Ergonomics Research Techniques

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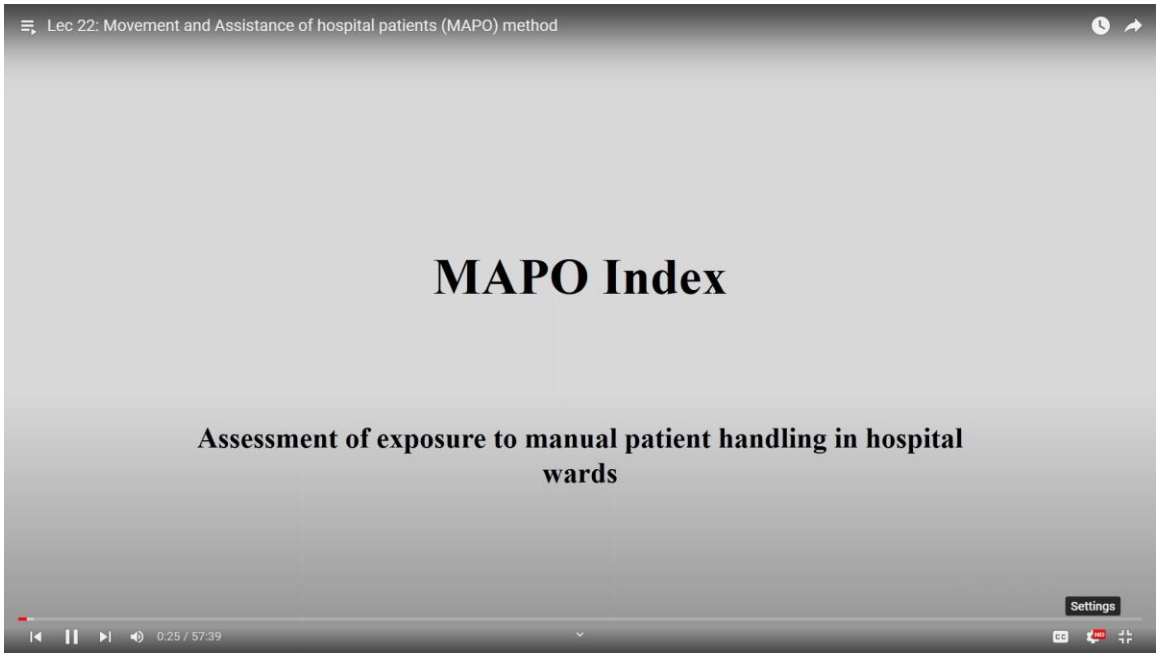
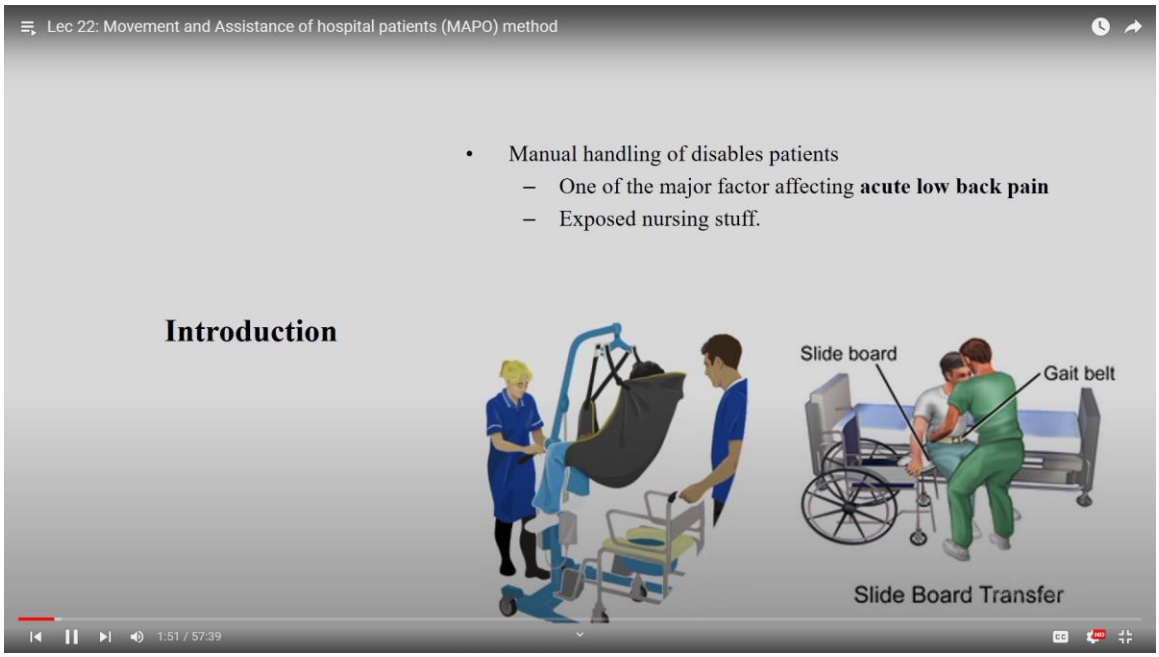
Week – 06

Lecture - 22

Lec 22: Movement and Assistance of hospital patients (MAPO) method



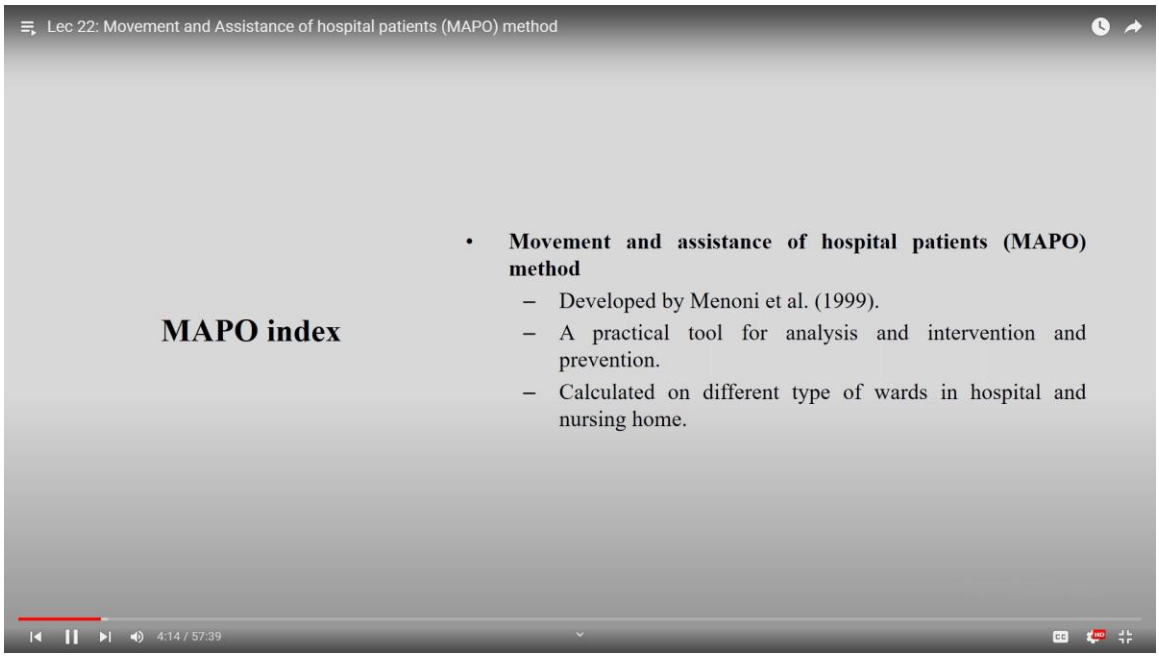
Welcome. Today we will be discussing one very specific instrument which we are going to use for hospital So, in healthcare sector when we handle different kinds of manual material like specifically in case of patient handling we we normally use this particular tool. The name of the tool is MAPO Manual Patient Handling Operation in hospital. So, we are trying to understand that whenthe nurses, caregivers take care of their patients in hospital condition then what kind of stress they are facing or they are kind ofexposure they have the hazardous exposure they have while handling such operation we are going to assess them and we are trying to understand through an index that how stressful it is, how complex the situation is and how we can improve it. So, let us start this particular instrument which is named MAPO index. So, manual handling of disabled patient.



So, when we are talking about manual handling of a patient mainly we handle patients who are disabled in terms of movement. So, the person either completely not in a position to move himself or herself or some cases are there where they can do some activity. However, they are notindependent enough to do the movement. So, in that case, they need some kind of assessment.

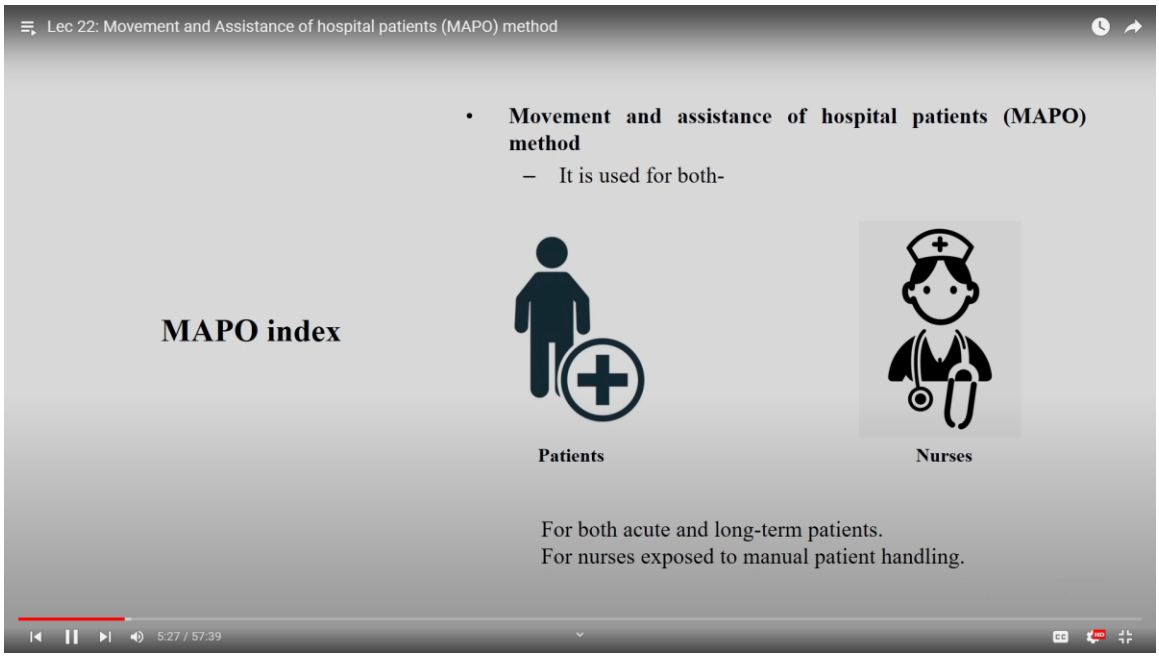
So, one of the major factor which is affecting are while doing such activity to the caregiver is the low back pain. Because I am shifting one person from one bed to wheelchair. Now when we areshifting the patient we need to be at most careful about their health condition. Different kinds of instruments are associated attached to the body of the patient. Also the patient is very much vulnerable in terms of the pain, in terms of infection and many other things.

So, we should be very careful while transferring them from one place to another. Now if we are handling such kind of patient mostly it happens that our back back the the low back is getting exposed towards load handling, load in terms of the weight of the patient. So, there we have lot of things lot of hazards and risks available we are going to assess them using this particular index. Mostly the nursing staffs are exposed towards this type of scenario and they are mainly the subjects for this kind of this particular instrument or this particular tool. So, MAPO are only useful when we are talking about patient handling by the nursing staff at any hospital.

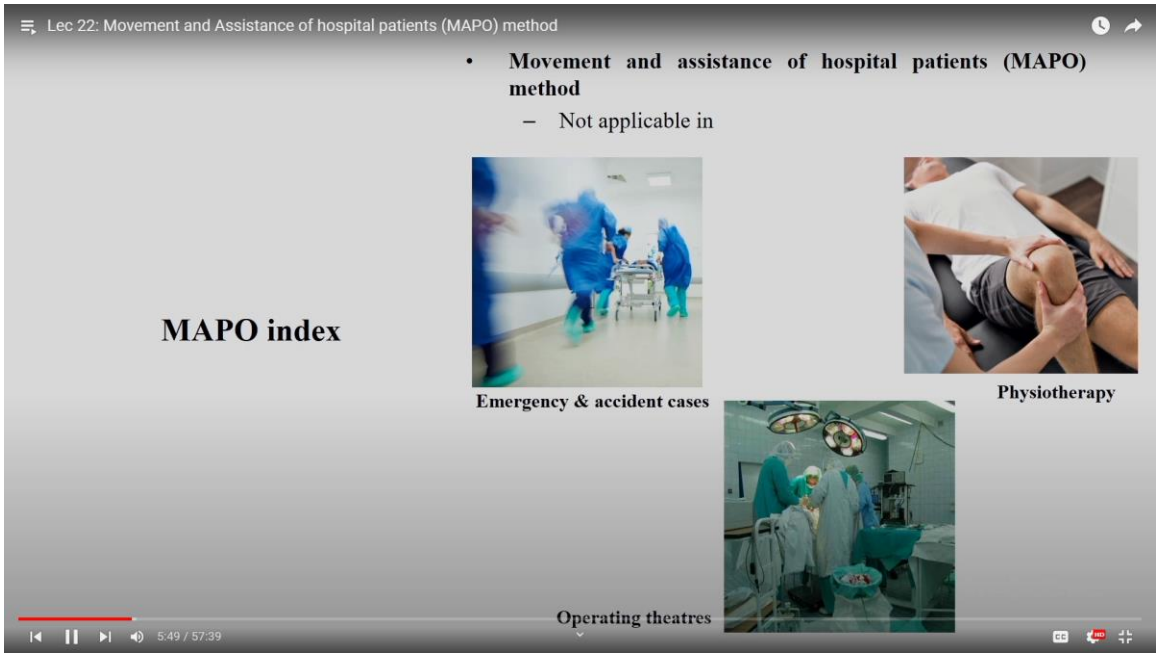


So, what this particular tool is all about? It is a movement and assistance of the hospital patient method. So, MAPO MAPO and then it is developed in 1999. So, you can understand it is not very old tool it is quite new. A practical tool for analyzing and intervention and then going for a prevention strategies to help the nursing staff while handling the patient. It also calculate the different types of wards which is available in the hospital and different nursing home.

