ANALYSIS OF PRACTICAL METHODS OF EARLY DETECTION OF IDIOPATHIC SCOLIOSIS

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Article History	Abstract
  	Scoliosis screening in school is essential for early detection before the curve worsens. Many idiopathic scoliosis patients occur in women with an average age of 14 years. They seek treatment when the age has reached skeletal maturity, and abnormalities have interfered with daily activities. Spinal surgery tends to require high costs, ranging from tens of millions to hundreds of millions of rupiah. Knowledge related to the basics of scoliosis is vital for the community because it affects the proper treatment according to their condition. The role of the Orthotist is still lacking in conducting regular scoliosis screening. We use data by purposive sampling based on inclusion criteria in clinics and hospitals that have spinal workshops or treat scoliosis. The study was conducted at two scoliosis clinics in Jakarta and two in Bogor, with quantitative methods via questionnaires and qualitative methods via Forum Group Discussion (FGD). Factors that influence orthotics in conducting scoliosis screening in patients are a lack of orthotic knowledge about appropriate scoliosis screening methods, especially related to indicators of ignorance of the SOSORT Guideline, not knowing the need to screen six parts of the patient's body, knowing the function of ATR and Scoliometer but not knowing how to apply them, and lack of active participation between orthotist and doctors. Several recommendations can be taken to improve scoliosis screening methods. Also a need to increase scoliosis screening knowledge, maximize scoliosis screening performance, and screen for scoliosis diagnosis by involving orthotics.
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Introduction

The Spine is one of the limbs that plays an important role, especially in supporting the weight of the human body load. The human spine is composed of 33 bones supported by ligaments and muscles, forming a curve or arch like the letter "S" when viewed from the side and is straight from the back view. The term "scoliosis" comes from the Greek "scolios," which means arch. In general, the definition of *scoliosis* is a spine that curves to the sides by 10 degrees or more. 1 The cause can be muscle as well as nervous (neuromuscular) disorders, congenital (congenital), and unknown (idiopathic) abnormalities.

Often scoliosis arises during *a growth spurt* at the beginning of puberty (Brox, 2014). About 80% of scoliosis is idiopathic, a disorder of unknown cause. Some countries show a 0.47-5.2% prevalence for cases of juvenile idiopathic scoliosis (Konieczny et al., 2013). As many as 2-3%, or about 7 million residents in the US, have scoliosis. Based on data *from The American Academy of Orthopaedic Surgeons,* in 2004, there were approximately 1.26 million patients with spinal disorders in health care, and 93% of them were diagnosed with scoliosis (*National 2 Scoliosis Foundation and DePuy Spine, Inc., 2009*). The prevalence rate of idiopathic scoliosis in the school population in Singapore is 0.93% in girls and 0.25% in men (Wong, 2005). The prevalence of scoliosis in schoolchildren in Korea is 3.26% (Suh *et al.*, 2011). While in Indonesia, the prevalence of scoliosis is around 4-4.5%, and females suffer more from it than males. According to Simanjuntak in 2008, the occurrence of scoliosis cases is more common in women than men in a ratio of 7:1. Generally, the prevalence of scoliosis in the adolescent group in Indonesia is not yet known for sure (Mukaromah, 2011).

The symptoms caused in people with scoliosis are usually absent. However, in some cases, people with scoliosis usually experience low back pain, a feeling of fatigue if sitting or standing for a long time, and the level of balance between the shoulders and hips is reduced; this can be seen from the unequal shoulder height, and the spinal curve is more bent to one side. The classification of the degree of curvature of the scoliosis curve, according to Mujianto (2016), is divided into four. The first is the Mild Scoliosis type (with a curve of <200), this type of scoliosis does not require treatment, it only needs to be monitored periodically (once every 3 to 6 months); the second type of Moderate Scoliosis (with a curve of 25-400), this type of scoliosis is still in the observation stage, but it still has the possibility of causing problems in the heart if not treated properly. The third is the Type of Severe Scoliosis (curve >400); if the curve exceeds 70 degrees, there will be a rotation of the vertebrae. This situation will cause the costa bone to compress the lungs, inhibit breathing, and lower the necessary oxygen levels, which can harm the heart organs. The fourth type of Scoliosis is Very Severe (with a curve of >100 degrees); if the scoliosis curve exceeds 100 degrees, it can injure the lungs and heart. People with very severe scoliosis can cause infections in the lungs/pneumonia. Treatment for idiopathic scoliosis is based on age, the curve's magnitude, and the severity risk of development. It includes observation sessions, orthotic management, and surgical procedures to correct scoliosis. A child less than ten years of age should be referred to an orthopedic specialist if it has a curve of more than 10 °, then also if the patient aged ten years or older has a degree of curve of more than 20°, and has an atypical picture or has had complaints of back pain or other neurological abnormalities. 4 Then scoliosis screening in schoolchildren is necessary to detect early before the scoliosis curve occurs further or gets worse.

