received variety of cases of Upper limb (shoulder, elbow and hand) and Lower limb (hip, knee and ankle). As per the ratio of males and females, the participation of males (52%) has been more than that of females (48%). As per age group wise, higher no. of respondents are in 55-65 age groups than other age groups.

Total no. of respondents with upper limb conditions are more as compared to lower limb. In lower limb we received only one hip case. So we could not form normative data for hip cases. So as per mean values of upper and lower limb cases, the higher mean value of raw score of lower limb (mean= 83.15) suggests higher disability as compared to upper limb cases (mean= 68.03).

We can see a significantly higher raw mean score of Domain 6: Participation (mean= 20.64) followed by Domain 5: Life activities (mean= 17.64) followed by Domain 2: Mobility (mean 12.44) followed by Domain 3: Self-care (mean= 8.76) followed by Domain 1: Cognition (mean= 8.3) and least was found to be in Domain 4: Getting along (mean= 6.54).

So as per mean value of Domain 6: Participation suggests that most respondents have difficulty in participation as compared to Domain 4: Getting along and Domain 1: Cognition.

As per domain-wise, Cognition is more affected in hand cases as compared to other cases. In the next domain, Mobility is more affected in knee cases as compared to others. Females respond with more problems in mobility as compared to males. Self-care is more affected in Upper limb cases. The respondents have equal problems in getting along. In Domain 5, lower limb cases have more problems in life activities. In domain 6, lower limb cases show more restriction in participation as compared to upper limb cases.

As per the observation, this study shows that all the patients have problems in getting along, life activities and participation more as compared to the other domains. As we notice, the respondents have difficulty to answer a few questions on "sexual activities" and "living with dignity because of the attitudes and actions of others". The respondents asked for explanation to respond on such questions. As per the calculations i. e. mean of all responses divided by number of questions represents the response of missing questions.

This suggests the requirement of cross-cultural adaptation of such questions in a more understanding manner in local language, we administered the scale in its original English version, since major population follows the English language. Those who did not understand the questions, we made them understand in our local language in order to get an appropriate response.

Finally, all normative review of literature of WHODAS 2.0 are fully supporting to our mean values of all domains as per the WHO manual.

5. Conclusion

Normative data is useful in assessing level of activities, participation and restrictions in patients with orthopaedic problems. It shows that we can understand the health status or status of disability with administering WHODAS 2.0 very effectively. All the domains of WHODAS 2.0 are well-defined and understand the problems with orthopaedic conditions.

Finally, the Occupational Therapists can use this tool or instrument to evaluate the functional status in orthopaedic cases. It also helps to understand the level of participation and activity restrictions. This will always be helpful to plan a rehabilitation program for patients with orthopaedic conditions.

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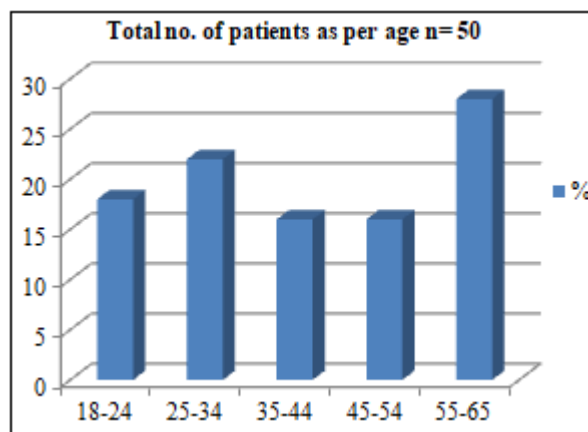