So, based on the type of ward, based on the number of bed it has in a particular ward, what is the type of nursing home or hospital it is? Based on that this index will change and it will in directs the observer or direct the intervention person to do the intervention.



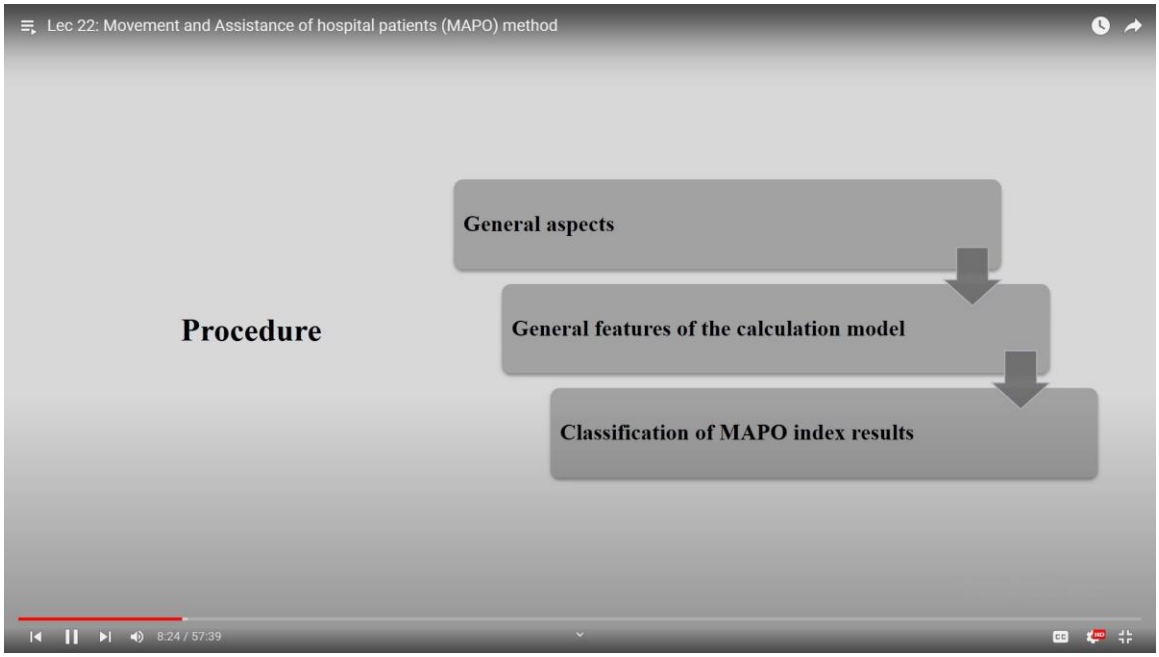
So, movement and assistance of hospital patient that is the MAPO method it is used for both patient and for the caregiver or the hospital nursing staff. For both acute and long term patient and for both nurses exposed to the manual patient handling for all these cases we can use MAPO index.



It is not really applicable in case of emergency and accident cases. So, we cannot use this particular tool in that scenario.

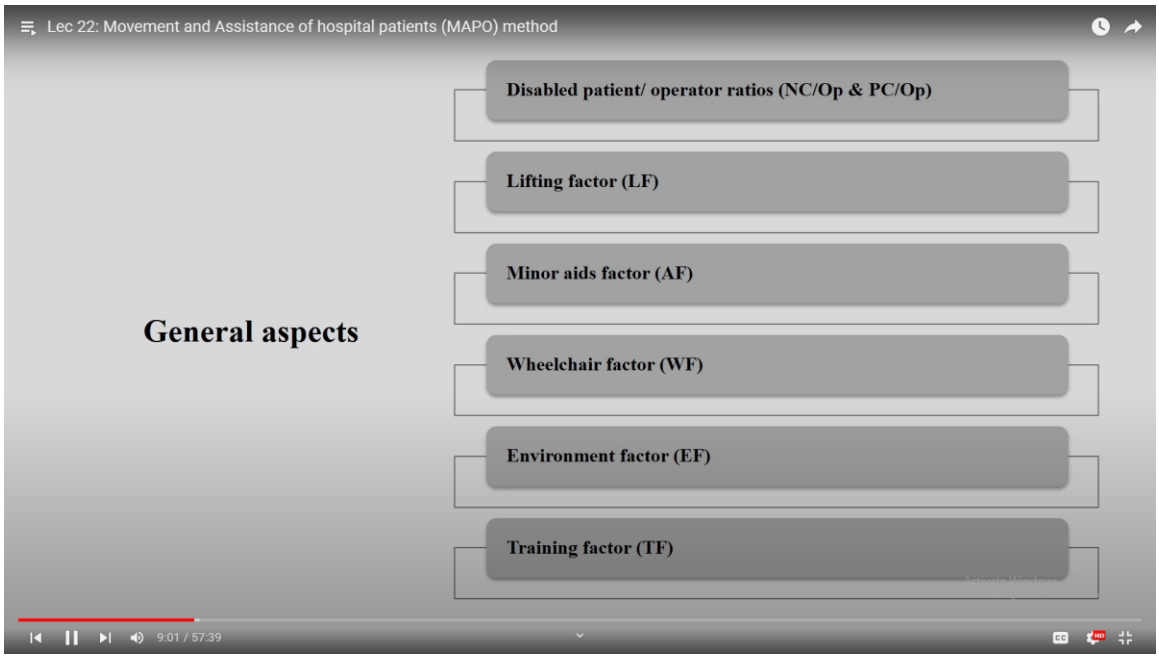
In any case of physiotherapy those cases also it is not applicable this tool is not applicable and it is also not applicable at the operation theatre. So, we can clearly understand this MAPO index is only applicable for the nurses or nursing staff who are handling the patient at regular basis at the different wards of any hospital. Not at the emergency situation, not at the operation theatre neither on the for the physiotherapy section. So, these are the cases where we can so it is a very clear cut indication where you can use the MAPO index where you cannot use the MAPO index. If you go by the exact identification you need to understand when a person is shifting some patient from one place to another place in a regular activity then only this MAPO is applicable.

Now, may you may ask a question why not at emergency sector because it is not applicable because the kind of stress and tension that they necessity of the emergency sector are very high. For those cases you really cannot use this particular tool. It is a regular tool where you have specific duties to be performed there is no hodgepodge it is like very streamlined process. So you need to move the patient from bed to washroom, bed to for a check up, bed or from when somebody doctor is coming to get go for a visit or maybe when a patient is there for a long time maybe you are take the caregiver or the nursing staff is taking them for a round. So for all those cases where it is a normal day to day regular activities at different wards of the hospital.



So when we talk about this particular tool or particular technique you need to understand this is need to be done in a step by step. So you have to identify the general aspect, general feature of the calculation model it has a typical calculation process because we are talking about an index. So you need to calculate it and once you get the index you have to go for

the classification of the index. So slowly we will go for the each step in detail. When we are talking about general aspect we need to understand that we have varieties of factors involved in this particular general aspect.

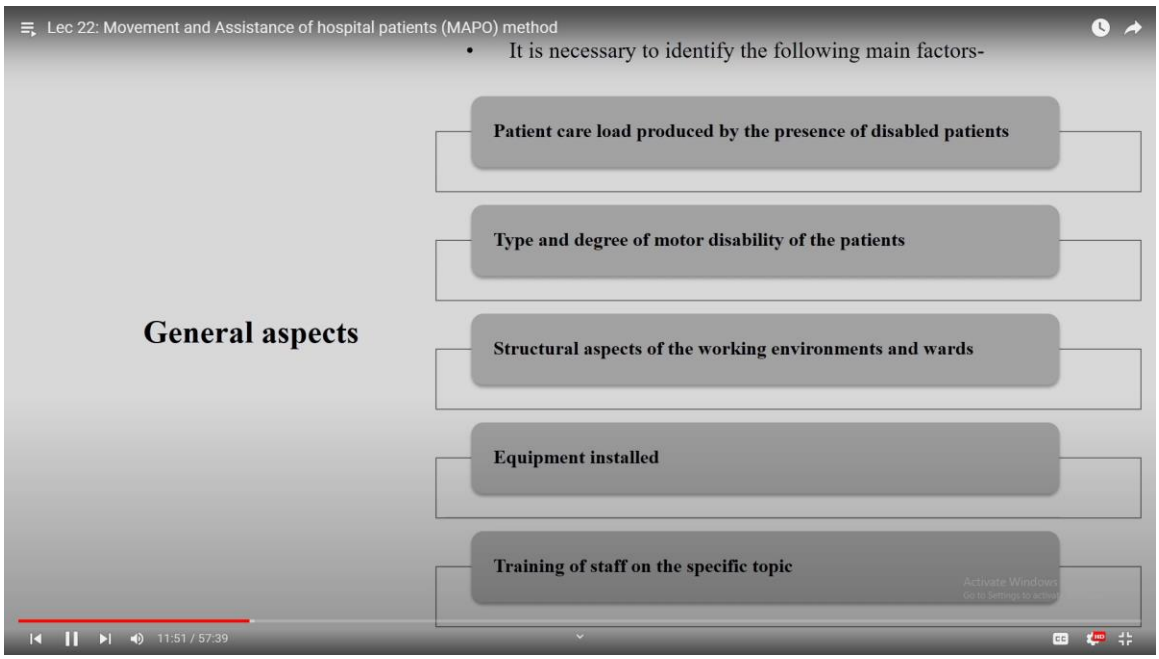


Very first thing is that what is your patient quality? Is the patient is completely non-cooperative that means the patient is not in a position to move at all by himself or herself. There will be no assistance given from the patient size. So the nursing staff have to take care everything. So each and every movement need to be taken care by the nursing staff. So that type of patient will be categorizing as non-cooperative patient.

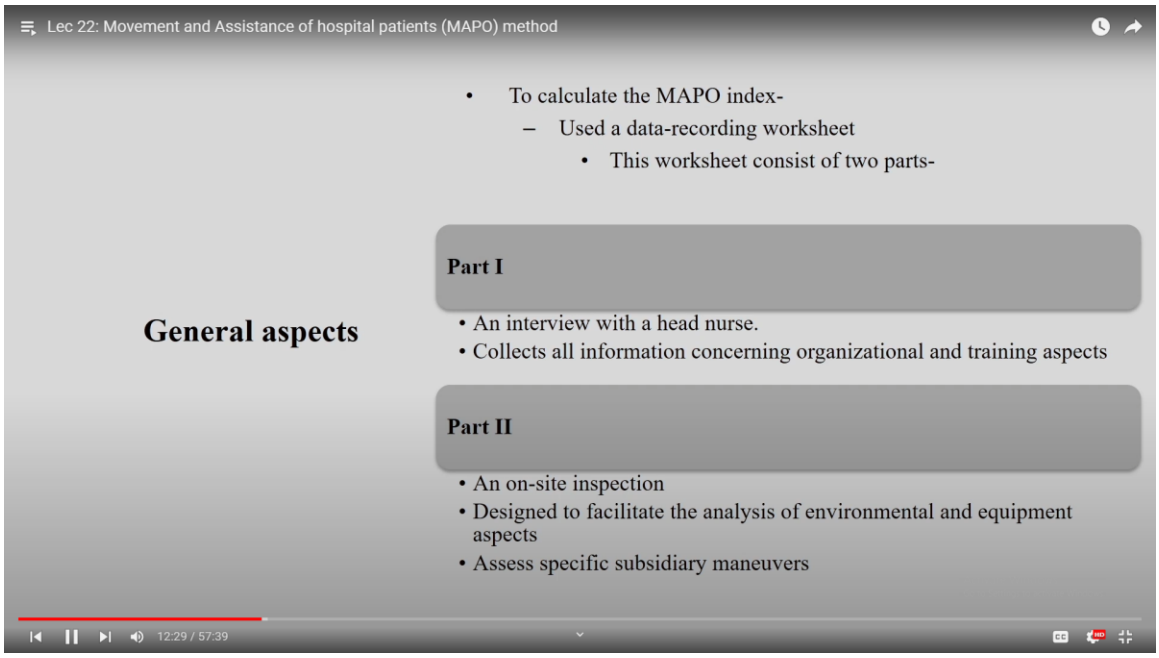
In some other cases where patient has some kind of movement he or she is in position with some kind of help can move himself or herself. So maybe there is some difficulties in whole movement but he or she can manage partially. So that is the partially cooperative patient. So one is non-cooperative patient another is partially cooperative patient. So before we start any kind of investigation from the MAPO perspective you need to categorize how many patients are there and what is their category.

How many of them are non-cooperative? How many are there who are partially cooperative? The second part is lifting factor. We will be discussing how do we calculate it. Then minor aids factor, then wheelchair factor because you are going we are talking about the movement right from one place to another patient handling. So wheelchair is very important factor in this particular index. Then environmental factor and training factor.

