Development of a Questionnaire to Find Out the Prevalence of Musculoskeletal Disorders in Farmers of Gujarat

Bhavana Gadhavi, MPT[1], Dr. Yagana Shukla, PhD[2]

[1]Principal / Senior Lecturer, Ahmedabad Institute of Medical Sciences, Ahmedabad, Gujarat 380060, India

[2]Senior Lecturer, Govt . Physiotherapy College, Civil Hospital, Ahmedabad, India

Abstract: *Introduction: Musculoskeletal Disorders are the most common cause of severe long term pain, disability, and poor quality of life and reduced productivity. India is primarily an agrarian economy and despite the extensive mechanization of agricultural farming is still a physically demanding job. Because of the nature of work, farm workers are at particular risk of developing musculoskeletal disorders (MSDs). The common scale used for analysis ergonomic will not suffice the purpose of study considering the farming process and manual task so a new questionnaire was designed. Methods: The questionnaire was developed following item generation, item pooling, item analysis and final version. It was mandatory to translate in local language by cross cultural adaptation as the target population was farm workers. Concurrent validity was established by co relating WMSDQ with Standardised Nordic Questionnaire (SNQ) which shows that moderate to high correlation so WMSDQ can be replaced with SNQ for study. Internal consistency was established by running PCA and the value of CA (Cronbach's Alpha) for WMSDQ is 0.68 that interpreted the questionnaire is acceptable and reliable for target population. Conclusion: The new questionnaire is useful tool for ergonomic evaluation and to find out prevalence of WMSD in Farmers.*

Keywords: work related musculoskeletal disorders, questionnaire, validity, farm workers

1. Introduction

Musculoskeletal Disorders are prevalent in communities across the globe and their impact is pervasive which are the most common cause of severe long term pain, disability, and poor quality of life and reduced productivity and are currently reported to be affecting hundreds of millions of people around the world [1], [2]. India is primarily an agrarian economy as farming is one of the most important occupations in the country [2]. Farming is generally perceived, by both farmers and the general public, as a healthy outdoor occupation but the reality is that farming is a hazardous activity [3]. A number of studies have classified farming as a risky occupation. Because of the nature of farm work, farmers and farm workers are at particular risk of developing musculoskeletal disorders (MSDs) [3]-[5] such as osteoarthritis (OA) of the hip and knee, low back pain (LBP), neck and upper limb complaints, and hand-arm vibration syndrome [5],[6]. Despite the extensive mechanization of agricultural sector during the last 50 years, farming is still a physically demanding job for many farmers and generally been considered as a High risk occupations for musculoskeletal disorders, mainly owing to a high level of physical work exposure [7], [8]. Musculoskeletal disorders [MSD] are a diverse range of medical conditions that can result in inflammatory and degenerative effects on the bones, periarticular tissues, tendons , joints, blood vessels and surrounding peripheral nerves [9]. WMSD are often described as among the most important causes of pain and physical disability, affecting millions of workers around the world [9]. Symptoms may appear as a result of acute pain or discomfort following an activity, adapting to an awkward posture or as a result of intense physical exertion to which the person is unaccustomed resulting in strain, sprain or other biomechanical restriction. Questionnaires are one of the most common methods of data collection in the social sciences. Designing and implementing a survey is a systematic process of gathering information on a specific topic by asking questions of individuals and then generalizing the results to the groups represented by the respondents [4]. Questionnaires are research tools widely used in epidemiologic studies involving complaints of musculoskeletal discomfort and pain [5].

2. Need of Study

The prevalence of musculoskeletal discomfort (MSD) among Indian farm workers is not well documented. The common scale used for analysis of musculoskeletal system will not suffice the purpose of study considering the farming process and lack of mordernization and facilities in India. So it arises a need to design a new questionnaire to evaluate work-related factor and activities that may contribute to musculoskeletal symptoms and Disorders in farmers of Gujarat.

3. Method

Prescribed principles were been followed to design a new questionnaire
1) A structured Format of questionnaire is designed
2) Sequence of General to more specific questions was maintained.
3) Content is Clear and smoothly moving
4) Question Formation & wording is easily understood & convey one thought at one time.
5) The questionnaire was developed using following steps: 1. The items were generated. 2. Pooling and selection of the items were done. 3. Analysis and reduction of items were done. 4. The questionnaire was finalized [3].

