

**UJI VALIDITAS DAN RELIABILITAS NORDIC  
MUSCULOSCELETAL QUESTIONNAIRE (NMQ)  
UNTUK PEKERJA KERAH BIRU**

***VALIDITY AND RELIABILITY TEST OF NORDIC  
MUSCULOSCELETAL QUESTIONNAIRE (NMQ)  
FOR BLUE-COLLAR WORKER***

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**ABSTRAK**

*Gangguan muskuloskeletal mempengaruhi produktivitas kerja pekerja industri manufaktur, khususnya garmen. Nordic Musculoskeletal Questionnaire (NMQ) dapat berfungsi sebagai instrumen identifikasi atau penilaian risiko yang harus penuh dengan persyaratan validitas dan reliabilitas. Validitas dan reliabilitas pekerja kerah biru versi Nordik Muskuloskeletal Questionnaire (NMQ) versi Indonesia merupakan kelanjutan dari validitas sebelumnya di Indonesia. Penelitian ini bertujuan untuk mendapatkan validitas dan reliabilitas Nordic Musculoskeletal Questionnaire (NMQ) dalam Bahasa Indonesia yang dapat digunakan untuk pekerja kerah biru. Kuesioner terjemahan menyederhanakan kata-kata dalam kalimat dan bahasa melalui panel diskusi ahli. Kuesioner telah diuji untuk mengetahui uji korelasi dan validitas antar butir, kemudian diuji reliabilitasnya dengan teknik pengukuran yaitu dalam waktu 7 hari untuk mendapatkan nilai Alpha Chronbach. Penelitian ini dianalisis dengan menggunakan SPSS 20 untuk hasil akhir. Penelitian menunjukkan bahwa responden yang memiliki latar belakang pendidikan maksimal SMA memberikan nilai validitas angket adalah mayoritas skor kuat (0,600 – 0,777) dan hasil angket uji reliabilitas pada penelitian pertama dan kedua memiliki nilai Alpha Cronbach yang hampir sama tingginya (0,965 – 0,966) dan berarti sangat reliabel.*

**Kata kunci:** *Nordic Musculoskeletal Questionnaire (NMQ), Validity Test, Reliability Test, Blue Collar Worker.*

**ABSTRACT**

*Musculoskeletal disorder affects work productivity of manufacturing industry workers, especially garment. Nordic Musculoskeletal Questionnaire (NMQ) can serve as an identification instrument or risk assessment that must be full of validity and reliability requirements. Validity and reliability of the Nordic Musculoskeletal Questionnaire (NMQ) Indonesian version of the blue collar worker is a continuation of previous validity in Indonesia. The research is aimed to get the validity and reliability of Nordic Musculoskeletal Questionnaire (NMQ) in Indonesian Language that can be used for blue collar worker. The translation questionnaire simplified the words in the sentence and language*

through a panel of expert discussion. The questionnaire has been tested to determine the inter-items correlation and validity test, then tested the reliability with the measuring technique that is within 7 days to get the value of Chronbach's Alpha. The research was analyzed by using SPSS 20 for final result. The research showed that respondents who have maximum education background of high school give the validity value of the questionnaire is the majority of the strong score (0.600 - 0.777) and the results of the reliability test questionnaire in the first and the second research has Cronbach's Alpha value of almost the same equally high (0.965 - 0.966) and means it is very reliable. The Nordic Musculoskeletal Questionnaire (NMQ) in Bahasa Indonesia is valid and reliable to be used among blue collar worker.