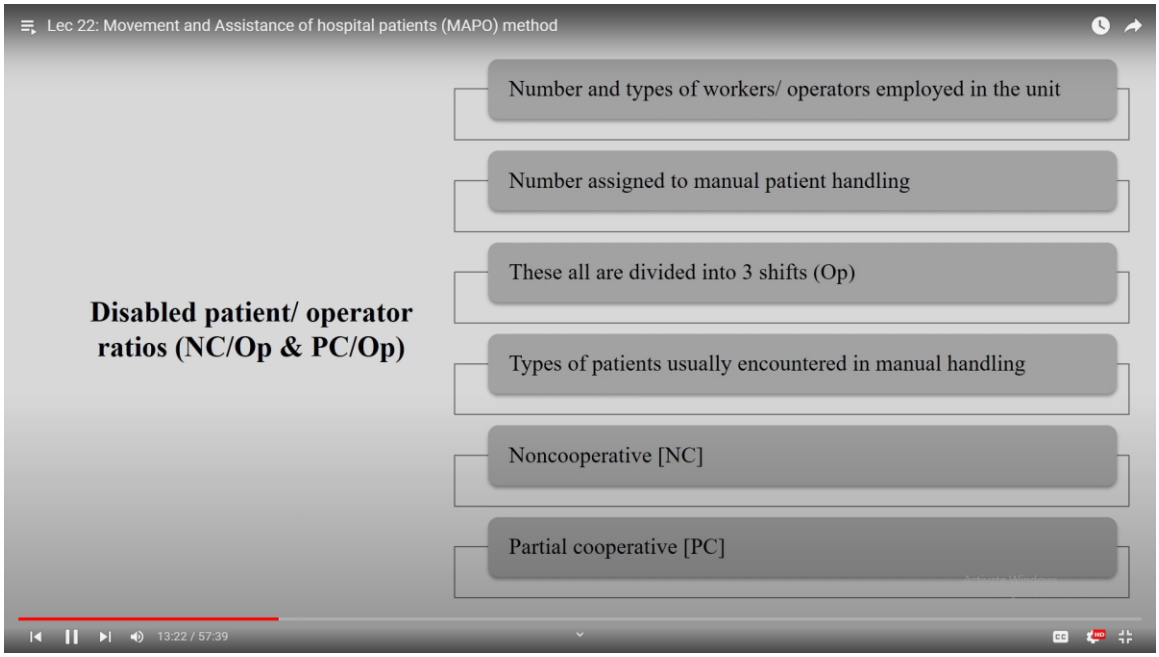
So if somebody is trained enough then there is less chance of difficulties faced by the person if they or he or she is not trained to handle patient definitely they are going to get lot of trouble. So training factor is very important in case of MAPO. So in total we have total 6 factors which are going to give you the impact or which you are going to get from the for the index. We are going to calculate each of them. It is necessary to identify all these factors as well.



What are those? Patient care load produced by the presence of disabled patient, type and degree of motor disability of that particular patient, structural aspect of the working environments and the wards, whatever the equipments are installed within that particular sector and training of the staff on that particular specific topic. These are also need to be taken care.

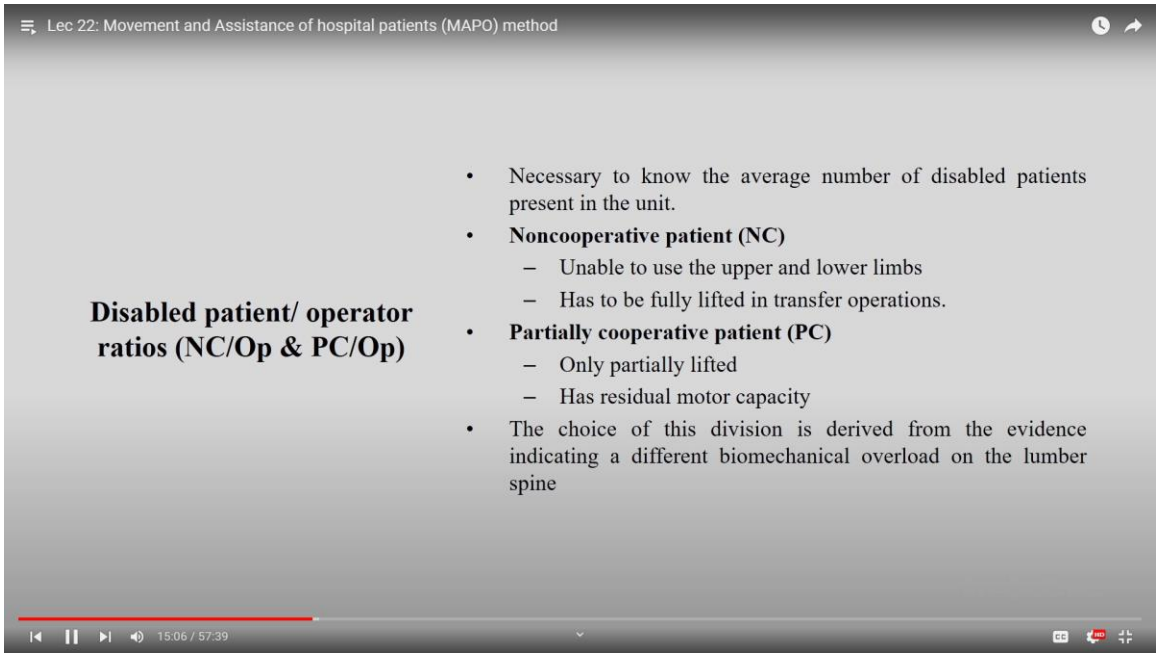


So to calculate the MAPO index we need to use the data recording worksheet we are going to show you in next few slides and this worksheet will contain 2 major aspects that is the part 1 and part 2. Part 1 will contain the interview with a head nurse and all collects all information concerning the organizational and training aspect. Second part of that particular form will have an onsite inspection and it is designed to facilitate the analysis of the environment and equipment aspect and assess the specific subsidiary maneuver. So these are the 2 major part that is available in that particular worksheet. We are going to discuss that worksheet in next slides.



So when we are talking about disabled patient in terms of disabled patient and operator ratio. So how many disabled patients are there? They are partially cooperative or non-cooperative and how many people are there who are going to help them? So that means the nursing staff. So number or type of workers and operators employed in that particular unit this information need to be collected in the form.

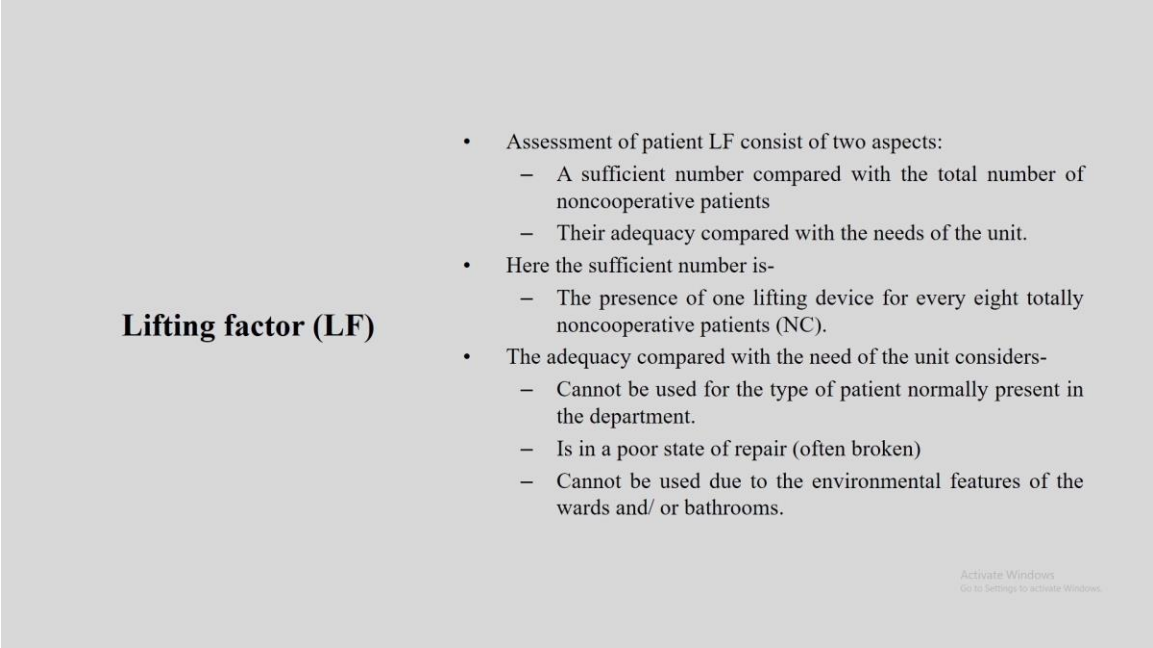
Number assigned to manual patient handling. How many people are involved in the manual patient handling? These all are divided into 3 shift like you know shift 1, shift 2 and shift 3. Type of patient usually encountered in the manual handling. So what is the types of patient? So non-cooperative or partially cooperative. So if we have all these information with us then we can get a ratio which will describe the non-cooperative patient divided by the number of people available to handle them and partially cooperative patient and then divided by the number of people to handle them.



So this ratio you will be getting in this particular section. So that is the disabled patient divided by the operator ratio. So the disabled patient and operator ratio that we are going to get in this particular section. So it is necessary to know the average number of disabled patient present in that particular unit. So as I mentioned non-cooperative and partially cooperative.

Under non-cooperative unable to use the upper and lower limb both and has to be fully lifted in a transfer operation. So it is not that partially they are doing it. You need to move completely from one place to another shifting ok. In case of partially only partially lifted has residual motor capacity.

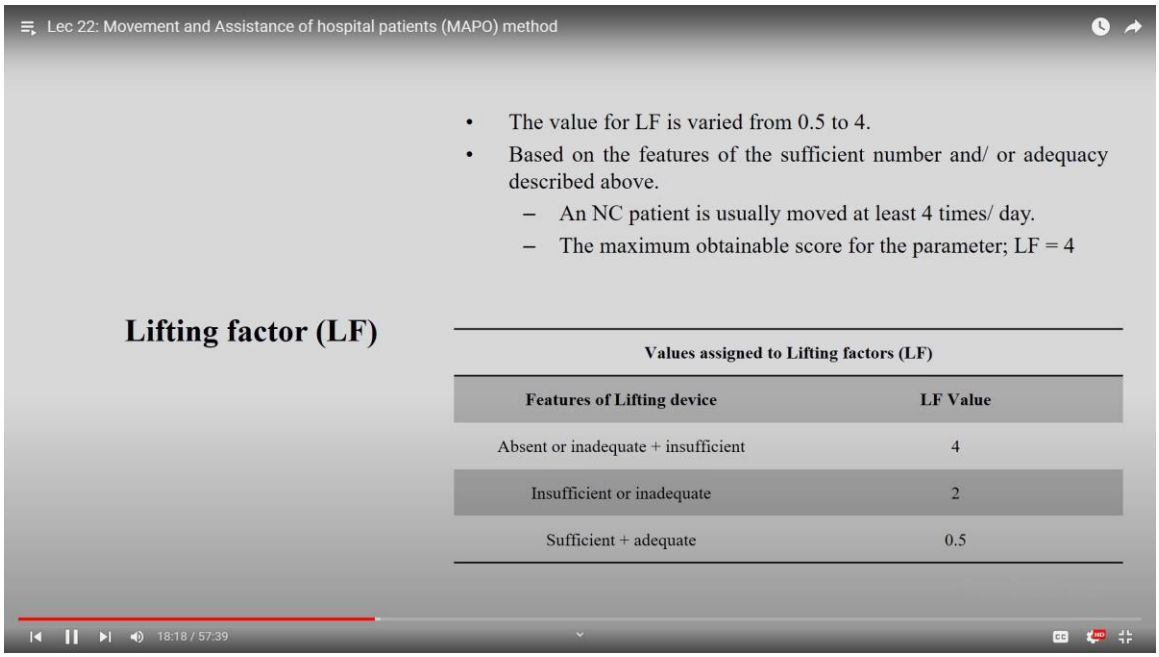
So that is the categorization. The choice of this division is divided from the evidence indicating a different biomechanical overload on the lumbar spine. So this particular category has some connection with this biomechanical overload on the lumbar spine. This way we are going to get the ratio of disabled person who are present in that particular ward and the operator who are going to handle them.



Now coming to lifting factor. Once we are sure that how many people are present and to be operated and how many staff are there who are going to handle them.

Once that is done then we are going to understand the lifting factor. All we are going to calculate in the worksheet as an example in the next in the next part of your presentation. So assessment of the patient lifting indexlifting factor consists of two aspects. One is a sufficient number compared with a total number of non-cooperative patient and their adequacy compared with the need of that particular unit. Hear the sufficient number is the presence of one lifting device for every 8 totally non-cooperative patient.

So this definition you have to remember. The presence of one lifting device for every 8 totally non-cooperative patient. If it is there then you will say it is sufficient. Whereas if it is inadequate what is the definition? The adequacy compared with the need of the unit considered cannot be used for the type of patient normally present in that particular department is in a poor state of repair. So sometimes it is broken so you need to take care of it and cannot be used due to environmental features of the wards or that particular bathroom that they are going to use.

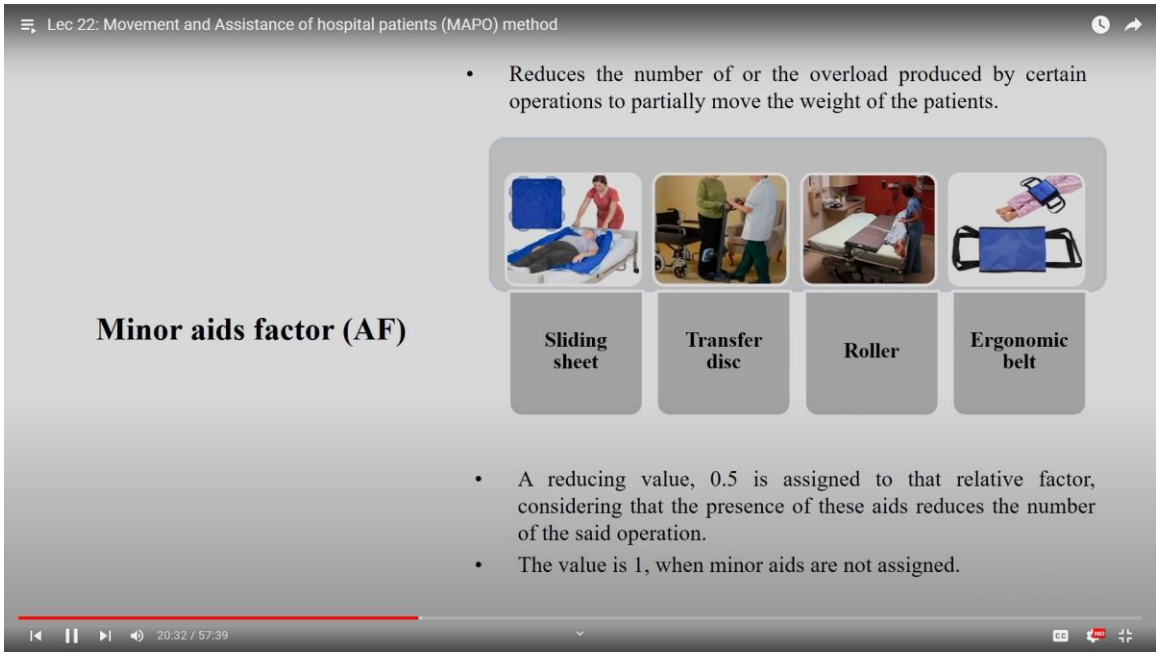


So for these cases also you need to give a consideration. So that is for the lifting factor. Now what else? The value of the lifting factor will vary from 0.5 to 4. How we are going to calculate the lifting factor we will discuss it.