Figure 1 (B): Total no. of respondents as per age

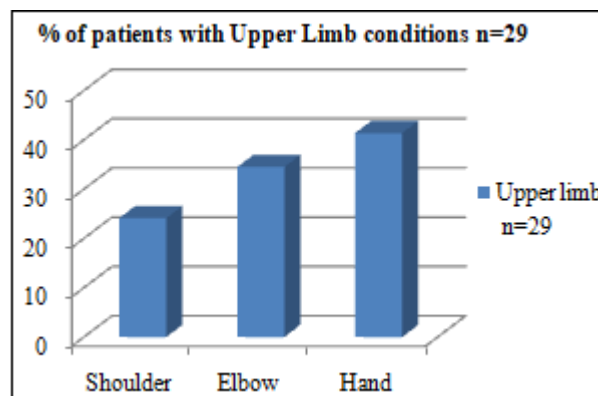


Figure 1 (C): Respondents with Upper Limb conditions

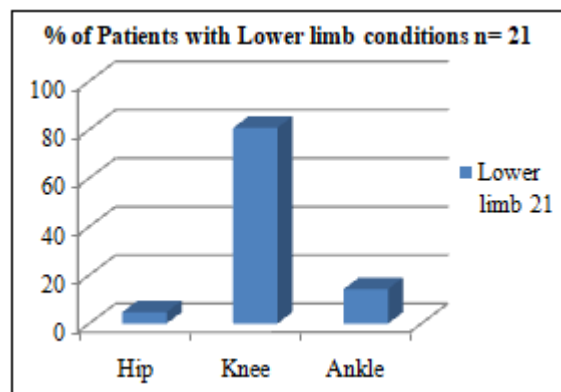


Figure I: D Respondents with Lower Limb conditions

Figure I: Demographic Characteristics of the Respondents