**Keywords:** Nordic Musculoskeletal Questionnaire (NMQ), Validity Test, Reliability Test, Blue Collar Worker.

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## **INTRODUCTION**

Report from the International "Blue Collar Worker" Office (ILO), 2009 case of musculoskeletal is one of the failures from the application of ergonomics in the workplace. Musculoskeletal disorders can makes low productivity of labor, causing about 34% of annual lost working time. Musculoskeletal contribute 7% of the overall loss of productivity. Knowing about the initial screening or as a screening for musculoskeletal complaints felt by workers can use Nordic Musculoskeletal Questionnaire (NMQ) (Dawson *et al.* 2009). Measurement methods by using this questionnaire can be done quickly, concisely, practically and sparingly through fulfill it by the workers-self, as well as interview. However the column form presented in this questionnaire seems to be a bit confusing and difficult to understand directly and quickly. The respondent or worker who will fill this questionnaire requires a better level of understanding and high concentration to be able and answer all questions properly and appropriately perfect (Brondino *et al.* 2020). Basically the instrument must fill the requirements of validity and reliability (reliable). The use of NMQ that has not been so popular in Indonesia can still be extended to other advanced research on "Blue Collar Worker" type through proving their validity and reliability in that population first (ILO 2009).

Manufacturers in the manufacturing industry, especially garment, clothing, pants, and others are generally dominated by women. This worker belongs to the category of Blue Collar Worker with an educational level that usually has a lower tendency than the White Collar Worker category..

## **METHODS**

### **Design**

The research design used was observational with cross sectional study. Place of research in garment manufacturing industry PT. B in JIEP Pulogadung Industrial Estate Jakarta with data retrieval time March - April 2017. Research subjects are all workers who meet the criteria of inclusion and exclusion.

Inclusion Criteria were workers are willing and agree to participate in the research by filling out and signing the consent form (Informed Consent), workers whose level of education or diploma last high school or equivalent, workers who do a minimum of 8 hours per day or 40 hours per week. While exclusion Criteria were, workers who have congenital or spinal deformities, workers who have a history of trauma and spine surgery, and workers who are pregnant

### **Instrument.**

The instrument used in this study is the simplified version of the Indonesian version of the Nordic Musculoskeletal Questionnaire (NMQ) (Crawford 2007), which is the result of an expert panel discussion with a re-validated first for the "Blue Collar Worker" worker group . Questionnaire filling is done in 2 stages at 2 different times, 1 week or 7 days. The dependent variable is the score of the questionnaire of the simplified language version of the Nordic Musculoskeletal Questionnaire (NMQ) questionnaire. The independent variables are age, BMI, last education, unit or part of work or type of work performed, length of service to the unit or part, years of work in the company in years and years of work in hours per week.

How to work in this research is the researchers to evaluate and analyze with 4 experts or experts in expert panel discussions on the Nordic Musculoskeletal Questionnaire (NMQ) questionnaire previously translated by earlier researchers to be simplified to be easily understood by respondents. The researchers then sent an electronic message requesting permission to the institution issuing the copyright of the Nordic Musculoskeletal Questionnaire (NMQ) questionnaire to be validated in Bahasa Indonesia and the reliability of the "Blue Collar Worker" worker as requested data of all workers in the company. Then do proportional random sampling for sampling respondents and arrange scheduling for the implementation of research with the company. The study was conducted 2 times at different times, which is about 7 days or 1 week. Finally, the researcher performs data analysis processed using SPSS 20.0 program.

### **RESULT**

The study was followed by 204 respondents conducted on Wednesday, March 29, 2017 and Wednesday, April 5, 2017. The most respondents with age above 35 years old are 106 employees. Education majority respondents are SMA - SMK - STM 113 people (55.4%) with normal nutrition counted 86 people (42.2%). Most respondents were from units or production sections of 152 people (74.5%), with those who worked more than 5 years ( $> = 61$  months) in units or sections of 120 people (58.5%) and on average had more than 10 year ( $> = 121$  months) 106 people (52%) and working hours  $\leq 40$  hours dominated 87.3% of this study.

In the table is presented a description of the original English NMQ questionnaire coexist with NMQ translation in Indonesian by translator and NMQ the final result of expert panel discussion. The questionnaire used in this study is a questionnaire that has been agreed upon from the results of experts panel discussion, with the adjustment of words - words and sentences explanations and questions that are considered to be understood by respondents who are workers "blue collar worker".