Based on the feature of the sufficient number and or adequacy what is described above, a non-cooperative patient is usually moved at least 4 times per day. In a day the person the non-cooperativeperson need to be moved for 4 times per day. And the maximum obtained score for this particular parameter that is the lifting factor will be 4. So what is this? This is the table that you can go for the lifting factor. Absence or inadequate and the insufficient so it is value is 4.

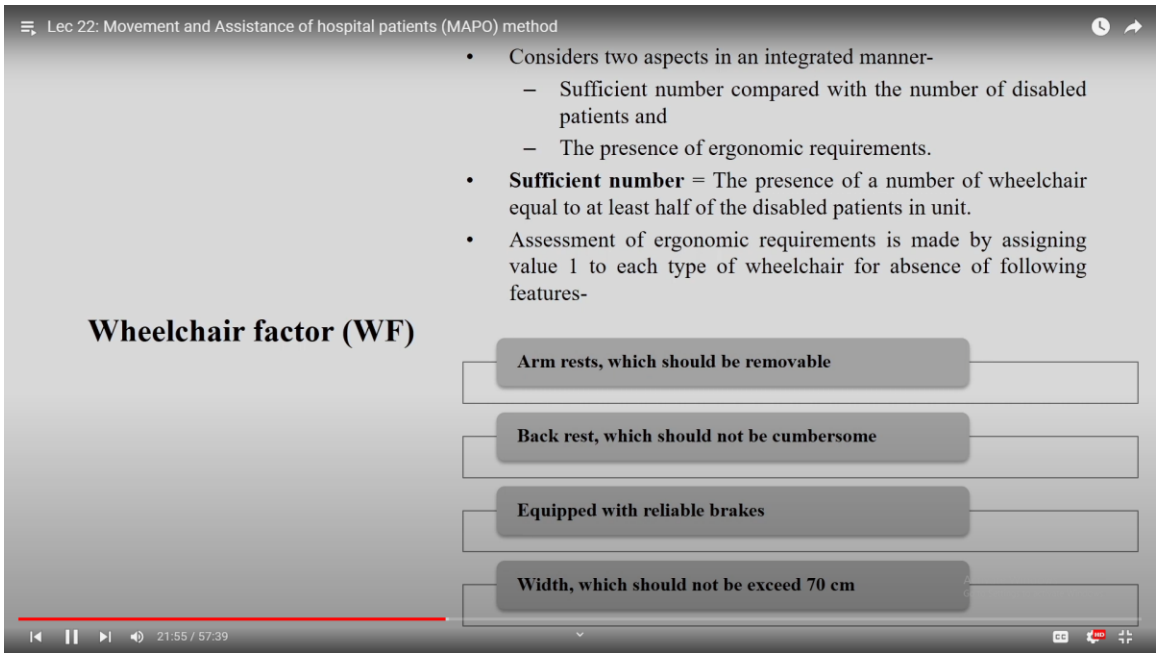
Insufficient and or inadequate anyone here it is insufficient means number is not available also whatever is available that is not adequate in that case it is 4. Here it is either insufficient or inadequate ok anyone then it is 2 and sufficient and adequate then it is 0.5. So you need to check what is the status of the lifting factor in that particular ward or in that particular hospital. If you are doing it for whole hospital then you need to do or if you are doing it only specifically for a ward you need to check.

So you need to understand what is absent or inadequate and then insufficient that means if number of equipment which is required is not available as per the requirement that means it is inadequate whereas insufficient means you have things but they are not up to the mark. So that if both the combinations are present then it is 4 if any one of them is present then it is 2 if none of them is present then it is 0.5.



Now minor aids factor so once you understood how you are lifting then what are the aiding factors. So of course you have some if you have some mechanical aid or know some helping aid definitely it is going to reduce the stress level, reduce the impact level.

So we are going to consider that. So reduces the number the overload whatever is producing by this certain operation to partially move the weight of the patient. So if you have sliding sheet then you have some advantage if you have transferred disc definitely you have an advantage if you have roller or some kind of ergonomic belt then definitely these are some kind of advantages. So a reducing value of 0.5 is assigned to the relative factor considering that the presence of these aid will reduce the number whatever you have you got from the lifting factor of this aid operation. So the value is 1 when minor aids are not assigned.

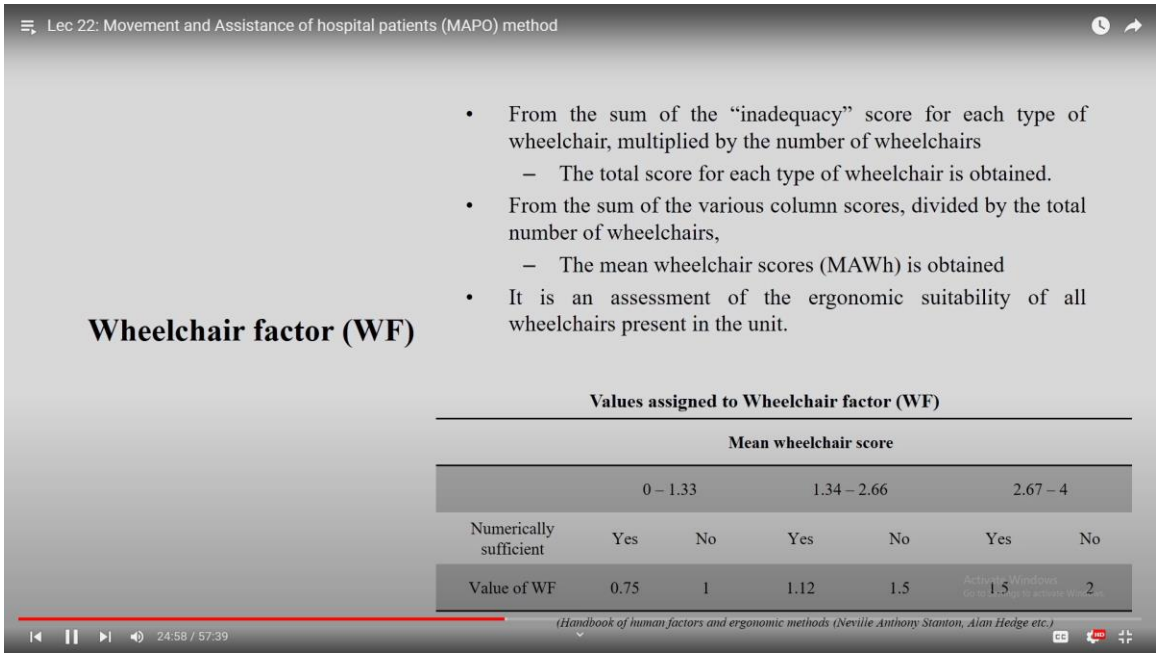


So if you have aid then 0.5 if you do not have aid then it is 1. Coming to wheelchair because that is the major factor involved here. So consider two aspect in an integrated manner first is the sufficient number compared with the number of disabled patient. Do you have sufficient number of field chair or not? And the presence of the ergonomic requirement in that particular wheelchair. One is sufficient number is present or not or whatever is there is it adequate or not So sufficient number is equal to how do you calculate the sufficient number? The presence of sufficient number of wheelchair equal to at least half of the disabled patient in that particular unit.

So suppose you have 10 disabled patient in your unit so you need at least 5 numbers of wheelchair in your unit to handle all these 10 patient. Now if you have only 4 chair 4 wheelchairs then definitely it is insufficient. So this is how we are going to calculate the sufficiency or insufficiency. Then is the assessment of the ergonomic requirement is made by the assigning value of 1 to each type of wheelchair for presence of the following feature. So if you have this particular feature that is the armrest which should be removable.

So if that feature is there then it is 1. Backrest which is which should not be cumbersome then it is 1. If it is cumbersome then no. Then equipped with a reliable brake then it is plus 1 and then width which should not be exceeded for 70 centimeter then also 1. So these are the ergonomics feature that you are going to check for the existing wheelchair. First is it is sufficient or not so number is sufficient or not and then you are going to check is it adequate or not.

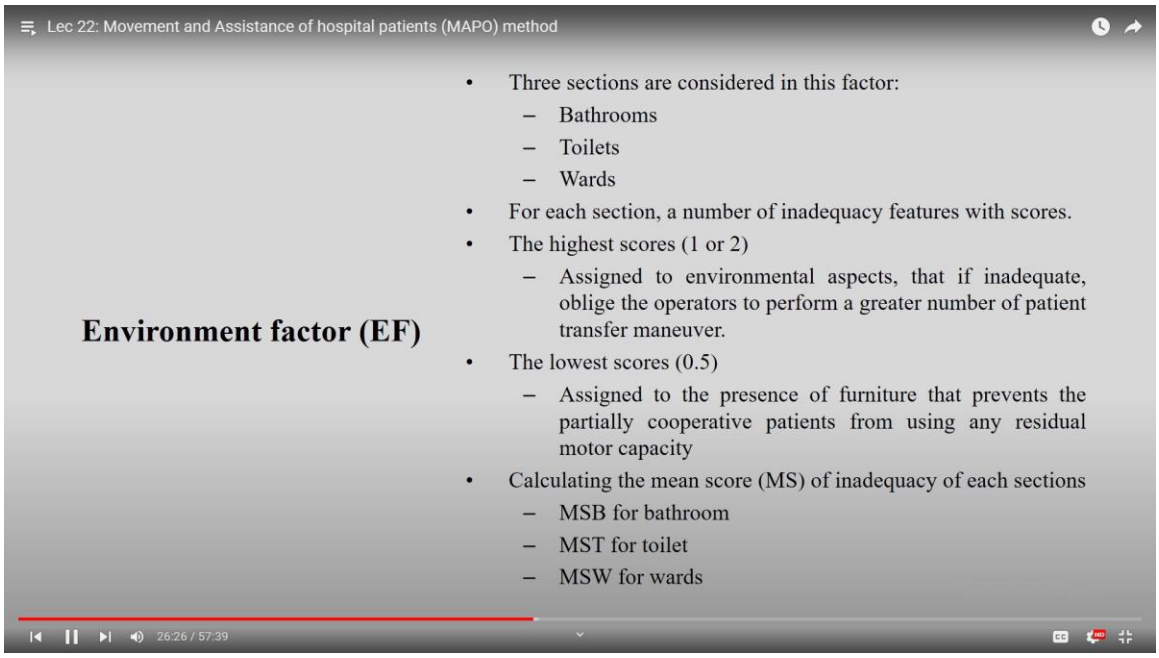
So maybe you have 10 patient your number of available wheelchair is 4 so first you identified it is insufficient and then you have among these 4 2 are having all these 4 features whereas 2 are not having all these 4 features. So some are adequate some are not adequate. So how do we calculate the wheelchair factor that we are going to test in the next slide.



From the sum of the inadequacy score for each type of wheelchair multiplied by the number of wheelchairs. The total score of each type of wheelchair is need to be obtained so that we are going to get and from the sum of various column score divided by the total number of wheelchair the mean wheelchair score will be obtained.

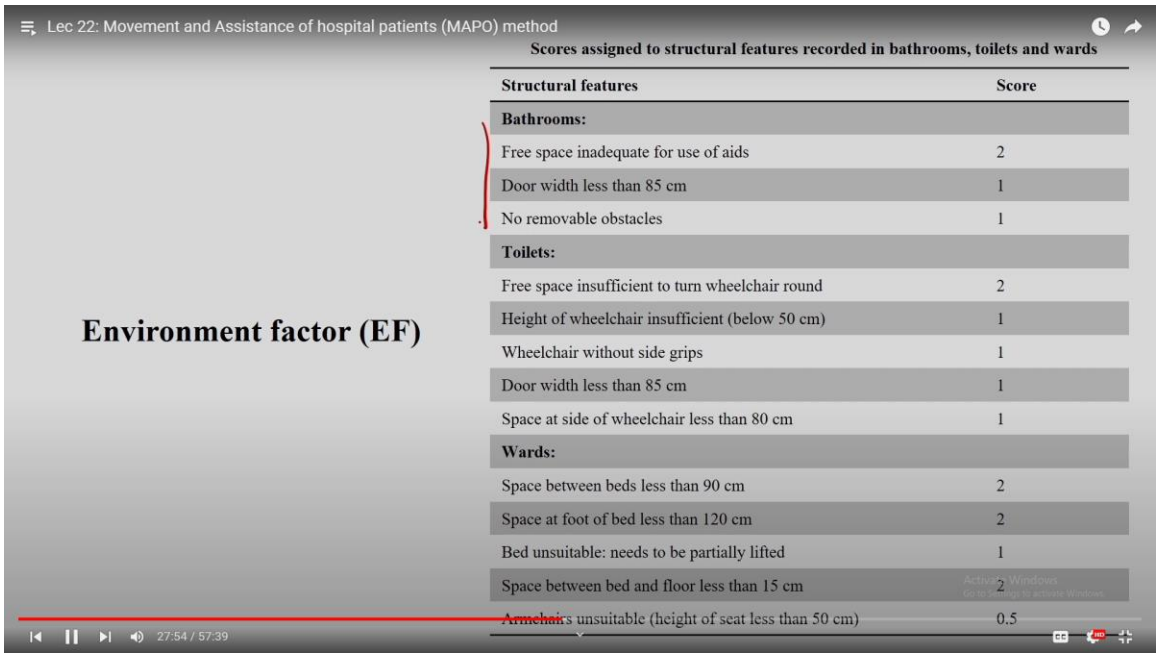
It is an assessment of the ergonomic suitability of all wheelchairs present in that particular unit. So how you are going to get that so you know if this mean wheelchair score is if 0 to 1.33 and numerically if it is sufficient then value is this if it is numerically not sufficient then value is this. If your score is lying between here and it is numerically sufficient then value is this if it is numerically not sufficient then it is. Similarly for this range so you may have a figure of wheelchair factor ranging from here either from this range from this range or from this range and once you have this range established then you need to check it is sufficient or not.

If it is sufficient then you go for this yes column if it is not sufficient then you go for the no column and you get the value of wheelchair factor.