In many countries, screening for scoliosis is usually done on elementary and children in a community. *The American Academy of Orthopaedic Surgeons recommends* screening girls twice, namely at 11 and 13 years, while screening in boys is only enough to be done once at the age of 13 or 14. Although there has been strong evidence of advanced scoliosis treatment, the screening/early detection method is still the most superior method for controlling the severity of scoliosis. The diagnosis of scoliosis is supposed to be carried out between the ages of 10 and 15. Suppose the progressive curve can be identified early. In that case, the appropriate treatment method in the form of *bracing* or orthotic devices and physiotherapy can also be

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determined quickly so that the patient does not need surgery. 5 It is necessary to have a scoliosis screening program that must be carried out periodically in Indonesian elementary schools.

The scoliosis screening program is very important to be involved in the elementary school to identify students with spinal deformities that may cause impairment of the body's range of motion and endurance, and in advanced stages, back pain and functions of other parts of the body. It has even entered into the health curriculum in many schools in several countries, such as the United States, England, and Japan. This idiopathic scoliosis screening is usually done by visually inspecting the spine (asymmetry of the shoulders, scapula, and hips). Then a forward hunchback test is carried out called the *Adam Forward Bending Test* (AFBT), a standardized test for scoliosis screening. 7 Scoliometer tools can also be used to measure the angle of rotation of the torso. However, in addition to the high price of the tool, this program also requires reliable and superior resources so that the screening program can be carried out regularly. In this era of advanced technology, the application "*Scoliometer by Dr. Kevin Lau*," has been available on the *Google Play Store* and *the iPhone app store*. Unlike the original physical device, the app can increase the measurement range from 30 to 60 degrees to determine a higher degree of the scoliosis curve. The app has been validated, is easy to use, and is accurate. With this convenience, it is hoped that the community will be able to play an active role in managing the scoliosis screening health program and do it regularly.

Problem Identification

Based on the above background, the author identifies the problem as follows:

1. The number of people with scoliosis continues to increase in Indonesia.
2. Many idiopathic scoliosis patients occur in women with an average age of 14 years.
3. Lack of knowledge among the Indonesian people about scoliosis cases and the importance of regular screening
4. Most sufferers only seek treatment when age has reached *skeletal maturity* and the abnormalities have interfered with daily activities.
5. Most people with idiopathic scoliosis have a *Cobb angle* of 41-50 degrees in the thoracal and 21-30 degrees Thoracolumbar and have had indications for surgery.
6. It is essential to find scoliosis as early as possible so that therapy can be carried out immediately.
7. Spinal surgery tends to require high costs, ranging from tens of millions to hundreds of millions of rupiah.
8. Knowledge related to the basics of scoliosis is vital for the community because it affects the proper treatment according to their condition.
9. The role of Orthotis and other health teams is still less effective in conducting regular scoliosis screening.

Problem Restrictions

This study analyzed the level of orthotic knowledge in screening scoliosis in patients.

Problem Formulation

Based on the background above, the researcher formulated the research problems as follows:

1. What factors influence orthotist in conducting scoliosis screening in patients?
2. What steps can be taken to improve the scoliosis screening method in patients?

Research Objectives

The general objective of this study is to produce an effective and efficient method of early detection of scoliosis cases. While the specific objectives of this study are as follows:

1. To find out the factors that influence the orthotic way of screening scoliosis in patients
2. To find the proper steps to improve scoliosis screening methods in patients.

Research Methods

Research Types and Designs

The research used quantitative and qualitative analytics with Cross-sectional design

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and in-depth interviews through *Forum Group Discussion (FGD)*, meaning that as many as twenty-two orthotic objects are given the same question model simultaneously. The next step was to study the prevalence, distribution, and relationship between the level of knowledge and the screening method by observing the status of the scoliosis screening method. This treatment was carried out only once, and measurements using independent and dependent variables were carried out during data assessment. The method used a qualitative approach, namely correlation, where the analysis is used to determine the relationship. The measurement of variables in this study used primary data from various orthotist in Scoliosis Clinic in Jakarta and Bogor City. The research design was *Cross-sectional,* which is the choice of researchers considering that the design of this study does not take long and that, at the same time, it can explore several variables and relationships between variables.