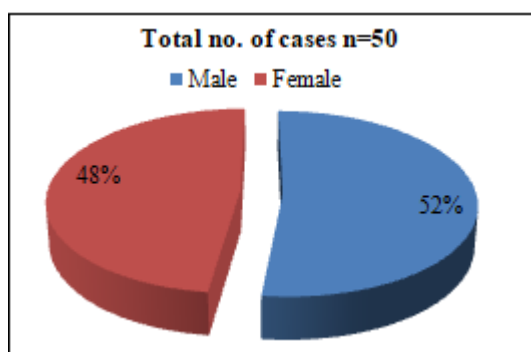


Figure 1: A Total no. of cases

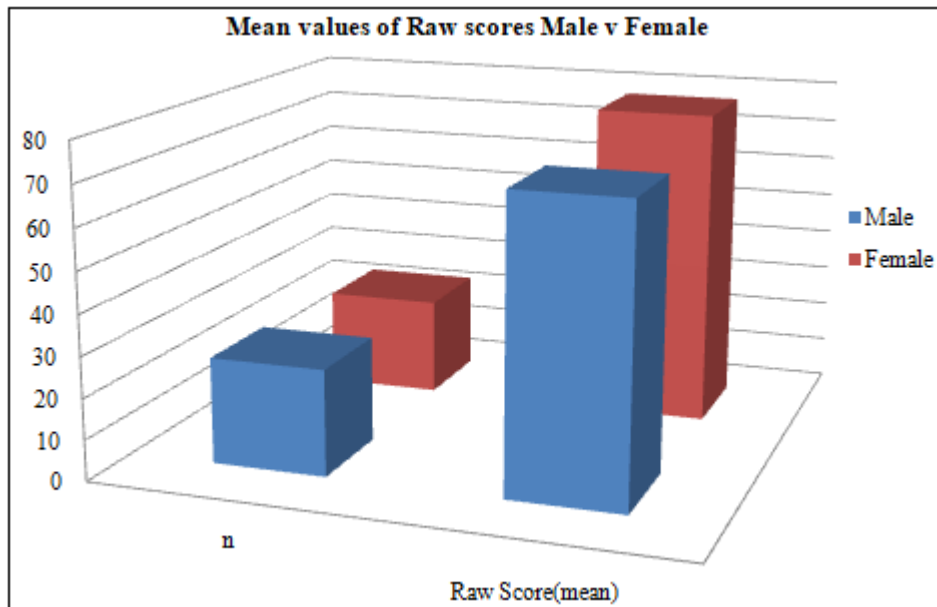


Figure II: WHODAS 2.0 raw score (mean) for males and females

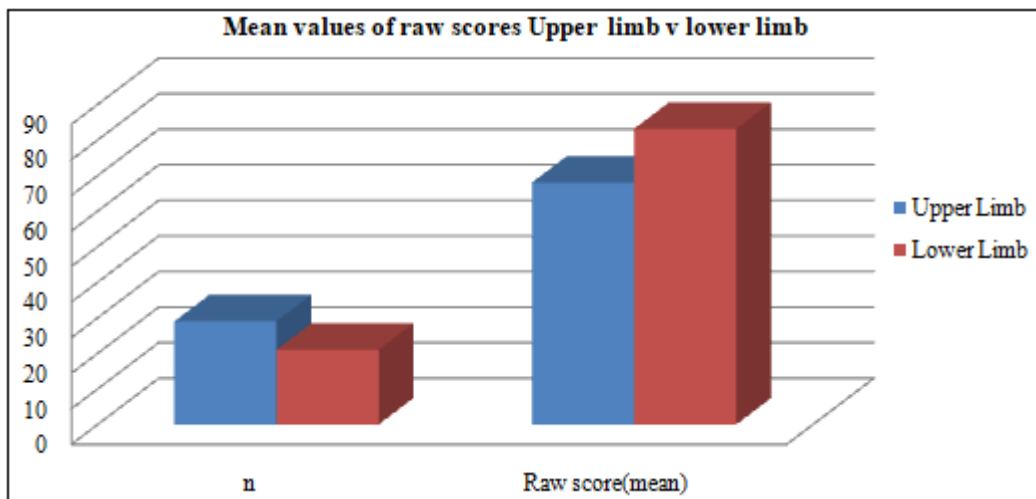


Figure III: WHODAS 2.0 raw score (mean) for upper and lower limb conditions