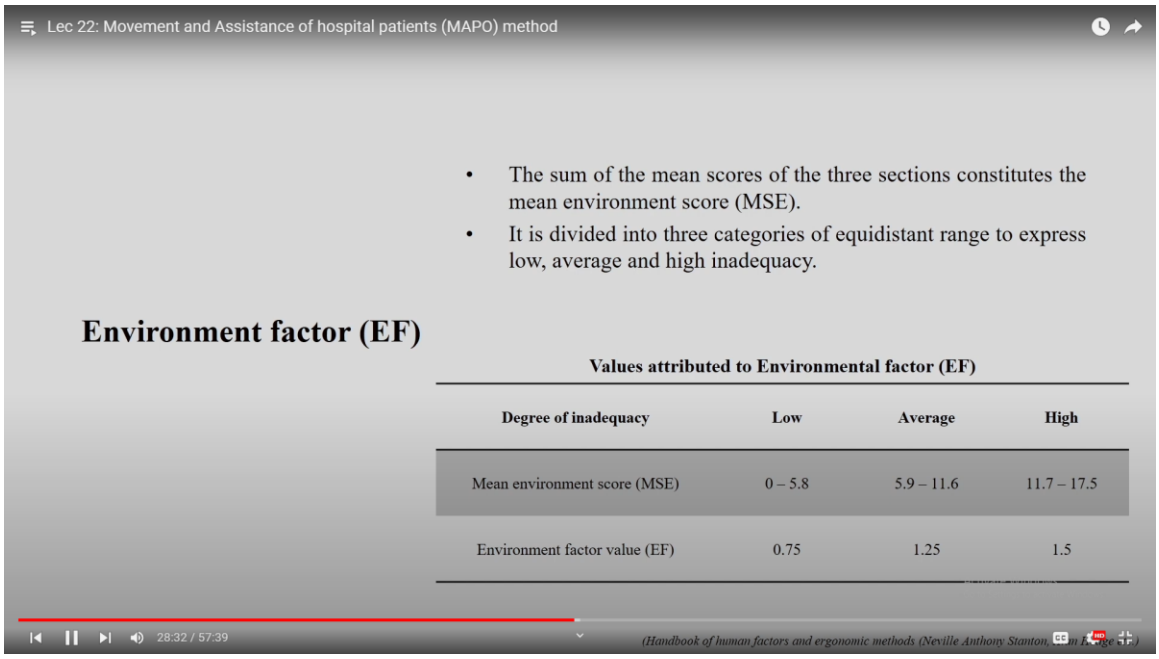
Now coming to environmental factor. Three sections are considered in this particular factor one is bathroom because that is the major area where you are going to transfer your patient, second is toilet and then third is the within word. For each section a number of inadequacy feature with we need to score it. The highest score that is 1 or 2 will be assigned to the environmental aspect that is that if inadequate obliges the operators to perform a greater number of patient transfer maneuver and the lowest score that is the 0.

5 will be assigned to the presence of furniture that prevents the partially cooperative patient from using the residual motor capacity. So, calculating the mean score that is the environmental score inadequacy of each section that is the MSB for bathroom, MST for toilet and MSW for word. So, you have mean score for bathroom, mean score for toilet and mean score for word. You have different score for this environmental factor.



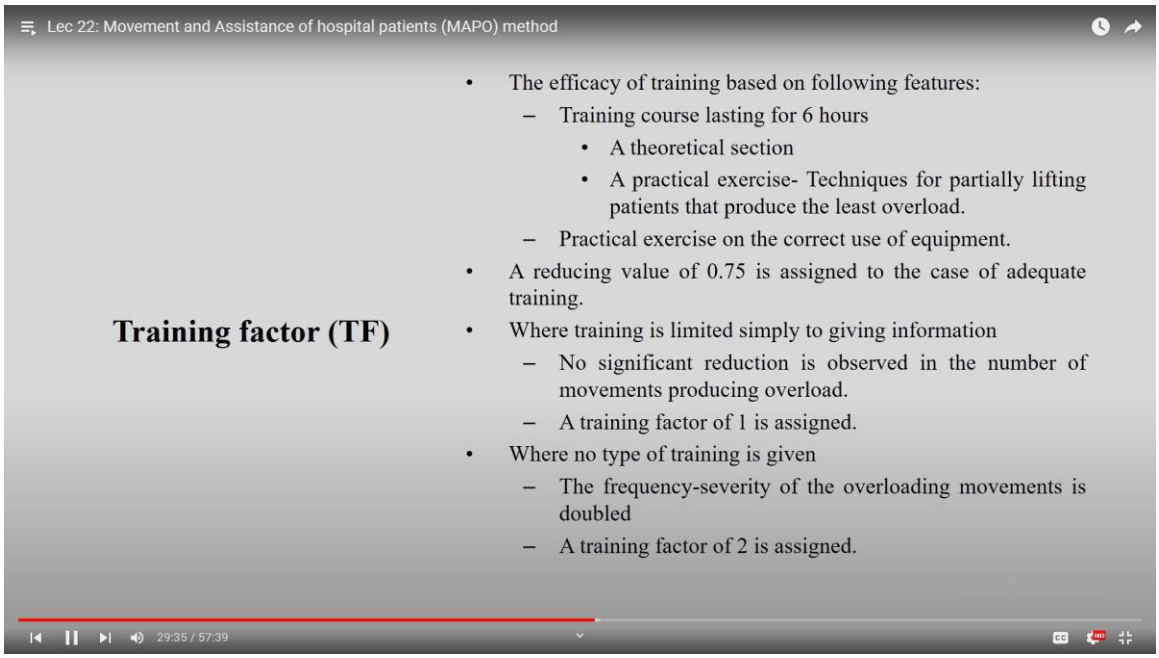
Now once you have this environmental factor you can see here for bathroom you have three variety for toilets you have 4, 5 and then for words you have 5.

So, you have these scores given here right from here you can refer to your worksheet Now, we will see how do we read them. Now coming to further in environmental factor the sum of the mean score.



So, from bathroom plus your toilet plus your work. So, the sum of the mean score of the three section constitute the mean environmental score or MSE and it is divided into three major category that is low, average and high and environmental factor value is this. So, you have first the ranges that you are going to get and from there you are going to get this particular factor environmental factor.

So, we have wheelchair factor, we have the factor coming from the number of people available there and the number of people available to operate them. So, that particular factor then you have environmental factor also we have taken consideration about the kind of minor aids available to handle the patient.

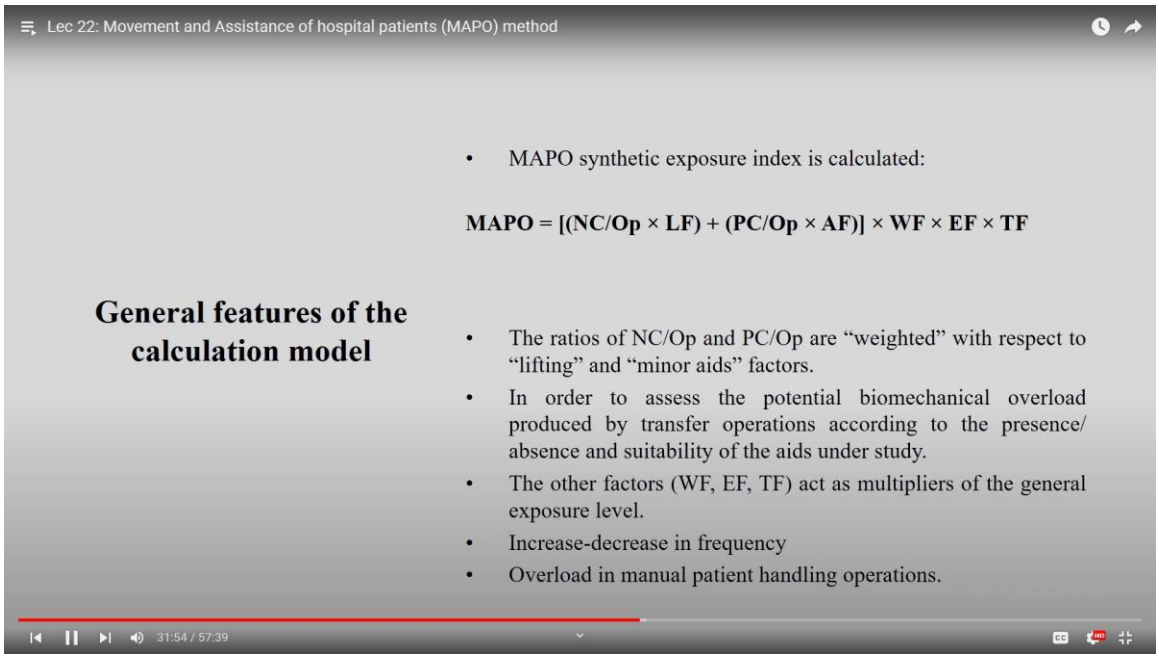


Next factor is the training factor. So, if you have good trainingthen you are safe enough to handle the patient whereas, if you do not have training you are going to expose yourself to a hazardous situation.

So, training is very important. So, we need to give a rating to the training as well. So, the efficacy of training based on the following feature we need to identify. So, training course lasting for 6 hours a theoretical section and a practical exercise. In practical exercise the technique for partially lifting patient that produce the least overload and the practical exercise on the correct use of the equipment.

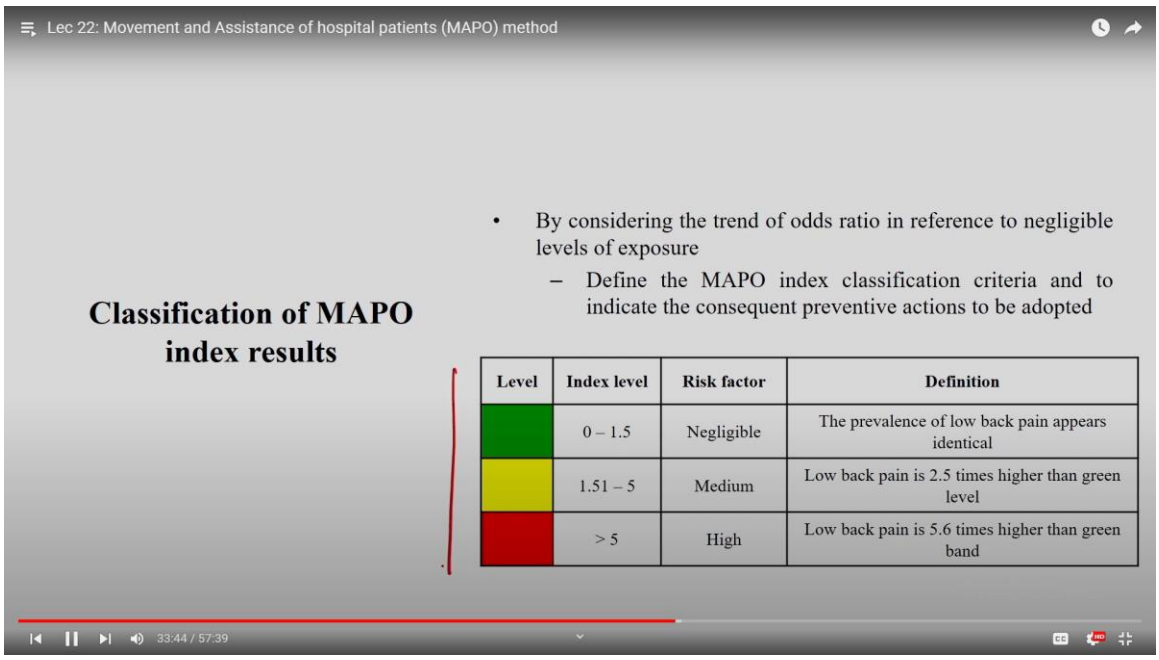
It is not only the what you are handling also how you are handling. So, patient definitely cooperative, non-cooperative these are the types what is the load limit all these are there, but how you are handling is also an important factor. A reducing value of 0.75 is assigned to the case of adequate training. So, if you have adequate training then you need to assign a reducing value of 0.

75. Where training is limited simply to giving information no significant reduction is observed in the number of movement producing overload training factor need to be given as 1. Where no type of training is given suppose training is given, but there is no impact then it is 1 and if there is no training the frequency severity of the overloading movement is double then the training factor will be assigned as 2. So, training also has some category. So, if it is effective then 0.75, if training is there it is not that effective that 1, if it is training is not at all there and it is showing the overload then it is definitely the value will be double.



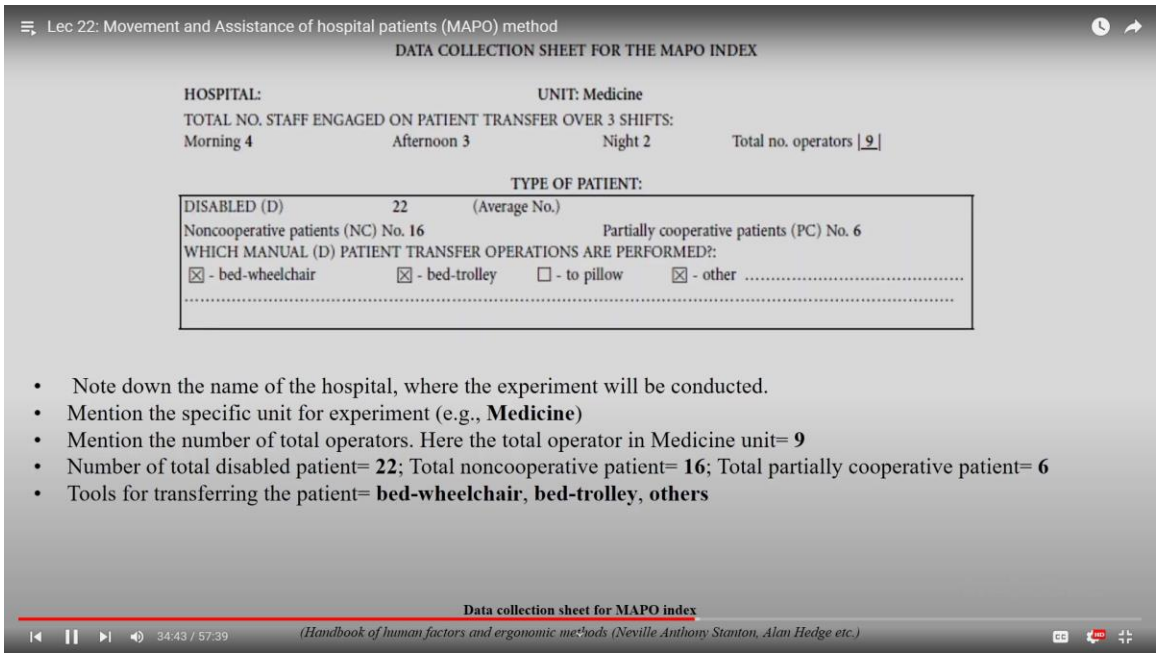
So, it is 2. Now, how do we calculate? So, MAPO synthetic exposure index will be calculated as MAPO is equal to non-cooperative patient divided by number of people available there multiplied by lifting factor. This is one portion plus partially cooperative patient divided by the number of people available there multiplied by all the AF asymmetry factor. Then multiplied by wheelchair factor then EF that is the environmental factor and the TF that is the training factor. The lifting this whole thing that ratio of non-cooperative by the operator and partially cooperative and the operator are weighted with the respect of the lifting and the minor aids aspect. In order to assess the potential biomechanical overload produced by the transfer operation according to the presence or absence and the suitability of their aids under this study that you need to assess.