Sample

The sampling technique was *purposive sampling*, meaning that respondents following the research context were based on the specified inclusion criteria.

a. Inclusion criteria:
  1. Orthotists who works within Jakarta city and Bogor regency/city
  2. Physically and spiritually healthy
  3. Have handled scoliosis cases and provided services in those cases

b. Exclusion criteria:
  1. Prosthetists
  2. Never treated a scoliosis case and provided services in that case

Time and Place

This research was conducted from June to November 2019 in scoliosis clinics or hospitals in Jakarta and Bogor.

Research Instruments

This study's measuring instruments used for data collection were questionnaire sheets and in-depth interviews with the Forum Group Discussion method.

Data Analysis

This field research aimed to obtain more precise and accurate data—the data obtained through a forum group discussion between the researcher and the orthotist. Interviews were conducted in the form of questions posed to the orthotic in question so that it is expected to obtain more evident data. In this study, the research object was orthotics at the Scoliosis Clinic in Jakarta and Bogor. We also conducted direct observations to the orthotist while they are performing special test to find Scoliosis at the research sites at the Scoliosis Clinic in Jakarta and Bogor. Afterwards, respondents filled out the Questionnaires. Researchers distributed questionnaires to respondents using a list of questions about knowledge, skills, abilities, and orthotic performance in the clinics.

Results of Research and Discussion

Data Exposure and Data Analysis

Table 1. Statistics

|		Total_X1	Total_X2	Total_Y
N	Valid	22	22	22
	Missing	0	0	0
Mean		9,55	7,91	4,50
Std. Error of Mean		,561	,294	,292
Median		9,00	8,50	5,00
Mode		7	9	6
Std. Deviation		2,632	1,377	1,371
Minimum		6	5	2
Maximum		14	9	6
Sum		210	174	99

The results of the analysis obtained the average knowledge of the Scoliosis Screening Method (symbol X1) was 9.55 out of a total question score of 15 or as much as 63.67%. Meanwhile, based on the results of statistics on Work Experience related to Scoliosis Cases (X2 symbol) there is an average of 7.91 out of a total question score of 9 or as much as 87.89%. Then finally regarding the screening variable for scoliosis diagnosis (symbol Y), an average of 4.5 of the total question score of 6 or as much as 75% was obtained.

A. Knowledge of Scoliosis Screening Methods (symbol XI)
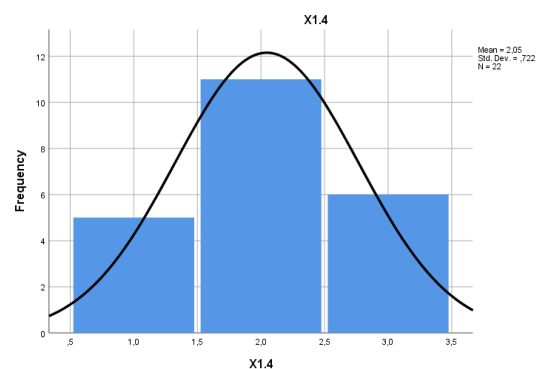

X1.1
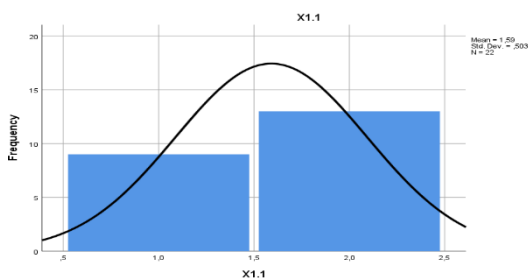
The results of the analysis obtained the average knowledge of the *SOSORT Guideline* was 1.59, with a standard deviation of 0.503. A total of approximately 13 respondents agreed that the *SOSORT Guideline* is important in scoliosis screening and 9 respondents disagreed that the *SOSORT Guideline* is important in scoliosis screening. Not a single respondent said they strongly agreed that the *SOSORT Guideline is* important in scoliosis screening.