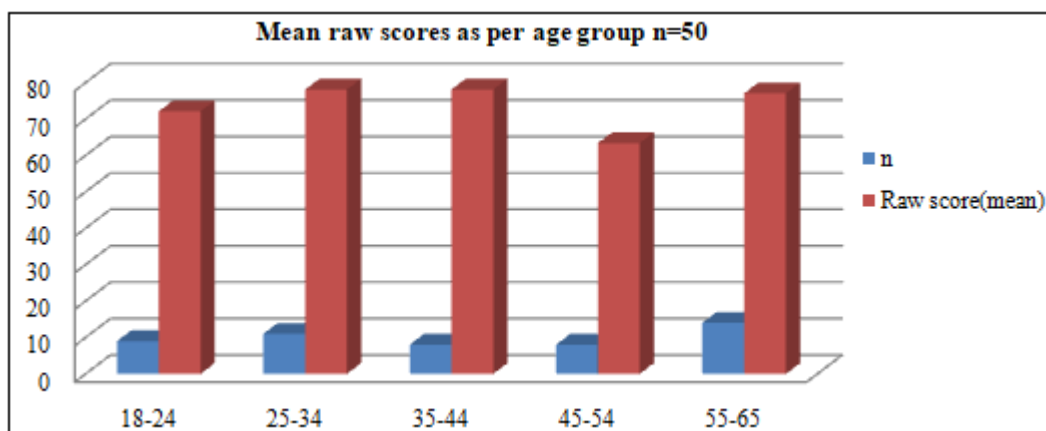


Figure IV: WHODAS 2.0 raw score (mean) as per age-wise distribution

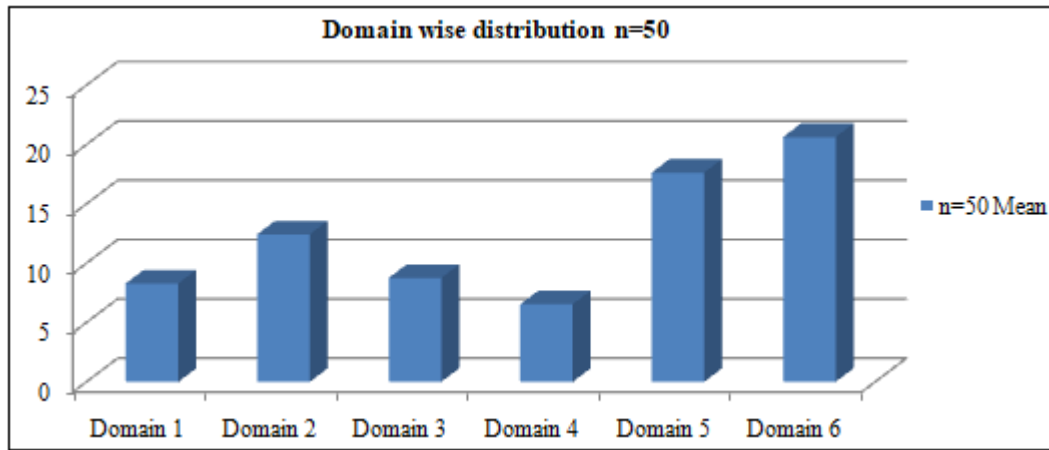


Figure V: WHODAS 2.0 raw score (mean) Domain wise distribution

Figure VI: WHODAS 2.0 Domain-Wise Distribution

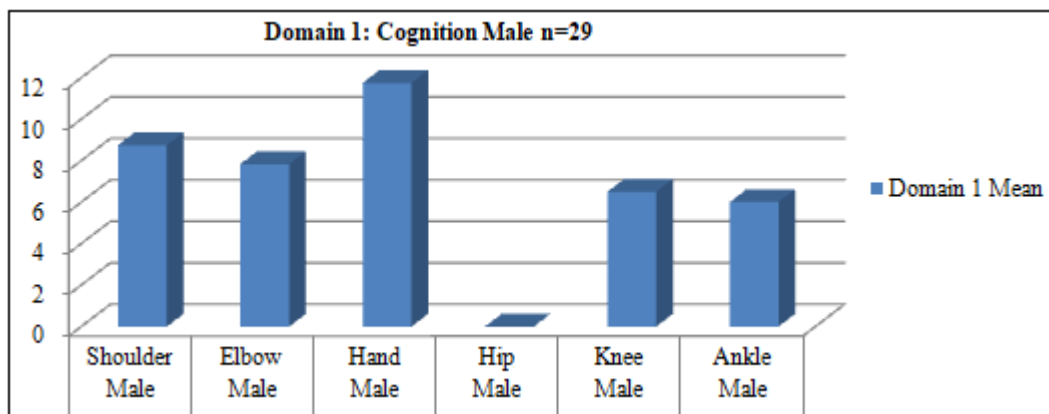