The other factor like wheelchair factor, environmental factor, training factor they will be act as an multiplier of the general exposure level. So, major component is coming from this particular sector whereas, these are the impacting factor and overload in manual patient handling operation can be can be evaluated through this particular formula. And once we have any index definitely we need to compare with some kind of value. So, this is the level how you can compare.



So, if you have a MAPO index value which is lying between this particular sector then it is negligible, if it is here then it is medium, if it is more than 5 then you need to be very careful definitely there is something wrong in the whole situation and you need some kind of intervention immediately and this is the definition of each sector.

So, negligible the prevalence of low back pain appears identical, medium the low back pain is 2.5 times higher than the green level and high it is 5.6 times higher than the green level. So, here is some kind of gradation present in this according to this color. Now how do we collect data? So, this is the pro forma that is given by the author.

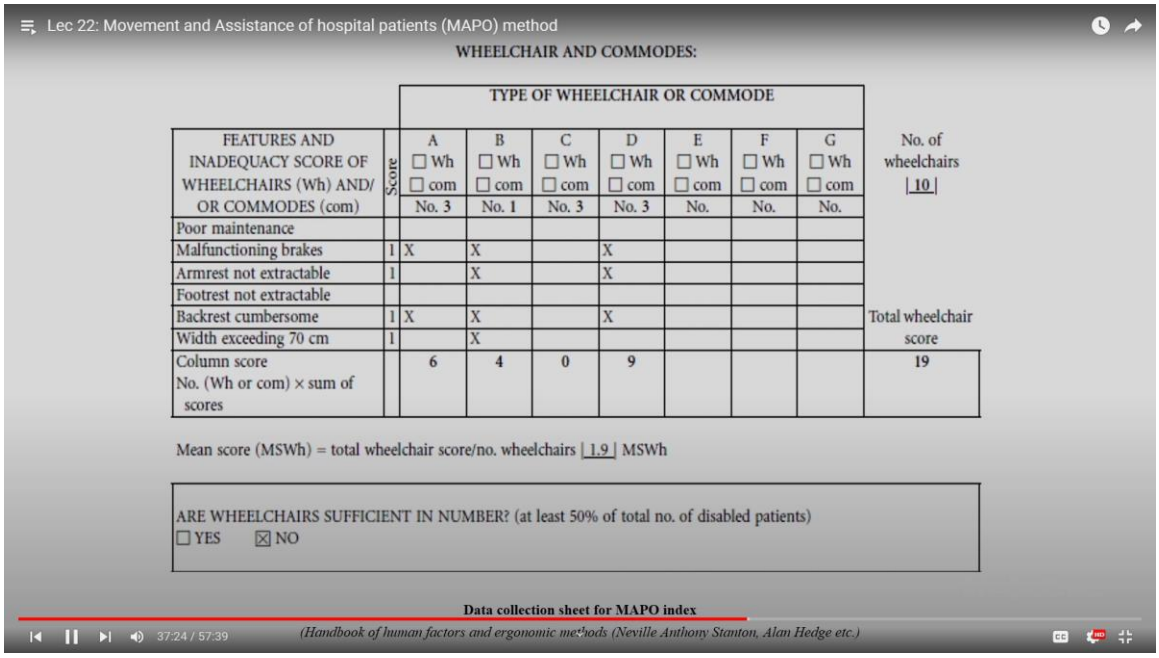


What you need to do? This is an example that we are going to discuss further slides where we are going to really calculate the MAPO. So, here you need to give the detail about the hospital which unit where you are going to collect your data. So, that is the unit here for example, we have done the analysis at the medicine sector. Then total number of staff. So, these all you will get from the discussion that is the part 1 of this particular sector So, you are going to get the information.

So, the number total number of staff engaged on patient transfer over 3 shift. So, here you can see that morning shift we have 4 staff, afternoon shift we have 3 and night shift we have 2. So, we have total 9 operator in that medicine ward. Now once we know how many number of people are there to operate then what you are going to do? You are going to understand who are the people going to get handle. So, number of patient from this you can understand you have total 22 disabled patient. Whereas non-cooperative number of non-cooperative patient is 16 and cooperative partially cooperative patient is 6.

Also you need to see that which manual patient transfer operation are to be done. So, bed to wheelchair, bed to trolley and something need to be done in other case. So, these are the varieties of operation that they are going to do in this particular sector. So, you need to note down the name of the hospital as I mentioned here we have taken the medicine as an unit and these are the information we have collected from the above stage. So, tools for transfer the patient we had wheelchair, bed wheelchair and bed trolley and some other

small equipment. This is the basic information you are going to collect from the first part of your data collection sheet.



Now, let us move to the next part where we are going to understand the type of wheelchair or the comor that we have. So, here we are going to calculate the wheelchair score, mean score. Now how we are going to collect? So, you see we can have A, B, C, D, E, F, G varieties of situation. So, that is uniform throughout this particular tool. You can see for each section for wheelchair factor, for lifting factor, for environmental factor you have such cases A, B, C, D, E, F, G these are the things.

If you have more than that you repeat. So, here what is mentioned here? The features and inadequacy score of the wheelchair and or the comorbidities present here. So, you have these values, the poor maintenance, malfunctioning break, armrest not extractable, if armrest there, but it is not extractable. So, it is very difficult someone to put inside. Footrest and it is not extractable, backrest is cumbersome and width is exceeding 70 centimeter So, you have these value. Now when we are talking about the number of wheelchair, so let us go back in our earlier slide that number of wheelchair present.

So, here what we are going to see? We have something 3 number of wheelchair where you have break problem in 1 and backrest combustion in 1. So, here you have 1 plus 1 that is the 2, 2 multiplied by the number of wheelchair present here.

So, total is 6. So, that is the value. That is the one category of wheelchair. In second category wheelchair more problem. What is that? It is malfunctioning break, armrest is

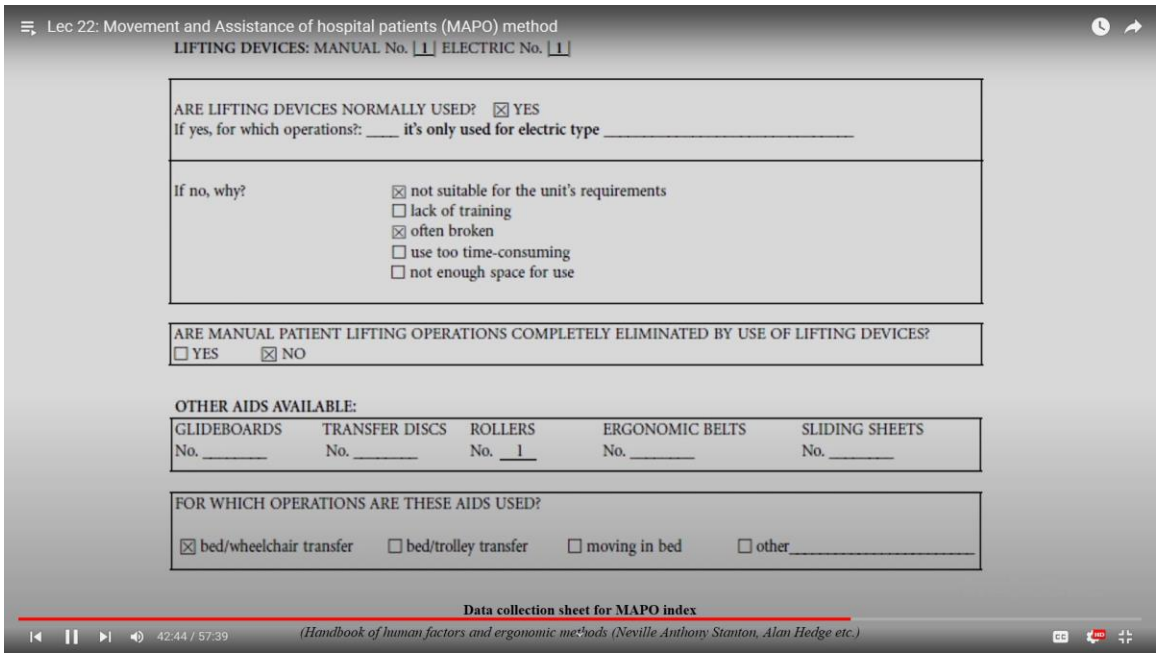
not extractable, backrest is also little cumbersome and width is exceeding you know 70 centimeter. So, 1 plus 1 plus plant 1 plus 1. So, total value is 4 whereas, such number of wheelchair is only 1.

So, multiplied by 1 is equal to 4, this is the value. You have 3 wheelchair which is fully functional, no problem. So, that means, value is 0. 0 multiplied by 3 value is 0. Whereas, you have another set of wheelchairs which is number is 3 and you have 3 problematic area.

So, 3 multiplied by 3 value is 9. So, you have 4 number of total number of wheelchairs are 10 whereas, you have 4 categories. In one category the value is 6, another category 4, third category 0 and sixth category is 9. So, total score becomes 19. Then what is the wheelchair mean score of the wheelchair? 19 divided by 10 that is 1.

9 that is the mean score for wheelchair. Now here question is are wheelchairs sufficient in number or not? Now we need to remember what is the definition of sufficiency. If you have 10 number of patient and you have 50 percent of that like 5 number of wheelchair then it is sufficient, if it is less than that it is not sufficient. So, 50 percent availability of wheelchair. So, what was our total number of patient? Our total number of patient in this particular case was 22.

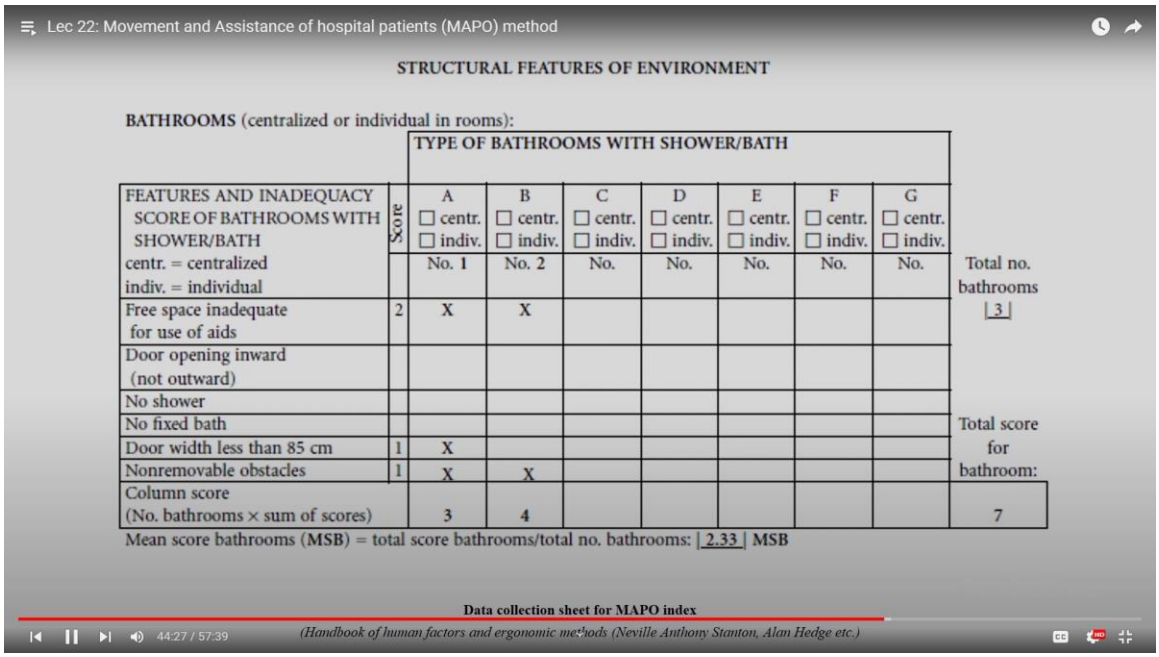
So, 16 plus 6, 22. So, technically if we want sufficient number of wheelchair it should be 11. Here we have how many? 10. So, definitely we have insufficient number of wheelchairs. So, let us see this. So, we have insufficient number of wheelchair.



So, we have given value is no we we do not have sufficient. So, score is 1.9 and we do not have sufficient number of wheelchair. So, this is about wheelchair. Now let us move to the next portion that is the lifting device. So, manual number 1 and manual lifting device you have 1 and some is there as electrical that is the number of you have 2 device.

So, our lifting device normally is used? Yes, here in this particular case it is yes. If no then why? So, always it is not used, some cases it is used. If also it is used mainly the electric type it is being used. So, these are the information you are collecting and mostly we are not using why? Not suitable for the units requirement and sometimes it is mostly it is broken. So, that is why we are not using. Are manual patient lifting operators completely eliminated by the use of lifting device ok? In this particular cases answer is no.

Is there any other aids available? Here answer is we have one roller and for which the operators are these aids used mainly from the bed wheelchair transfer we are using this type of roller not for other cases. Bed to trolley or for other cases or moving bed we are not using. Only from bed to wheelchair transfer this roller is being used. So, this is the information available for associate aids What we are going to do with this? We will see later.