3.1 Content validity

The WMSDQ for farmers consists of 37 questions on work factors that could contribute to musculoskeletal symptoms among farmers. It was designed considering different aspect like Years of farming ,types of crops grown, posture while performing manual activities during farming, period of rest, repetitions of task, incidence of musculoskeletal pain , its frequency , modification in task , parts to be affected, its relation with activities of farming and its progress . The questionnaire has three main section of information - Personal Detail, Occupational Detail – 10 questions related to occupation and MSD Detail - 25 questions related to MSD. A committee of 10 bilingual subject matter specialists (SMSs) evaluated the content validity by checking the title, clarity, relevance, comprehensiveness and format of the study. The SMSs made suggestions for the items that did not fulfill the established agreement level. Mongst 25 qustions , 8 questions were ambiguous so it was deducted. Final version by consensus was been approved and established by percentage of agreement at 90% and final version of 10 questions in occupational detail and 17 questions in MSD detail was finalized .

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3.2 Linguistic Validity

As the target population is farmers and farm workers, it was mandatory to translate in local language The translation and the back translation of the questionnaire were done by cross cultural adaptation that includes five stages: stage 1- **Translation in targe**t language: Bilingual translators whose mother tongue is the target language produce the two independent translations (t1 and t2). Stage – 2: **Synthesis of translation** .The two translators and a recording observer sit down to synthesize the results of the translations (T12version). Stage – 3: **Back translation**. Working from the T-12 version of the questionnaire and totally blind to the original version, a translator then translates the questionnaire back into the original language. This is a process of validity checking to make sure that the translated version is reflecting the same item content as the original versions. Stage- 4: **Expert committee.** The composition of this committee is crucial to achievement of cross-cultural equivalence. The committee has reviewed all the translations and reaches a consensus on any discrepancy. Stage- 5: **Test of the Prefinal Version.** The final stage of adaptation process is the pretest. This field test of the new questionnaire seeks to use the prefinal version in subjects from Ideally, between 30 and 40 persons should be tested so pretest was done on51 subjects to analyse sensitivity and further validity [12].

3.3 Concurrent validity

Fifty one Farmers who filled a WMSD Questionnaire also completed the NORDIC Questionnaire. Amongst 51, 46 subjects reported musculoskeletal pain in which maximum have reposted in low back than knee, shoulder and neck
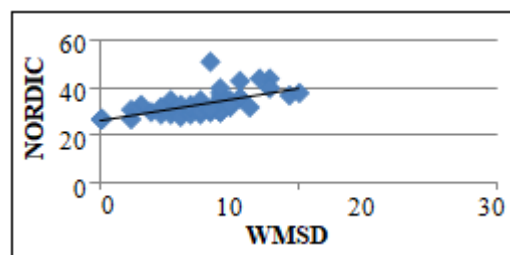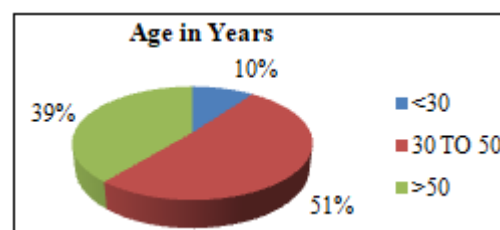

4. Results

To quantify the data collected by qualitative analysis ideally 20 sample per questions has to be taken but it is been considered generally that 4 sample per question is enough to establish the validity. By keeping 95% CI range for interpretation of qualitative data, a total of 200 samples were taken, 100 each for two different regions. The Range for correlation was obtained by the formula Mean $\pm 1.96 \times$ SD, Which in turn was 19.15 ± 10.74, so the range for correlation of WMSDQ is 8.4 to 29.9. By using principal components analysis (PCA). questions that measure the same component were load onto the same factors. Thus three different components were assessed for 200 samples, in which 11 questions deals with pain and discomfort, 4 questions for activity and work and 1 question was for treatment and relief. And accordingly questions were divided in to three subsections.
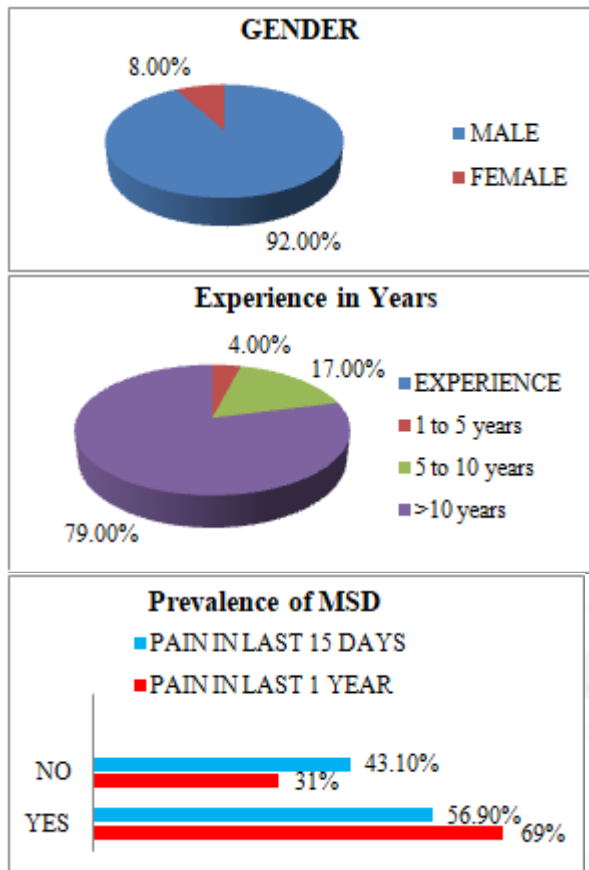
4.1 Reliability by Internal Consistency