Figure 6 (A): Raw score of males for Domain 1: Cognition

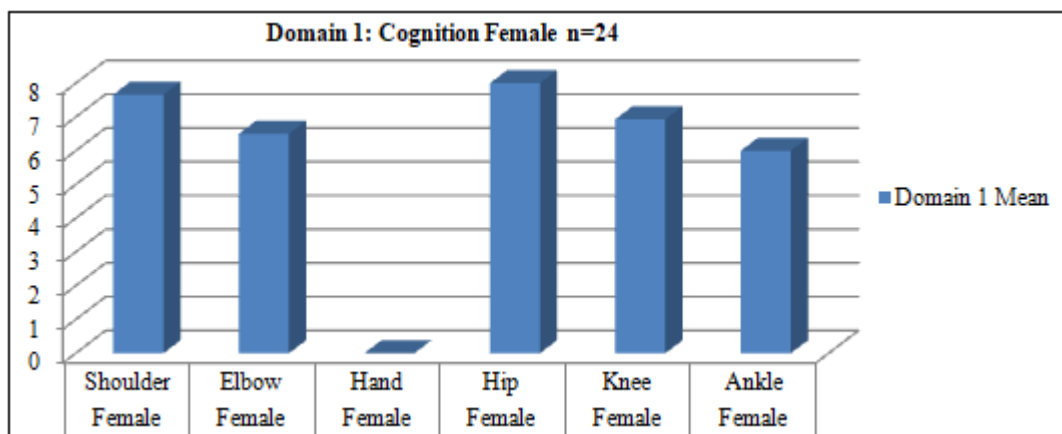


Figure 6 (B): Raw score of females for Domain 1: Cognition

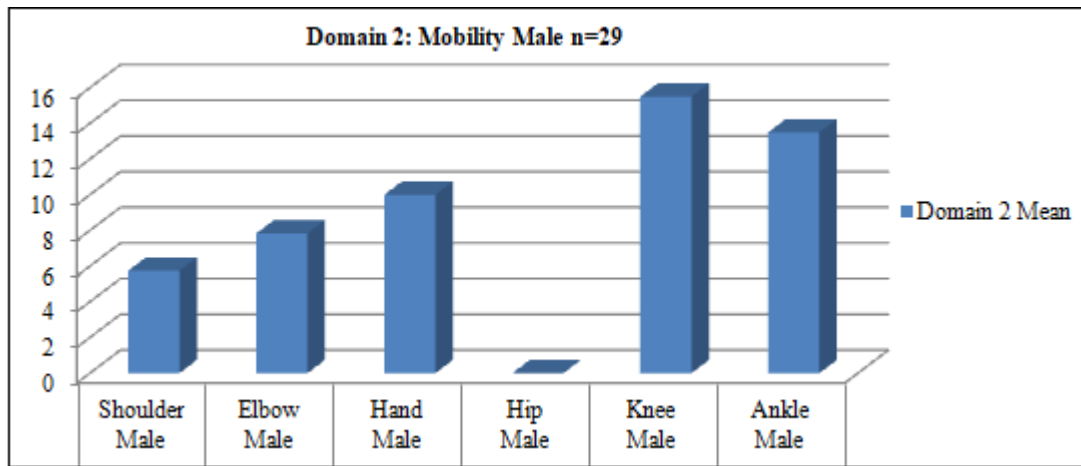


Figure 6 (C): Raw score of males for Domain 2: Mobility

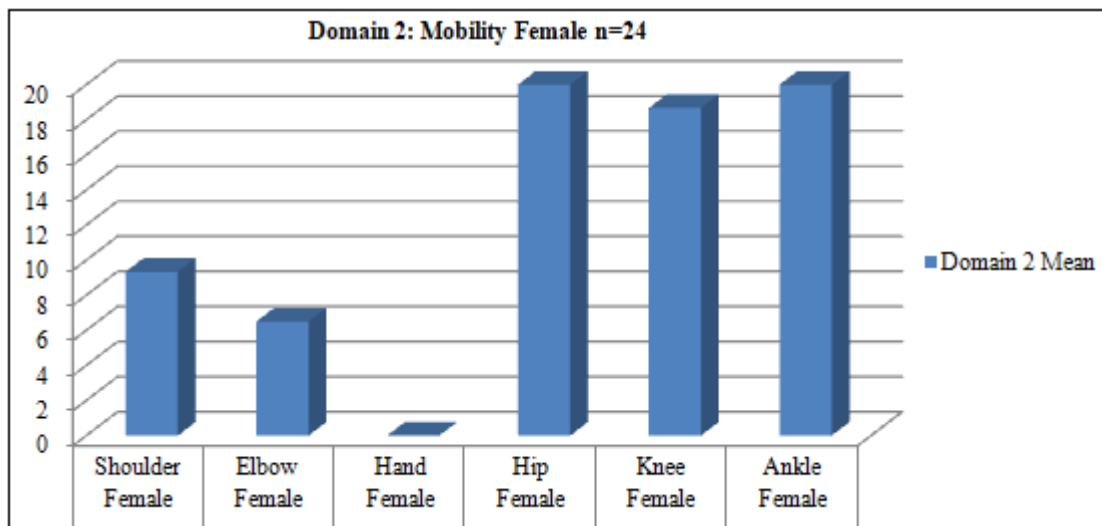