<b>Original Questionnaire</b>	<b>Translated Questionnaire Result of Translator</b>	<b>The Final Questionnaire Results of Panel Expert Discussion</b>
Now to answer the questionnaire : Please answer buy putting across in the appropriate box –	Cara mengisi kuesioner : Jawablah dengan memberi tanda silang di kotak yang	<b>Instruksi cara mengisi kuesioner :</b>

Original Questionnaire	Translated Questionnaire Result of Translator	The Final Questionnaire Results of Panel Expert Discussion
<p>one cross for each question. You may be in doubt as to how to answer, but please do your best anyway. Please answer every question even if you have never had trouble in any part of your body.</p> <p>In this picture you can see the approximate position of the parts of the body referred to in the questionnaire. Limits are not sharply defined, and certain parts overlap. You should decide for yourself in which part you have or have had your trouble (if any)</p> <p>Have you at any time during the last 12 months had trouble (such as ache, pain, discomfort, numbness) in :</p> <p>Have you had trouble during the last 7 days ?</p> <p>During the last 12 months, have you been prevented from carrying out normal activities (eg. job, housework, hobbies) because of this trouble.</p>	<p>tepat – satu tanda silang untuk setiap pertanyaan. Anda mungkin ragu mengenai cara menjawab, mohon diusahakan dapat mengisi dengan sebaik – baiknya. Jawablah setiap pertanyaan, walaupun Anda tidak pernah menghadapi masalah di bagian tubuh mana pun.</p> <p>Pada gambar, Anda dapat melihat dimana kira – kira posisi bagian tubuh yang disebutkan di dalam kuesioner ini. Batas – batasnya tidak tegas, dan bagian tubuh tertentu bertumpang tindih. Anda harus memutuskan sendiri bagian tubuh yang Anda rasakan pernah atau kini sedang bermasalah (jika ada).</p> <p>Pernahkah Anda di dalam 12 bulan terakhir mengalami masalah ( misalnya sakit, nyeri, rasa tidak nyaman, mati rasa)</p> <p>Pernahkah Anda mengalami masalah selama 7 hari terakhir ?</p> <p>Selama 12 bulan terakhir, pernahkah Anda terhalang dari menjalani aktivitas sehari – hari (misalnya : kerja kantor, kerja rumah, hobi) karena masalah ini ?</p>	<p><b>1. Pilihlah keadaan ( A / B / C ) yang sesuai dengan apa yang Anda rasakan</b></p> <p><b>2. Jawablah pertanyaan di bawahnya dengan jujur sesuai dengan apa yang Anda rasakan</b></p> <p><b>Mohon mengisi dengan jujur sesuai apa yang Anda rasakan.</b></p> <p><b>Perhatikan gambar di atas. Anda dapat melihat posisi bagian tubuh yang ada masalah.</b></p> <p><b>A. Dalam 12 bulan terakhir,</b> Apakah Anda pernah mengalami masalah (misalnya sakit, nyeri, rasa tidak nyaman, mati rasa / kebas / baal, dll) ?</p> <p><b>B. Dalam 7 hari terakhir,</b> Apakah Anda pernah mengalami masalah (misalnya sakit, nyeri, rasa tidak nyaman, mati rasa / kebas / baal, dll) ?</p> <p><b>C. Dalam 12 bulan terakhir,</b> Apakah ada hambatan dalam melakukan aktivitas sehari – hari (misalnya kerja kantor, kerja rumah, hobi) karena masalah ini ?</p> <p>Tambahan keterangan sebagai penjelasan gambaran tabel :                  Setiap kolom A, B dan C terdapat nomor dengan lokasi tubuh                  1, 2, 3 Leher                  4, 5, 6 Bahu                  7, 8, 9 Sikut                  10, 11, 12 Pergelangan / Tangan                  13, 14, 15 Punggung atas                  16, 17, 18 Punggung bawah (Pinggang)                  19, 20, 21 Di salah satu atau kedua panggul / paha /</p>

uji validitas dan reliabilitas nordic musculoskeletal questionnaire (nmq) untuk pekerja kerah biru (Lily K. Burkon)