X1.2
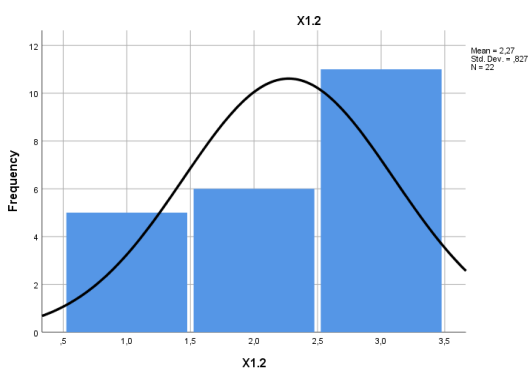
The results of the analysis obtained an average knowledge about the Importance of Scoliosis Screening in 6 Parts of the Body was 2.27, with a standard deviation of 0.827. A total of 11 respondents strongly agreed with the Importance of Scoliosis Screening in 6 Body Parts. Meanwhile, 6 people agreed and 5 people disagreed regarding the Importance of Scoliosis Screening in 6 Body Parts.
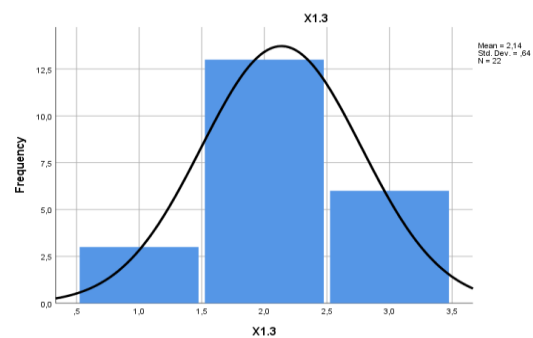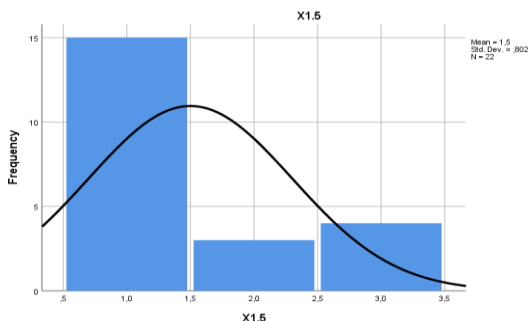

X1.3

The results of the analysis obtained an average knowledge of the Importance of Knowledge about the *Angle of Trunk Rotation* (ATR) Function was 2.14, with a standard deviation of 0.64. A total of approximately 13 respondents agreed regarding the Importance of Knowledge about the *Angle of Trunk Rotation (ATR) Function*. Meanwhile, only 3 respondents disagreed and 6 people expressed strong agreement regarding the Importance of Knowledge about the *Angle of Trunk Rotation* (ATR) Function.


X1.4

The results of the analysis obtained an average knowledge of the Importance of Knowing the Function of *the Scoliometer* was 2.05, with a standard deviation of 0.722. A total of approximately 11 respondents who had an

agreed perception regarding the Importance of Knowledge about *the Scoliometer* Function. Only 6 respondents strongly agreed regarding the Importance of Knowledge about *scoliometer* functions and the rest disagreed.
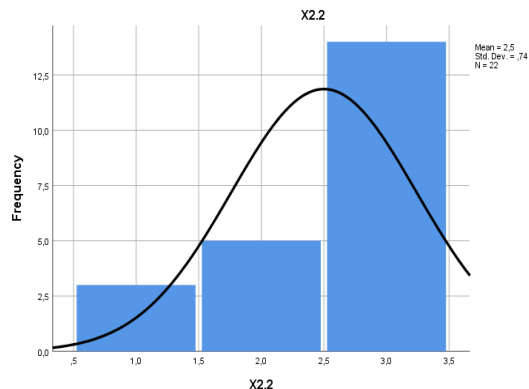

The results of the analysis obtained an average knowledge of the SOSORT Guideline was 1.5, with a standard deviation of 0.802. A total of approximately 15 respondents had disagreements regarding the Importance of Knowledge about *the Scoliometer* Function. Meanwhile, only about 4 respondents agreed regarding the Importance of Knowledge about *the Scoliometer* Function.