Figure 6 (D): Raw score of females for Domain 2: Mobility

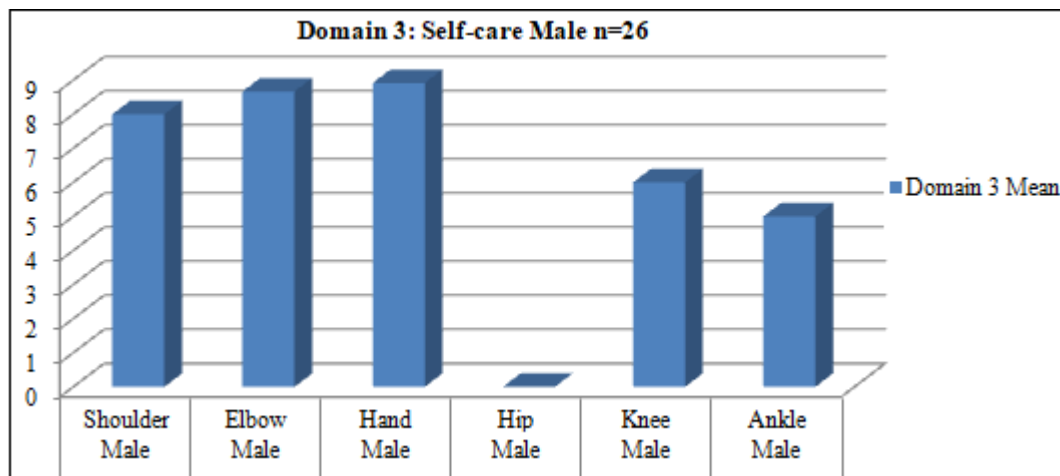


Figure 6 (E): Raw score of males for Domain 3: Self-care

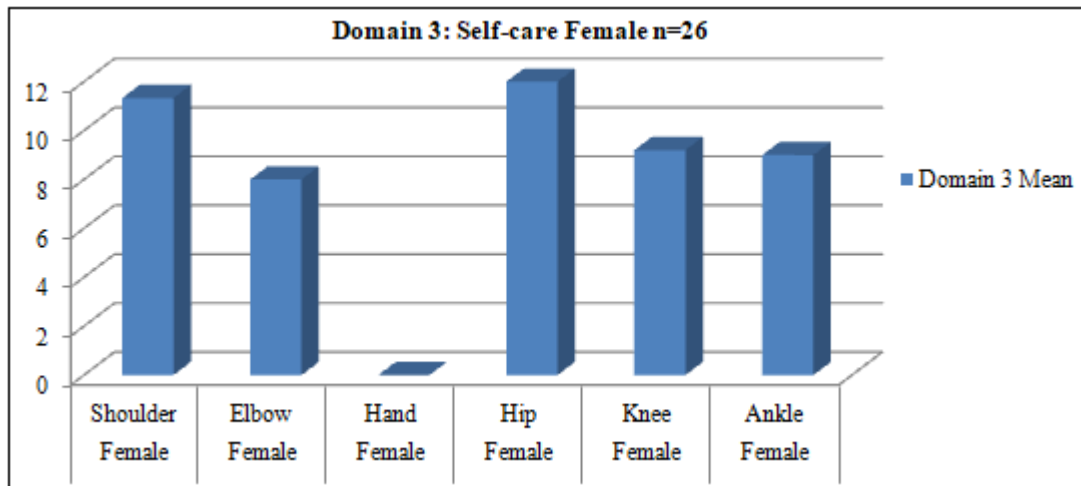


Figure 6 (F): Raw score of females for Domain 3: Self-care

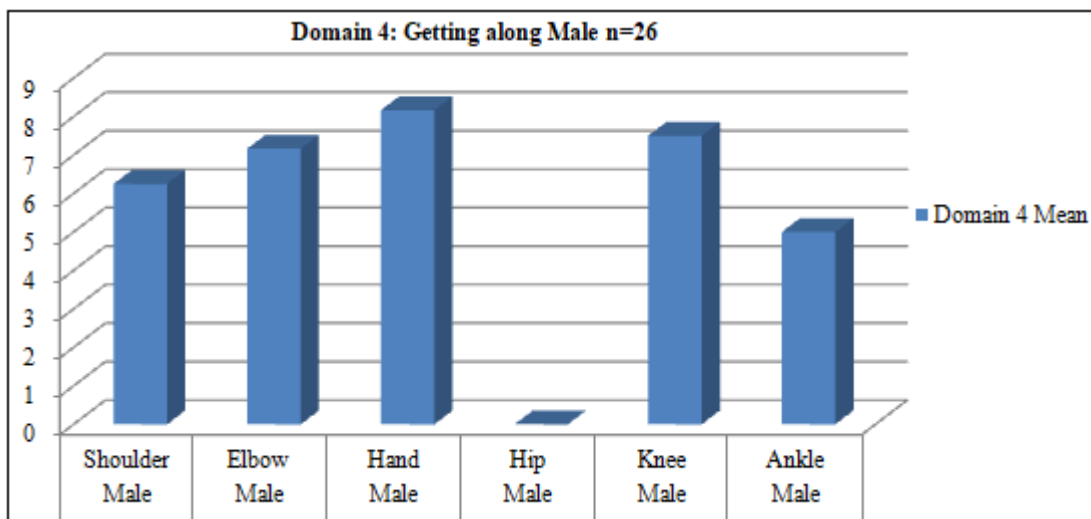