Original Questionnaire	Translated Questionnaire Result of Translator	The Final Questionnaire Results of Panel Expert Discussion
		bokong 22, 23, 24 Lutut 25, 26, 27 Salah satu atau kedua pergelangan / kaki
<p><b>NECK</b></p> <p>How to answer the questionnaire : By neck trouble is meant ache, pain or discomfort in the shaded area. Please concentrate on this area, ignoring any trouble you may have in adjacent parts of the body. There is a separate questionnaire for shoulder trouble.</p> <p>Please answer but putting across in the appropriate box – one cross for each question. You may be in doubt as to how to answer, but please do your best anyway.</p>	<p><b>LEHER</b></p> <p>Cara mengisi kuesioner : Masalah leher berarti sakit, nyeri, atau rasa tidak nyaman di daerah berarsir. Mohon pusatkan perhatian Anda pada masalah daerah ini dengan mengabaikan setiap masalah yang mungkin Anda rasakan di bagian tubuh yang berdekatan. Ada kuesioner tersendiri untuk masalah bahu. Jawablah dengan memberi tanda silang di kotak yang tepat – satu tanda silang untuk setiap pertanyaan. Anda mungkin ragu mengenai cara menjawab, mohon diusahakan dapat mengisi dengan sebaik – baiknya.</p>	<p><b>LEHER</b></p> <p><b>Perhatikan masalah pada leher : sakit, nyeri, atau rasa tidak nyaman di daerah berarsir pada gambar di sebelah.</b></p> <p><b>Pilih sesuai dengan apa yang Anda rasakan.</b></p> <p>Tambahan keterangan sebagai penjelasan : Leher disingkat L terdapat 8 pertanyaan</p>
<p><b>SHOULDER</b></p> <p>How to answer the questionnaire : By shoulder trouble is meant ache, pain or discomfort in the shaded area. Please concentrate on this area, ignoring any trouble you may have in adjacent parts of the body. There is a separate questionnaire for neck trouble.</p> <p>Please answer but putting across in the appropriate box – one cross for each question. You may be in doubt as to how to answer, but please do your best anyway.</p>	<p><b>BAHU</b></p> <p>Cara mengisi kuesioner : Masalah bahu adalah sakit, nyeri atau tidak nyaman di daerah berarsir. Mohon pusatkan perhatian Anda pada masalah daerah ini dengan mengabaikan setiap masalah yang mungkin Anda rasakan di bagian tubuh yang berdekatan. Ada kuesioner tersendiri untuk masalah leher. Jawablah dengan memberi tanda silang di kotak yang tepat – satu tanda silang untuk setiap pertanyaan. Anda mungkin ragu mengenai cara menjawab, mohon diusahakan dapat mengisi dengan sebaik – baiknya.</p>	<p><b>BAHU</b></p> <p><b>Perhatikan masalah pada bahu : sakit, nyeri, atau rasa tidak nyaman di daerah berarsir pada gambar di sebelah.</b></p> <p><b>Pilih sesuai dengan apa yang Anda rasakan.</b></p> <p>Tambahan keterangan sebagai penjelasan gambaran tabel : Bahu disingkat BH terdapat 9 pertanyaan dengan nomor pertanyaan kelanjutan dari nomor pertanyaan pada leher</p>
<b>LOW BACK</b>	<b>PUNGGUNG BAWAH</b>	<b>PUNGGUNG BAWAH</b>