A standard test of internal consistency is Cronbach's Alpha (CA). The range is from 0 – 1.0. In most cases the value should be at least 0.70 or higher although a value from 0.60 to 0.70 is acceptable. By formula the CA value of WMSDQ is 0.68 that interpreted the questionnaire is acceptable and reliable for target population but for higher reliability some questions can be removed with almost same interpretation. The Pearson correlation coefficient test was used to assess concurrent validity because data had a normal distribution. Amongst 51, 46 subjects reported musculoskeletal pain in which maximum have reposted in low back than knee, shoulder and neck Pearson correlation coefficient (r) = 0.654 which signifies that there is moderate to high correlation between both the tool.

4.2 Results of Pilot Study

Data was analyzed in MICROSOFT EXCEL for age and gender distribution, years of experience, prevalence of MSD.

GENDER

Experience in Years

Prevalence of MSD

study population. The improved and validated interventions to reduce exposures and to improve the health of farmers and farm workers [9].

There is 69% (high prevalence) of MSD in farmers of north Gujarat which is supported systematic review identified the prevalence of MSDs by body region in farmers and established that LBP was the most common MSD, followed by upper and then lower extremity MSDs , the prevalence of MSDs in farmers is greater than in non-farmer populations [7].

High prevalence of Back pain is supported by a study done on farmers of west Bengal, which says 48.8% of farmers involved in rice cultivation has back pain mainly during reaping activities [9].

6. Conclusion

This was perceived by farmers who took part in study that the new questionnaire described their problems more precisely than standard tool used. It was easy for the farmers to use this questionnaire and is a valid tool for the assessment of WMSD in Farmers. It will be useful for ergonomic evaluation as well as to find risk and prevalence of WMSD in Farmers. There is high prevalence of WMSD in farmers of north region of Gujarat and in more experienced workers. Most affected age group is middle aged men so preventive measures should be taken care of.

5. Discussion

There is no "gold standard" measurement tool for estimating the prevalence of MSDs along with ergonomic factors in farmers and thus a new questionnaire was designed.

The word farmer including farm workers, migrant farm workers, farm employees, farm employers, farm residents. Farm workers are exposed to a variety of physical hazards. As a group, they are at particular risk of accidental injury and certain categories of MSD. Musculoskeletal disorders may disproportionately affect farm workers due to the types of farm tasks performed. Awareness of farmers' needs are growing among providers of occupational health and safety services.

The actual work of the farmers was not correlated well in the Standardised Nordic questionnaire which may have resulted into high scores indicating greater prevalence of MSDs. In addition, several of the domains of the WMSD Questionnaire are not covered in NORDIC questionnaire like work nature , work posture & work intensity. Leonard Joseph Henry in 2013 assessed outcome by Standard Nordic Musculoskeletal Questionnaire (SNMQ) and Quick Exposure check (QEC) for work-related musculoskeletal disorders (WRMDs) in palm plantation workers and concluded that QEC checks risk for WMSD better than SNMQ [8] which shows that detailed analysis is needed by proper tool. . Thus in our study, the WMSD questionnaire for farmers was developed and its validity and reliability were determined and described to assess detailed ergonomic factors realted to WMSD in farmers. Fagarsanu and kumar recommended in their study that questionnaire should be suitable for study design and

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Author Profile

Dr Bhavana Gadhavi received Bachelor of Physiotherapy from School of physiotherapy, SSG hospital, MS University, Baroda in 1994 and Master of Physiotherapy musculoskeletal conditions) from CCS University, Meerut , UP, India in 2009. She is PhD scholar from Gujarat University, Ahmedabad. Write now she is working as a senior lecturer since 2008 and Principal at Ahmedabad Institute of Medical Sciences, Ahmedabad since last 6 years.