Figure 6 (G): Raw score of males for Domain 4: Getting along

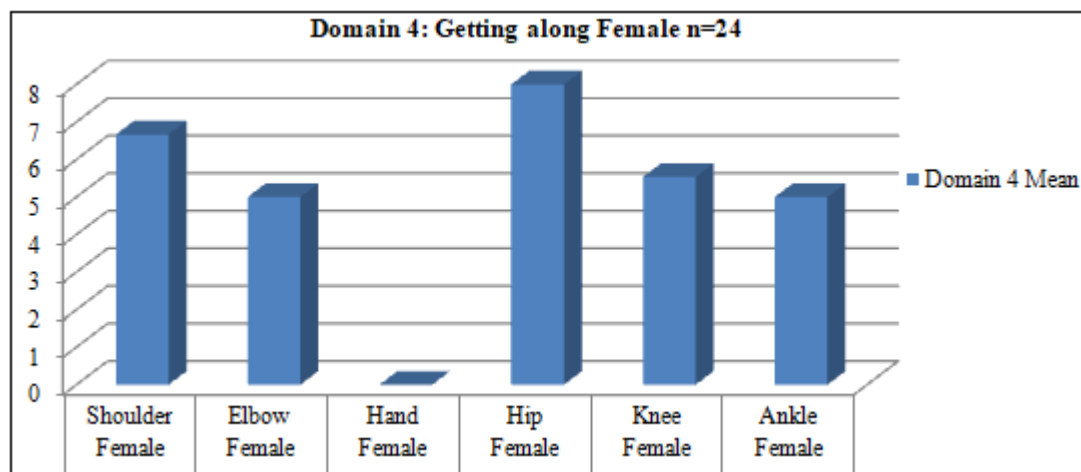


Figure 6 (H): Raw score of females for Domain 4: Getting along

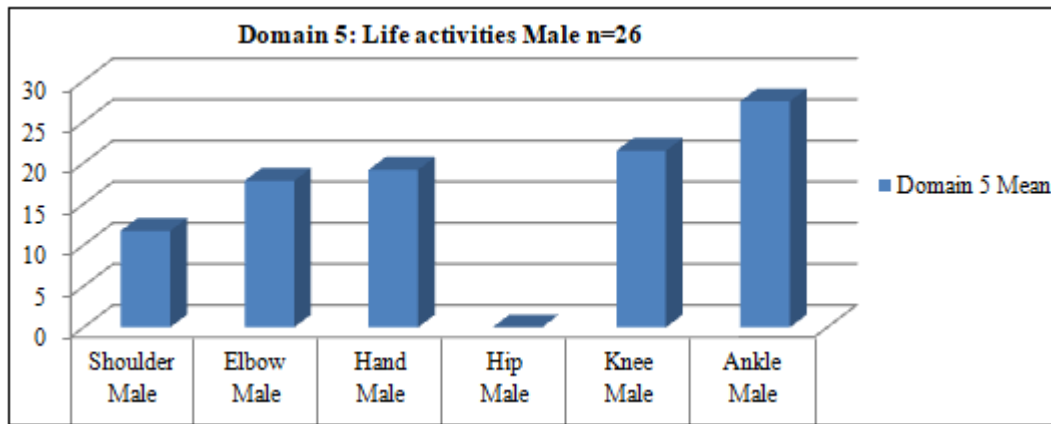


Figure 6 (I): Raw score of males for Domain 5: Life activities