Original Questionnaire	Translated Questionnaire Result of Translator	The Final Questionnaire Results of Panel Expert Discussion
<p>How to answer the questionnaire : In this picture you can see the approximate position of the part of the body referred to the questionnaire. By low back trouble is meant ache, pain or discomfort in the shaded area wheather or not it extends from there to one or both legs (sciatica). Please answer but putting across in the appropriate box – one cross for each question. You may be in doubt as to how to answer, but please do your best anyway.</p>	<p>Cara mengisi kuesioner : Pada gambar, Anda dapat melihat dimana kira – kira posisi bagian tubuh yang disebutkan di dalam kuesioner ini. Masalah punggung bawah adalah sakit, nyeri atau tidak nyaman di daerah berarsir. Apakah menjalar dari daerah itu ke salah satu atau kedua paha (skiatika) atau tidak. Jawablah dengan memberi tanda silang di kotak yang tepat – satu tanda silang untuk setiap pertanyaan. Anda mungkin ragu mengenai cara menjawab, mohon diusahakan dapat mengisi dengan sebaik – baiknya.</p>	<p><b>Perhatikan masalah pada punggung bawah : sakit, nyeri, atau rasa tidak nyaman di daerah berarsir pada gambar di sebelah.</b></p> <p><b>Pilih sesuai dengan apa yang Anda rasakan.</b></p> <p>Tambahan keterangan sebagai penjelasan : Punggung bawah disingkat P terdapat 8 pertanyaan dengan nomor pertanyaan yang mengulang dari awal kembali</p>
<p>1. Have you ever had neck/ shoulder / low back trouble (ache, pain or discomfort) ? 1. No 2. Yes</p>	<p>1. Pernahkah Anda mengalami masalah leher / bahu / punggung bawah (sakit, nyeri atau rasa tidak nyaman) ? 1. Tidak 2. Ya</p>	<p>1. Pernahkah Anda mengalami masalah leher / bahu / punggung bawah (sakit, nyeri, atau rasa tidak nyaman) ? 1. Tidak 2. Ya</p>
<p>If you answered NO to question 1, do not answer questions 2 – 8</p>	<p>Jika Anda menjawab “TIDAK” atas pertanyaan 1, JANGAN jawab pertanyaan 2 – 8</p>	<p>Jika Anda menjawab “<b>Tidak</b>” pada pertanyaan 1, <b>jangan jawab</b> pertanyaan 2 – 8</p>
<p>2. Have you ever hurt your neck/ shoulder / low back in an accident ? 1. No 2. Yes</p>	<p>2. Pernahkah leher / bahu / punggung bawah Anda cedera dalam suatu kecelakaan ? 1. Tidak 2. Ya</p>	<p>2. Pernahkah leher / bahu / punggung bawah Anda cedera dalam suatu kecelakaan ? 1. Tidak 2. Ya</p>
<p>3. Have you ever had to change jobs or duties because of the neck/ shoulder / low back trouble? 1. No 2. Yes</p>	<p>3. Pernahkah Anda terpaksa berganti pekerjaan atau tugas karena masalah leher / bahu / punggung bawah ? 1. Tidak 2. Ya</p>	<p>3. Pernahkah Anda terpaksa berganti pekerjaan atau tugas karena masalah leher / bahu / punggung bawah ? 1. Tidak 2. Ya</p>
<p>4. What is the total length of time that you have had neck/ shoulder / low back trouble during the last 12 months ? 1. 0 days 2. 1 – 7 days 3. 8 – 30 days</p>	<p>4. Berapa lamakah total Anda mengalami masalah leher / bahu / punggung bawah selama 12 bulan terakhir ? 1. 0 hari 2. 1 – 7 hari 3. 8 – 30 hari</p>	<p>4. Berapa lamakah waktu total Anda mengalami masalah leher / bahu / punggung bawah selama 12 bulan terakhir ? 1. 0 hari 2. 1 – 7 hari 3. 8 – 30 hari</p>