## B. Work Experience Related to Scoliosis Cases (X2 emblem)
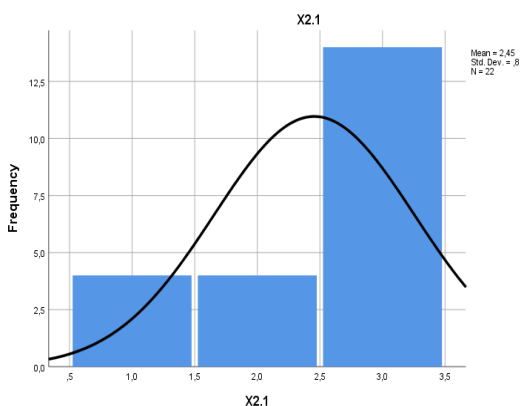
The results of the analysis obtained an average knowledge about the Length of Work (more than one year) Not Necessarily a Scoliosis Expert was 2.45, with a standard deviation of 0.8. A total of 14 respondents who have a strongly agreed perception regarding length of work (more than one year) is not necessarily a scoliosis expert. Meanwhile, a total of 4 people each agreed and disagreed regarding the Length of Work (more than one year) Not Necessarily a Scoliosis Expert.
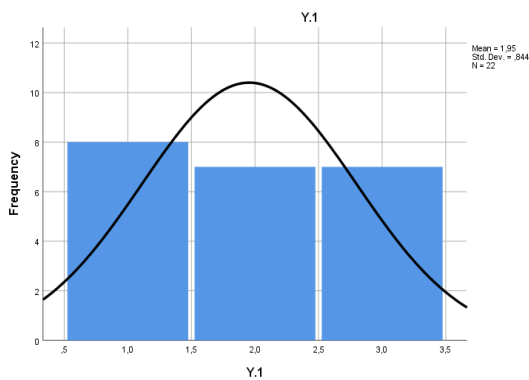

The results of the analysis obtained an average related to the Importance of Screening Before Prescription was 2.5, with a standard deviation of 0.74. A total of 14 respondents who had a strong perception agreed with the importance of screening before prescription. Meanwhile, a number of 5 respondents agreed and 3 respondents disagreed that it was important to do screening before prescription.
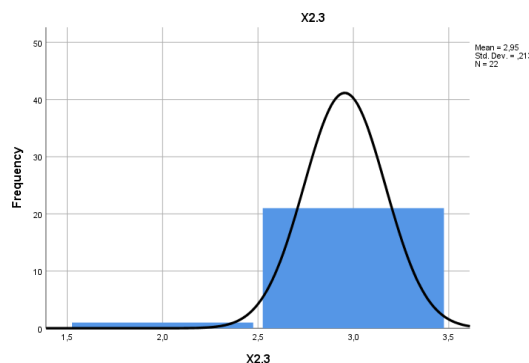
The results of the analysis obtained the average related to Orthotics must Play a Role with a Multidisciplinary Team is 2.96, with a standard deviation of 0.213. A total of 20 respondents strongly agreed that Orthotics should Play a Role with a Multidisciplinary Team. Meanwhile, only 2 respondents disagreed with this.

C. Screening for The Diagnosis of Scoliosis (Y symbol)

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The results of the analysis obtained the average related to the Negative Screening Results Suggested for the Next Re-Screening was 1.96, with a standard deviation of 0.844. A total of 8 respondents who disagreed and as many as 7 respondents each who agreed and strongly agreed regarding the Negative Screening Results Were Suggested for the Next Re-Screening.
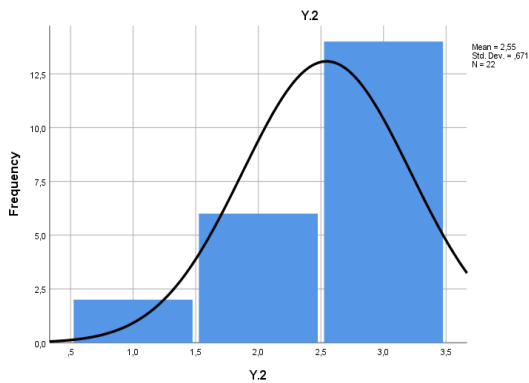
The results of the analysis obtained an average related to the X-Ray Stage Advanced Positive Screening Results of 2.55, with a standard deviation of 0.671. A total of 14 respondents strongly agreed and as many as 6 respondents agreed. Only 2 respondents disagreed regarding the X-Ray Stage Advanced Positive Screening Results.

Research Findings

After the researchers conducted research at two scoliosis clinics in Jakarta City and two scoliosis clinics in Bogor Regency / City with quantitative methods via questionnaires and qualitative methods via *Forum Group Discussion* (FGD), it can be explained the research findings as follows: Knowledge is an internal factor that affects the success of

scoliosis management, in addition to work experience as well as educational background. This situation is because knowledge related to the early detection of scoliosis appropriately and well-owned by the orthotic will affect the management of scoliosis cases from an early age.