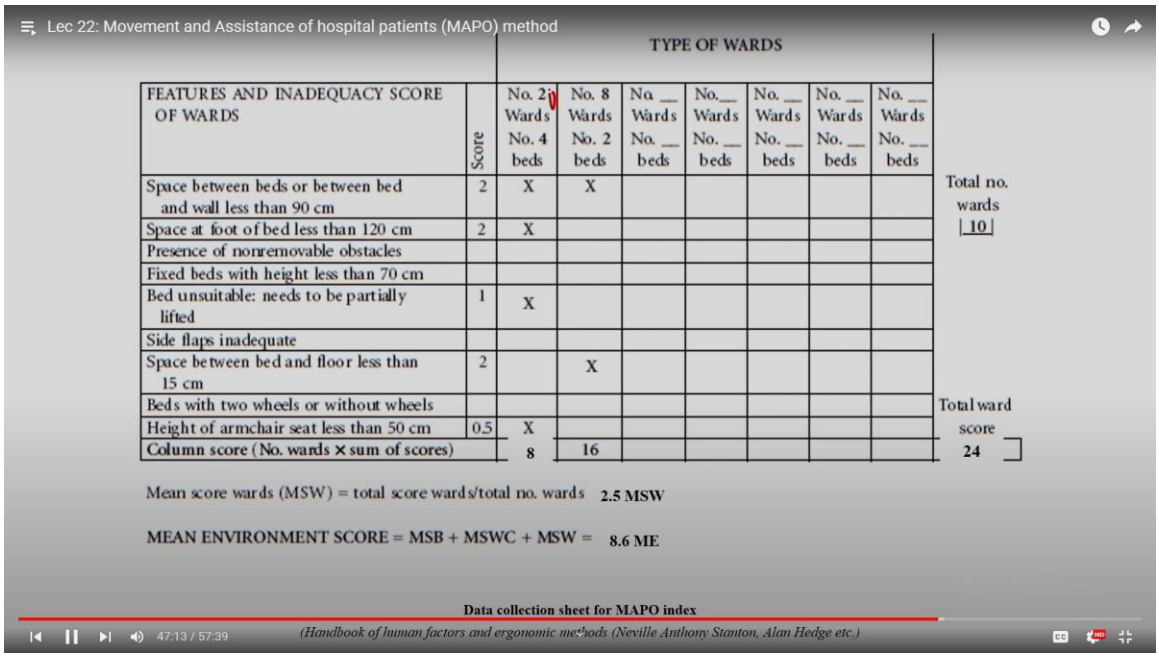


Now coming to the next factor that is the environment. We have how many factors in environment? We have 3 factors, one for bathroom, one for toilet and one for ward. You have 3 factors. So, first discuss the bathroom factors.

Here you have all these features. What is free space is inadequate for the use of the aids. Door opening inward, inward not the outward. No shower, no fixed bath. Door widths are less than 85 centimeter non-removable removable some obstacle and columns then you are going to get this column score. Now here also same one case 1, case 2, case 3 like that you have the cases.

How many total number of bathrooms you have? You have total 3 numbers of bathroom. How they are divided? Category 1 is 1 and category 2 you have 2 numbers of bathroom. What is the problem? You have issues in first category that is the free space is inadequate and door widths are less than 85 centimeter and non-removable obstacle.

So, you have 1, 2, 3. So, 3 multiplied by 1 the value is 3. Whereas here you have 1, 1. So, 2 1 plus 1, 2, 2 multiplied by number of bathroom present. So, it is 2 then you get the value 4. So, total is 3 plus 4 is 7. So, 7 what you have total score of bathroom divided by total number of bathroom 7 divided by 3 the value is this that is the mean score of bathroom.



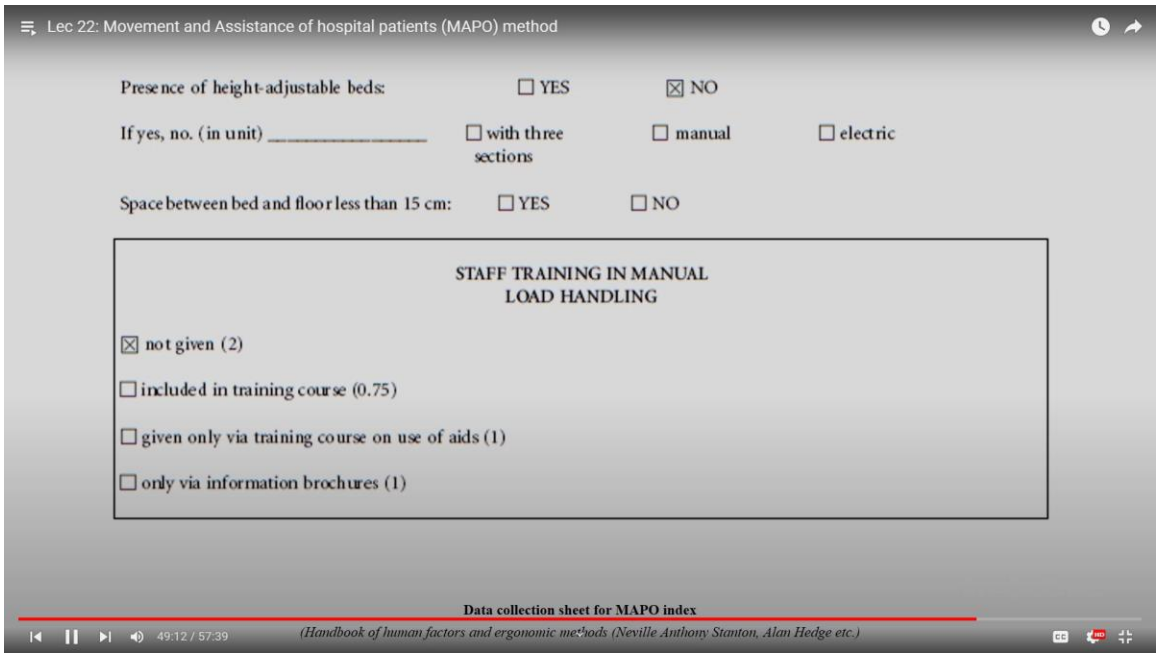
Similarly, we need to calculate the toilet score. Here you can see you have 8 western commode, you have 2 major category in category A you have 1 in category B you have 7. Here the value is 3 and here the value is 28.

So, total value is 31. Similarly, we calculate the 31 divided by 8 and the value is 3.87. So, this is the mean toilet score. We have type of words same case same. So, how many number of word you have number 2, number 8 and how many. So, that here you can see that how many number and in that how many beds are beds are available So, that accordingly you can categorize them here we have only 10 words that you are going to discuss.

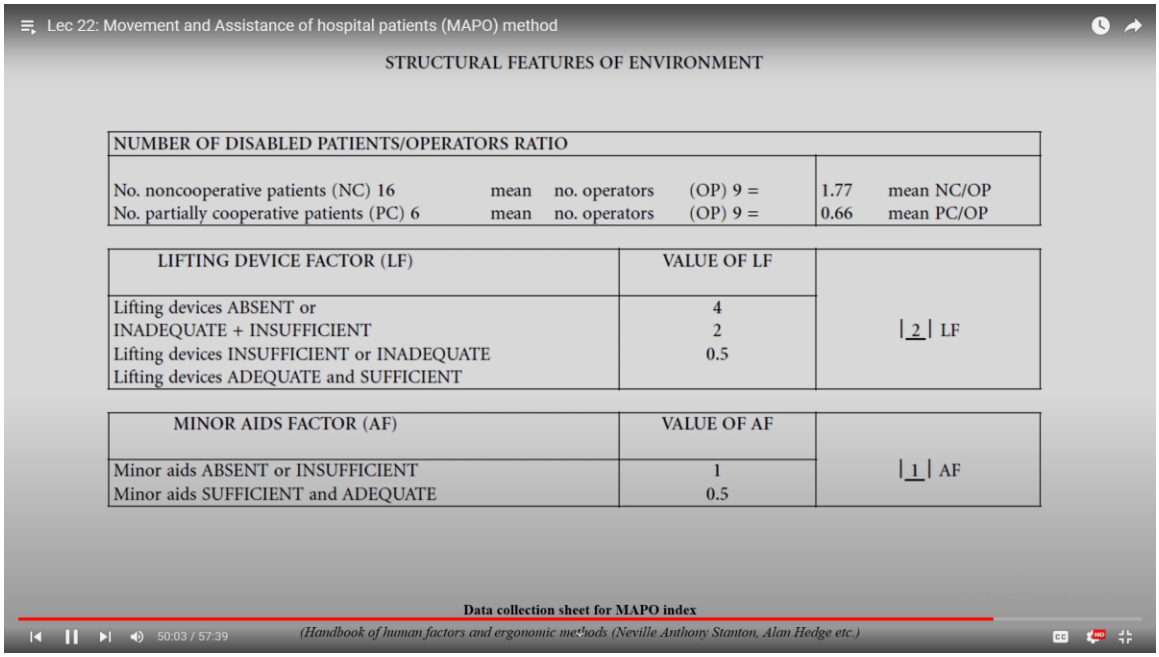
So, here it is 2 plus 8 is total 10. Although there is number of beds mentioned it does not have any impact in case of calculation. Here are the features available how you are going to calculate the type of words based on that the total you know word score. So, these features are available here. Here you can see in the first category you have 1, 2, 3, 4, 4 scores, score 4 multiplied by you have 2 number of word.

So, you have value 8. Here you have 1, 2, 2 values and you have total 8 words. So, value is 16. So, 8 plus 16 is 24, 24 divided by 10 it is almost 2.

4 it is not 2.5 it is 2.4 it is not 5 it is 4. So, this is how you calculate the toilet score. Now you had bathroom score, you have toilet score and you have word score. You add them and you get the mean environment score. You get mean environment score.

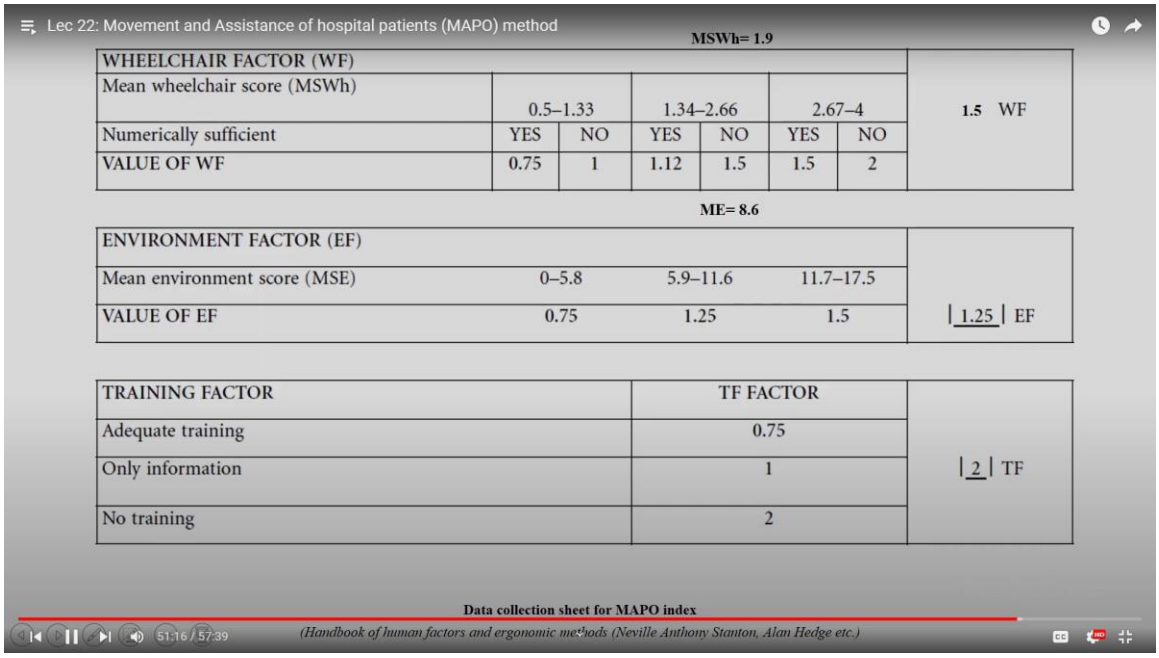


Now what you need to do extra here. So, please you have to presence of the height adjustable beds. If you have yes, if you do not have then no and then more category that with 3 section manual or electric how do you do that and the staff training manual handling. So, here in that case it is not given. So, value is 2. We mentioned if included training then 0.75, if it is there, but not fully then 1, if it is not at all there then value is 2.. So, in this particular situation or in this particular case the value was 2.



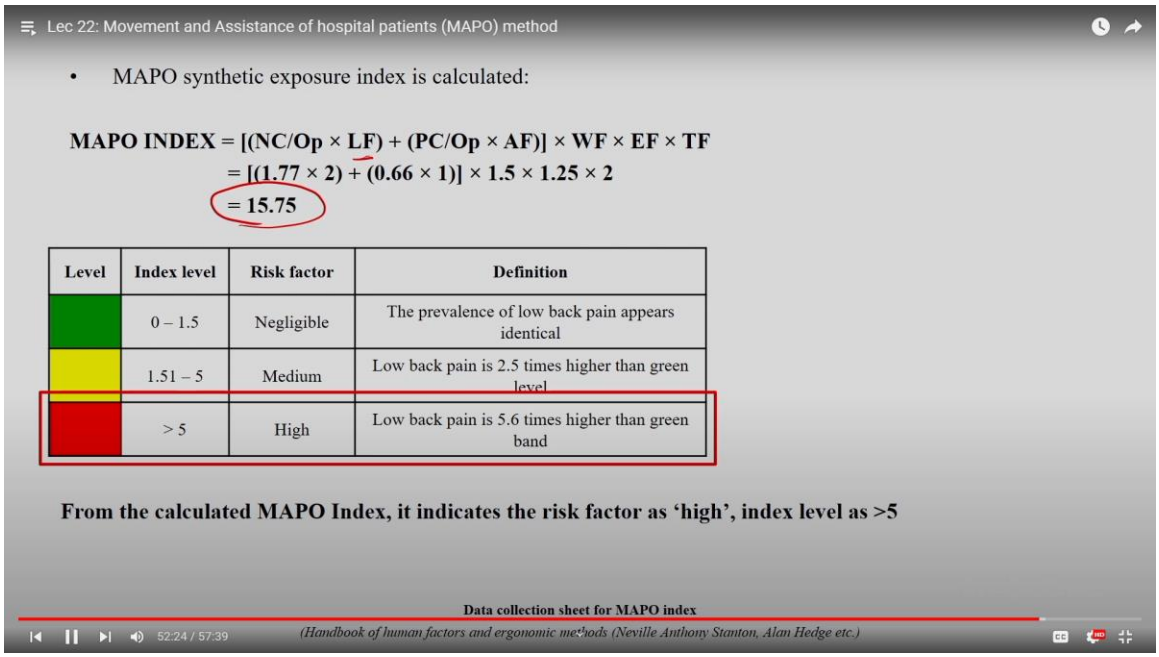
So, let us see how do we get the analysis. So, number of disabled patient by the operators ratio. Here you can see the non-cooperative and the operator ratio is 1.77, whereas

partially cooperative patient and the operator the value is 0.66. So, lifting device factor you have different section 4, 2 and 0.5. So, you what we have in this particular case that is the inadequate and insufficient. So, here you will get the value 2. Then minor aids factor like if you have some kind of additional we had some kind of roller, roller which is going to help us from moving from bed to the wheelchair that is why the value is 1 that is the minor aid factor.