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Original Questionnaire	Translated Questionnaire Result of Translator	The Final Questionnaire Results of Panel Expert Discussion
4. More than 30 days, but not everyday 5. Everyday	4. Lebih dari 30 hari, namun tidak setiap hari 5. Setiap hari	4. Lebih dari 30 hari, namun tidak setiap hari 5. Setiap hari
If you answered 0 days to question 4, do not answer the questions 5 – 8	Jika Anda menjawab “0 hari” atas pertanyaan 4, JANGAN jawab pertanyaan 5 – 8	Jika Anda menjawab “0 hari” pada pertanyaan 4, <b>jangan jawab</b> pertanyaan 5 – 8
5. Has neck/ shoulder / low back trouble caused you to reduce your activity during the last 12 months ? a. Work activity (at home or away from home) ? 1. No 2. Yes b. Leisure activity 1. No 2. Yes	5. Pernahkah masalah leher / bahu / punggung bawah membuat Anda mengurangi aktivitas selama 12 bulan terakhir ? a. Aktivitas Kerja (di rumah atau di luar rumah) ? 1. Tidak 2. Ya b. Aktivitas Hobi di waktu senggang ? 1. Tidak 2. Ya	5. Pernahkah masalah leher / bahu / punggung bawah membuat Anda mengurangi aktivitas selama 12 bulan terakhir ? a. Aktivitas kerja (di rumah atau di luar rumah) ? 1. Tidak 2. Ya b. Aktivitas hobi di waktu senggang ? 1. Tidak 2. Ya
6. What is the total length of the time that neck/ shoulder / low back trouble has prevented you from doing your normal work (at home or away from home) during the last 12 months ? 1. 0 days 2. 1 – 7 days 3. 8 – 30 days 4. More than 30 days	6. Berapa lamakah waktu total Anda terhalang dari mengerjakan aktivitas sehari – hari (di rumah atau di luar rumah ) akibat masalah leher / bahu / punggung bawah selama 12 bulan terakhir ? 1. 0 hari 2. 1 – 7 hari 3. 8 – 30 hari 4. Lebih dari 30 hari	6. Berapa hari waktu total Anda terhambat dari mengerjakan aktivitas sehari – hari (di rumah atau di luar rumah) akibat masalah leher / bahu / punggung bawah selama 12 bulan terakhir ? 1. 0 hari 2. 1 – 7 hari 3. 8 – 30 hari 4. Lebih dari 30 hari
7. Have you been seen by a doctor, physiotherapist, chiropractor, or other such person because of neck/ shoulder / low back trouble during the last 12 months ? 1. No 2. Yes	7. Pernahkah Anda diperiksa seorang dokter, ahli fisioterapi, ahli kiropraksi, atau ahli sejenis akibat masalah leher / bahu / punggung bawah selama 12 bulan terakhir ? 1. Tidak 2. Ya	7. <b>a. Apakah Anda melakukan pengobatan alternatif, misal pijat, urut, bekam atau lainnya akibat masalah leher / bahu / punggung bawah selama 12 bulan terakhir ?</b>  <b>1. Tidak</b> <b>2. Ya</b> <b>b. Apakah Anda melakukan pengobatan medis oleh dokter atau ahli fisioterapi akibat masalah leher / bahu / punggung</b>

Original Questionnaire	Translated Questionnaire Result of Translator	The Final Questionnaire Results of Panel Expert Discussion
		<b>bawah selama 12 bulan terakhir ?</b> <b>1. Tidak</b> <b>2. Ya</b>
8. Have you had neck/ shoulder / low back trouble at anytime during the last 7 days ? 1. No 2. Yes	8. Pernahkah Anda mengalami masalah leher / bahu / punggung bawah selama 7 hari terakhir ? 1. Tidak 2. Ya	8. Pernahkah Anda mengalami masalah leher / bahu / punggung bawah selama 7 hari terakhir ? 1. Tidak 2. Ya

The results of the questionnaire validity test in this study dominated strongly. The validity test is done gradually by assessing 58 overall question items initially. Then the results obtained 13 item of questions in the study of invalid (value  $r < 0.3$ ). Furthermore, an analysis of the invalid question items is obtained, 6 items of questions that cannot be maintained again because the question is independent or not correlated with other questions. While the 7 items of questions maintained are the types of questions that correlate with other questions and the question also assess the elements of Indonesian culture and cultural influences in addressing and taking decisions on daily actions when feeling pain or pain or certain complaints. In the end, there were only 52 question items that could be assessed and used for the recommendation of using this NMQ questionnaire.

Comparison of test reliability test-retest test conducted by filling in 2 different time, that is within 7 days, obtained Cronbach's Alpha value from each item statement tended to be almost equally high that is 0.965 - 0.966. This means that the NMQ questionnaire is reliable.