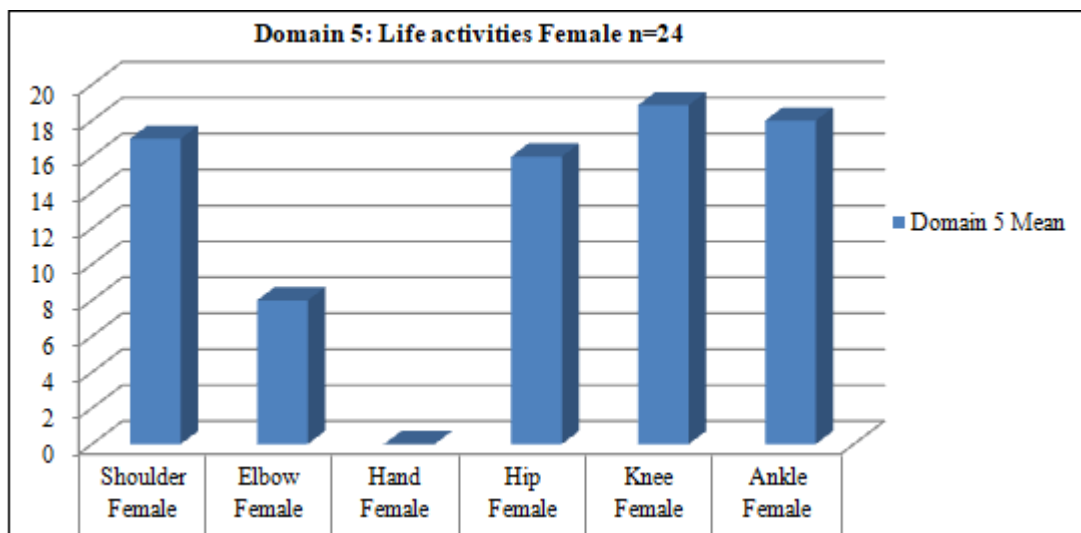


Figure 6 (J): Raw score of females for Domain 5: Life activities

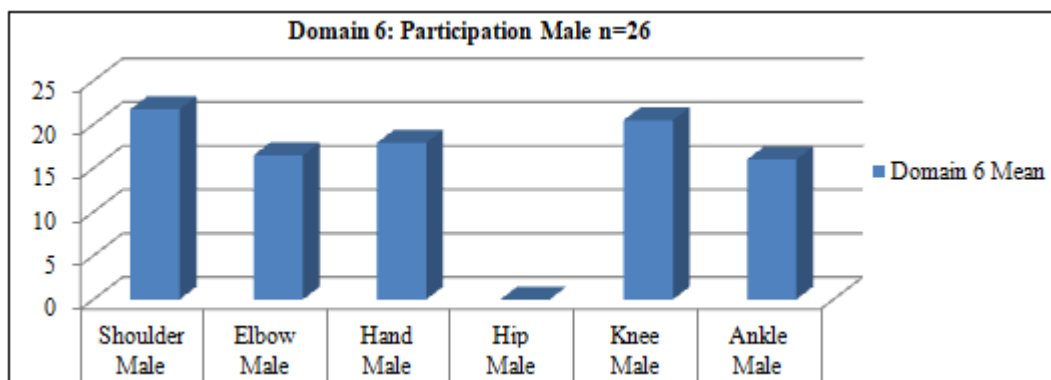


Figure 6 (K): Raw score of males for Domain 6: Participation

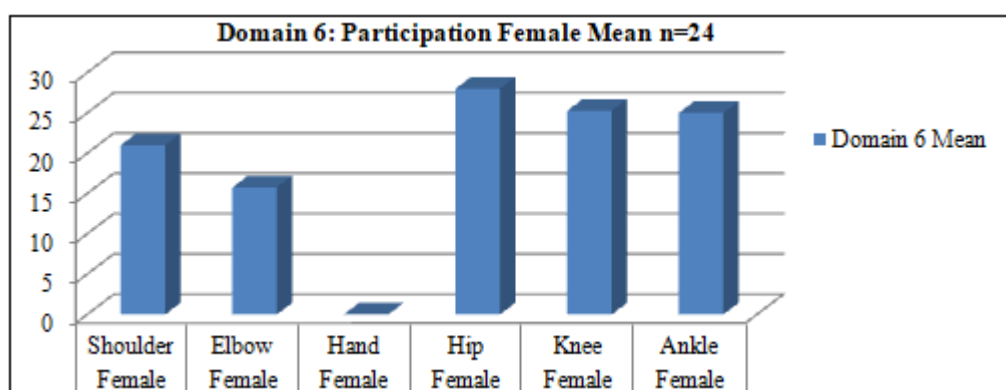


Figure 6 (L): Raw score of females for Domain 6: Participation