In case of wheelchair what we had our value was as per I remember our value was for wheelchair let us remember yes 1.9. So, if it is 1.9 that means, we are lying in this particular region 1.9 and the number of wheelchair definitely was not sufficient. We had total 10 numbers of wheelchair and the number of patient was 22.

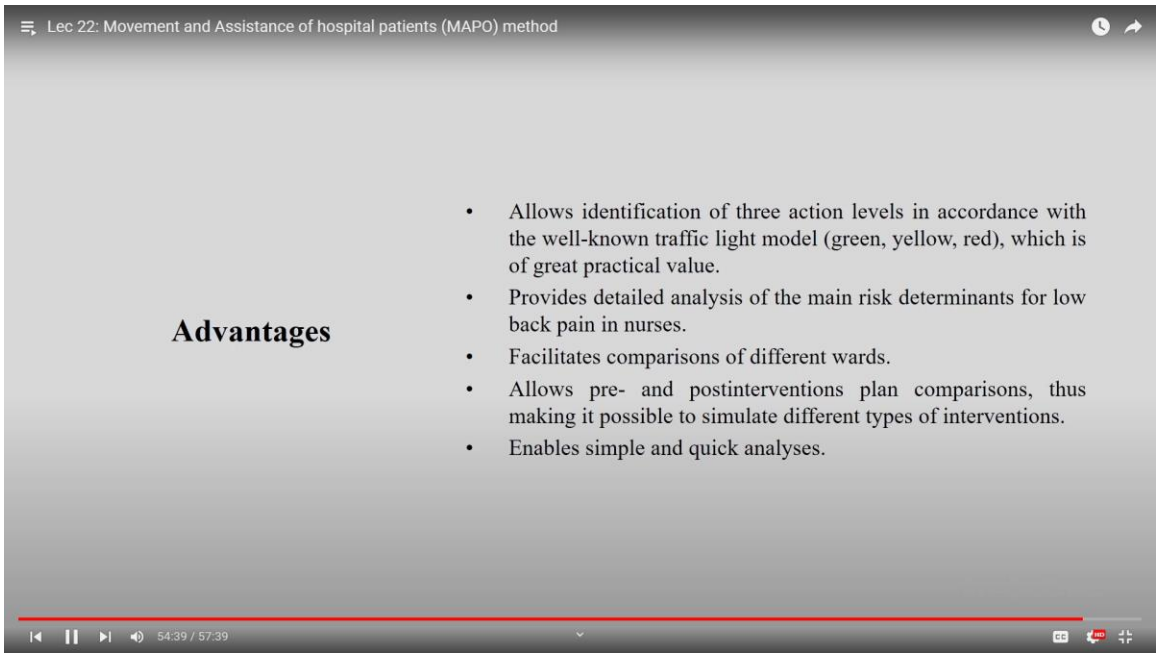
So, technically we should need 11 wheelchairs whereas, we have 10. So, the value is this particular case right 1.5. Environmental factor we added them and it became this particular case that is the value of 1.5. So, this particular section ok and in training factor as I said it is no that is the information given by this particular section.



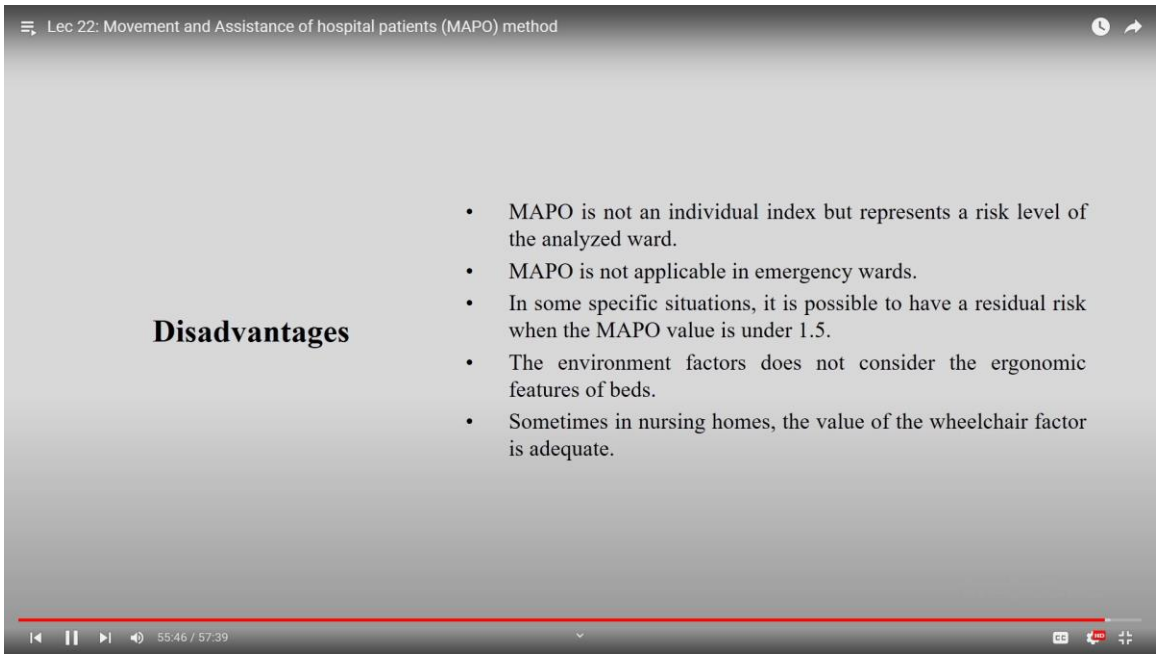
So, value is 2. So, we have all these factors with us now let us multiply them. So, we get some value after multiplying. So, this is the lifting factor multiplied by the ratio of non-cooperative patient by and the operator and then plus the partially cooperative patient and the operator. So, this is the value and then you multiply withwheelchair factor, environmental factor and training factor.

Finally we get a value of 15.75. You can really understand this is very very high. So, the risk in this particular sector is quite high it is 5.6 times higher than this green zone. So, as I said we need to do some kind of intervention immediately by seeing this value. Either you increase the number of wheelchair or you increase the status of the wheelchair, you increase the number of the operator, you increase or you improve the situation of the bathroom, then toilets and the words like difference between the two bed to the other.

So, layout and everything or you give them better training to handle the situation. For by doing all these factors or all theseimprovement you can reduce this particular value that is the 15.75 and then you can say yes you have done the intervention correctly. If the value reduces and come back to this level then it is safe to work, if it is not then you need to keep on working till it is coming down. That is how you are going to use this MAPO index for evaluating or assessing the manual handling or manual patient handling at the hospital.



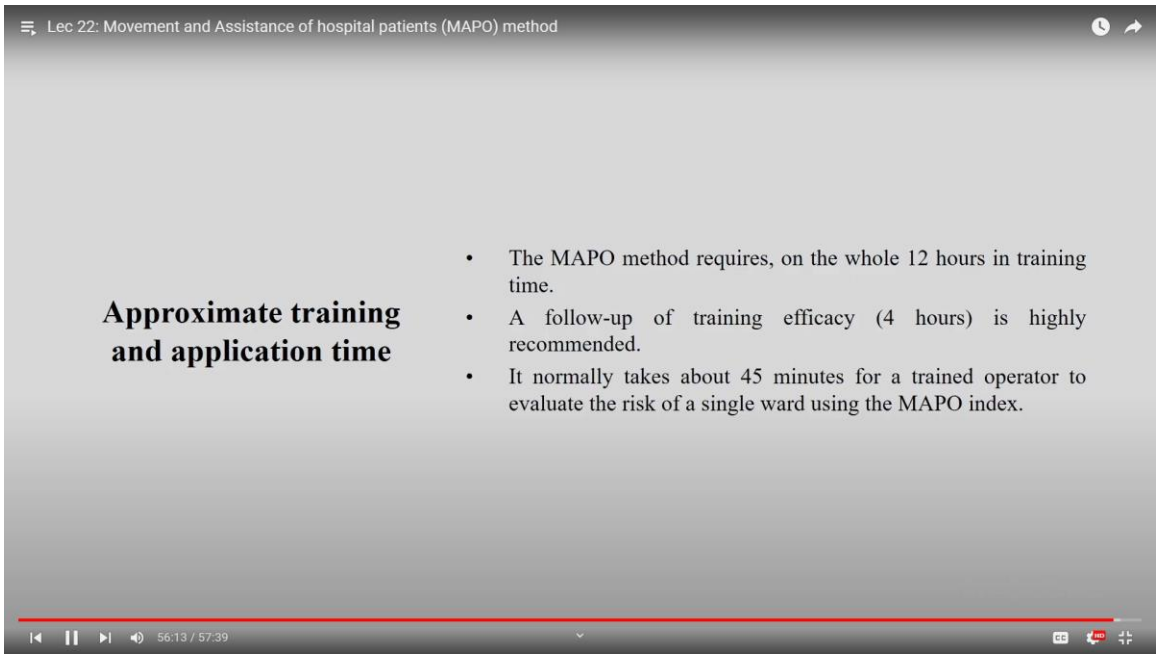
So, this is how you should use them. So, as a protocol let us understand what are the advantages of this particular tool. This particular tool allows the identification of three action levels in accordance with the well known traffic light model that is the green yellow red which is a great practical value and provides detailed analysis of the main risk determinants for low back pain in nurses. It facilitates comparison of different words, word to word comparison you can do. Also it allows pre and post intervention plan comparison thus making it possible to simulate the different types of intervention and also it enables simple and quick analysis So, these are the advantages.



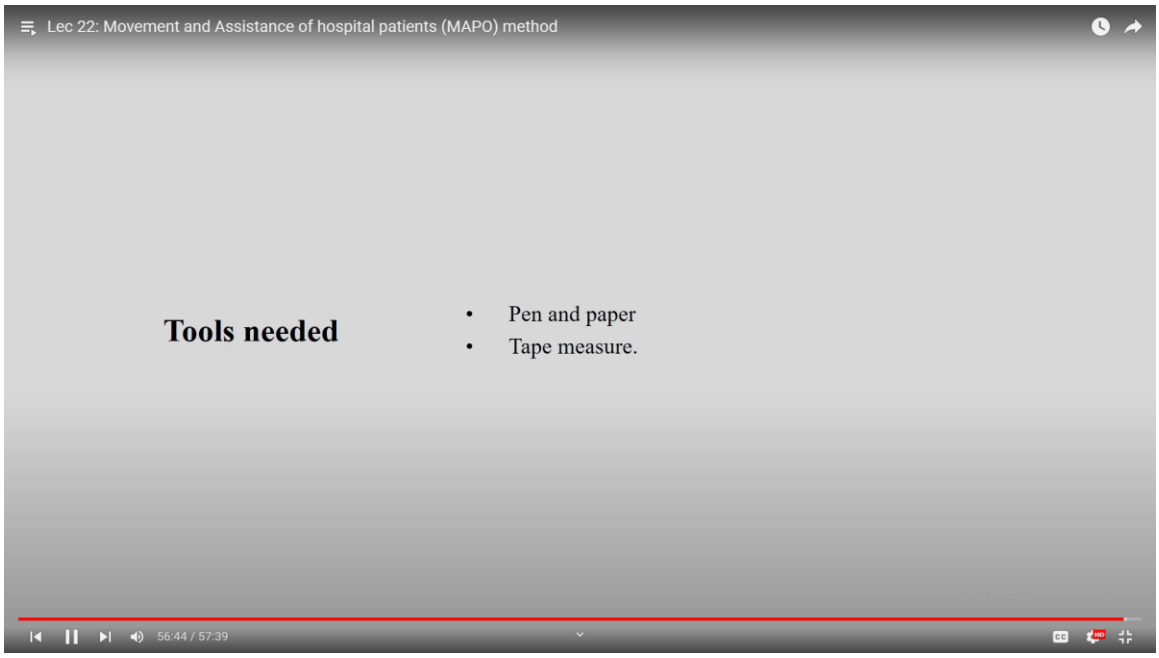
There are some disadvantages. So, MAPO is not an individual index, but represents a

risk level of the analyzed word. MAPO is not applicable in emergency word as I mentioned earlier. In some specific situation it is possible to have a residual risk when MAPO value is under 1.5 and the environmental factors does not consider the ergonomic features in the bed only for the wheelchairs it is being used.

Sometimes in nursing homes the values of the wheelchair factor is adequate. However beds are not adequate. So for those cases it is little conflicting.



So the MAPO method requires on the whole 12 hours training time a follow up of training efficacy, efficacy for 4 hours is highly recommended and it takes about 45 minutes to collect the data and further you can analyze at the your laboratory.



What instrument you need? You need pen, paper, tape measurement to find out the distances and the width and all those things.

Also you need the worksheet MAPO worksheet. MAPO worksheet will help you to get the index correctly. So, that is all for MAPO. I suggest you go any one of the nearest hospital and try to get permission to do the study and practice it at your own that how this particular tool is effective in your case That is all. Thank you so much.