## DISCUSSION

In this study the analysis conducted by the researcher is the assessment of the validity and reliability of the final questionnaire results from the expert panel discussion on the questionnaire filling done by the respondents with the maximum education level of high school or equivalent working in the company and commonly known as workers "blue collar worker". On the first sheet of NMQ looks how to submit instructions on filling out the questionnaire sheet of the final result of expert panel discussion in more detail so that it can be instantly read and understood by the respondent. Then the 3 columns contained in the sheet are classified by giving the alphabetical code A, B and C.

The specification of the time the complaint is felt is thickened with the expectation of the respondent better understood and more accurately on the answers to be given from each question. Instructions for each part of the body (neck, shoulders and lower back) are summarized to be simpler back to facilitate the respondents to read and understand (Kumagai *et al.* 2021). So are the words of the interlocking questions that are reinforced to explain that if the previous question is answered no then the respondent is not required to answer the next question. Questions on each part of the body are essentially the same, there is only 1 difference in the shoulder body part in the addition of a complaint question over the last 12 months with the right or left shoulder position or both as one of the answers.

Next to the specific questionnaire of the neck, shoulders and lower back that have the same question, there is one question that has significant changes, namely question number 7 on the neck and lower back and number 8 on different shoulders due to the addition of questions in this section.



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The translation of the question into 2 smaller sections is expected to broaden the understanding of the actions taken by respondents in overcoming the problem of pain complaints. Cultural and customary tendencies have a profound influence in determining the steps and views of their communities when making decisions (Shavitt and Barnes 2020).

The original questionnaire and previous English translations (Dawson *et al.* 2009) were only questioned by physicians, physiotherapists, chiropractors or similar experts due to problems over the past 12 months, but the results of the panel's panel of expert discussions were spelled out into 2 more specific questions, namely treatment treatment alternatives such as massage, massage, cupping or other then on the next point is questioned step of medical treatment by doctor or physiotherapist. So the answer given by the respondents depends on the cultural characteristics of the Indonesian people who usually prefer to use alternative medicine first before doing an accurate medical examination. Changes in the order of the questions to be more specific by the experts are appropriate when used for respondents as in this study the workers "blue collar worker".

The results of the analysis concluded that the simplification of the translation of the Indonesian language questionnaire showed maximum results and satisfactory. Changes that occur in the final questionnaire results of expert panel discussion looks at the narrative of the delivery of sentence questions with the beginning of instructions and images more understandable and clear understanding. This is certainly very helpful and facilitate the respondents who have the ability to catch and less understanding to be able to better understand and understand how to fill the questionnaire. Thus the questionnaire in Bahasa Indonesia which has been simplified from the expert panel discussion can be used in this study because it already has the composition of words in sentences or words used in the questionnaire can be understood and has been in accordance with the characteristics of workers at the level of "blue collar worker " (Decius *et al.* 2021).

The characteristics of respondents who are highly regarded is based on the level of education because it can affect understanding and appreciation of explanations and questions in the questionnaire for filling. The majority of respondents have high school level or equivalent (SMK or STM), so tend to better understand the questionnaire question and make the respondent can fill the questionnaire well and consistently. In this study female respondents more than men and age who dominate is 35 years and over with normal nutritional levels based on IMT scale. Production (factory) holds the largest number of 152 people (74.5%) of the total respondents. Respondents studying on average have worked in the company for more than 10 years ( $\geq 121$  months). The length of work in their part was the majority over 5 years ( $\geq 61$  months) with working hours  $\leq 40$  hours 87.3% of the total respondents.

The validity test is done gradually by assessing 58 overall question items initially from each time of the research. Then the results obtained 13 items of invalid questions (value  $r < 0.3$ ). Furthermore, an invalid item questionnaire was analyzed by 6 items that could not be retained because the questions were not correlated with other questions. While the other question items that are maintained are the types of questions that correlate with other questions and the question also assessed the elements of the habits and cultural influences of the Indonesian nation in addressing and taking decisions on daily actions when feeling pain or pain or certain complaints.

Based on the results of the questionnaire validity test, we get 5 b, neck 7 b, shoulder 14 b, shoulder 16 b, and lower back 5 b, 7 a, and 7 b are the question items that are still maintained. However it requires a review to be able to modify the question. This may be able to change the order or order of words in the sentence or given a more detailed explanation of the meaning of the word that still raises a double meaning (ambiguous) so as not to confuse respondents to answer or provide meaning (meaning) a lot. In the first study there are 33 items of questions that have a strong  $r$  value and means the items in the questionnaire have been in accordance with the understanding of respondents in filling the answers. The strongest strong  $r$  score is in question number 13 (How long did you have total shoulder problems during the last 12 months?) With a value of  $r 0.777$ . While the weak  $r$  value can be seen in question column A number 7 but the question is obtained valid value of

0.360. Item question that must be maintained because the question is continuous with other questions (independent or dependent). A strong  $r$  value indicates the validity of the item is very valid and is an expression of the respondent's understanding of the meaning of the questionnaire question items that can be stated as appropriate to the ability of respondents to answer and understand the meaning of the question. While the value of  $r$  being actually also means validity of the question item has been valid although not more powerful than the strong  $r$  value in answering the questionnaire by the respondent. The weak value of  $r$  in this study may mean that the grain of the question is poorly understood by the respondent and may also tend to be missed or ignored in the filling selected by the respondent (Dhiman 2019). The test results of questionnaire validity are strongly dominated and 52 question items are declared valid for recommended use .

The results of the reliability test in this study assess the consistency of respondents' answers from 2 times filling the same questionnaire conducted by respondents who are also the same within a period of 7 days. Cronbach's Alpha values were obtained at two tests of 0.965 and 0.966, which means that the whole item is very reliable. Based on the observation of the researcher to get the consistency of respondents in filling the questionnaire, it needs a good understanding of the respondents in reading carefully and thoroughly every fill instruction and the question field according to the perceived by the respondent. In addition, repetitive item items in different sections (neck, shoulders and lower back) can make it easier for respondents to understand questions more quickly and accurately. Repetition of words in sentences and changes only to the location of the complaint makes this reliability test value to be high. This research is done by re-measuring technique, 7 days time is enough time for the respondent to recall the first research questionnaire at the second research visit.

The research process that still can not be implemented and applied in this research is recommendation of using 52 items of valid question to be translated back (back translate) result of expert panel discussion questionnaire in the form of English again. Then assessed and evaluated the suitability of the meaning of the original questionnaire for the first time. This is best done by different experts from the first team of experts who simplify the language. Better yet, if a second team of experts is involved - those directly involved in the creation of the original NMQ questionnaire (Mendonça *et al.* 2018; Dahl *et al.* 2022), in this case the Nordic Council. So researchers in this study can only recommend the use of NMQ questionnaires results of expert panel discussion in Indonesia for workers "blue collar worker" can only use 52 items of valid questions. Researchers do not deepen research and analysis to the factors that cause pain or the occurrence of complaints as expected by respondents to be able to know the state of musculoskeletal health they feel. The researchers did not validate the category to assess the questionnaire with the gold standard of musculoskeletal examination.

The simplified NMQ questionnaire as the final result of the expert panel discussion on this research is quite appropriate for the level blue collar worker. This questionnaire can be used for other scientific and occupational purposes, as in the community of health cadres to find out the musculoskeletal problems of citizens or their environment.

## CONCLUSION

Respondents in this study amounted to 204 garment factory workers with a maximum education level of high school or equivalent that can be categorized workers "blue collar worker". Characteristics of respondents include female sex, dominant age is 35 years and above with normal nutritional level based on IMT scale, production section (factory) holds the most amount of total all respondents and respondents who follow the average research has worked in the company more than 10 years ( $\geq 121$  months) with a working period in their part was majority over 5 years ( $\geq 61$  months) with working hours  $\leq 40$  hours. The value of validity test of NMQ questionnaire obtained result of

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majority of strong value (0.600 - 0.777). The results of the reliability test questionnaire in the first study with the second has a value Cronbach's Alpha is almost equally high (0.965 - 0.966) which means very reliable.

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