On the other hand, if someone pays attention continuously, it can arouse interest. Determining the knowledge of scoliosis screening involves several factors, likr Knowledge of scoliosis screening methods based on *the SOSORT Guideline*. This *benchmark of THE SOSORT Guideline* indicators has been proven effective in the management of scoliosis screening because it was discussed at the 4th International Conference on The Conservative Management of Scoliosis, delivered by SOSORT, in May 2007. Some of the objectives are as follows:

1. The inclusion of detailed information related to this issue,
2. The existence of analysis and discussion are taken from consensus participants at the time of the last meeting,
3. The positive impact of screening on the frequency of need for spinal surgery and preventive measures,
4. There are strong reasons that the screening program with the SOSORT method should be continued.

Based on the results of an interview with Mr. G as an Orthotist at the O clinic, the orthotic needs to know this SOSORT Guideline because it can support and improve the quality of the examination so that an accurate diagnosis is obtained, which is closely related to making a more optimal orthotic so that the patient's final result will be satisfied. The costs incurred also become more effective due to optimal correction results. The next factor was the importance of doing scoliosis screening which is done thoroughly on six body parts. Usually, this phase of measuring six body parts is referred to as the Standing Forward Bending Test or the Adams Forward Bending Test (AFB Test). This AFB test is very well known to be applied to school students. It is also widely applied by healthcare workers in hospitals or clinics as subjective evaluation material or qualitative

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cases of scoliosis. Some of the indicators that health workers must perform based on these physical measurements provide a quantitative evaluation of the deformities found and can be the basis for providing referrals according to the results obtained during screening.

Based on the results of an interview with Mrs. S as an orthotic at clinic B, it was stated that "The patient is asked to prepare in a forward bending position, with the position of the body bending forward with a downward view, the position between the right leg and the left foot should be about 15 cm apart, the knees bent back, the shoulders relaxed and the hands positioned in front of the knees with a straight position of the elbows and dangling palms." In addition, Mrs. S also conveyed further that there is a lack of health promotion about scoliosis in the community, combined with the lack of competent orthotics for scoliosis. Usually, only this is done by the orthotic in his clinic. Even though the SOSORT Guideline has provided a complete guide to this scoliosis screening method. The following technique is to measure the height of the ribs using a ruler, flexicurve, or scoliometer. Inclinometer measurement measures the angle of rotation of the rod (ATR), which is observed when the patient is in a forward bending position). This method is the simplest, fastest, most reliable, and least expensive technique in measuring spinal deformities.

Orthotic knowledge of the function of the Angle of Trunk Rotation (ATR) and the use of scoliometers for such measurements are closely related in scoliosis screening. According to the SOSORT Guideline, this scoliometer is highly recommended for screening scoliosis in schools, and The Bunnel scoliometer is the most widely used. The other type is Prujis Scoliometer. This ATR measurement provides objective results for the child's growing spine. The earlier it is known that there is AN ATR or rotation in the back, the more it can prevent further scoliosis severity. The problem about ATR and scoliometers is directly proportional to the findings in quantitative data, which presents the results that only 13 respondents agreed regarding the Importance of Knowledge about the Angle of Trunk Rotation (ATR) Function. Meanwhile, only three respondents

disagreed, and six people expressed strong agreement regarding the Importance of Knowledge about the Angle of Trunk Rotation (ATR) Function. In general, they understand the function of ATR and scoliometers but do not understand how to apply them to patients when conducting the screening process. Based on interviews with S's mother and G's father, they stated, "Most of our clinics do not have scoliometers because they are expensive from abroad, and we also lack knowledge about screening techniques. The current methods that can be done for screening are still unknown, and we usually only do AFB tests.

Regarding indicators of the work experience of orthotics in handling scoliosis cases, it is usually the orthopedic doctor who gives the diagnosis that the patient is positive for scoliosis and must be immediately given a Spinal Orthosis (SO) tool by the orthotic. In the Forum Group Discussion (FGD) process, Mr. A from clinic N and Mrs. L from clinic G in Bogor were informed that there was still a lack of socialization about the importance of scoliosis screening in the community. In addition, due to the limited funds from the patient, the patient is sometimes reluctant to do further screening when it is notified that the patient may use orthosis in the future. Further socialization from professional organizations is needed to underline the orthotic authority to carry out scoliosis screening. According to the SOSORT Guideline, those with the right to perform scoliosis screening are health practitioners with a license or certificate related to scoliosis screening training. In addition, the orthotist, as screeners, are individuals who can screen for scoliosis adequately and appropriately. This license is characterized by doctors who have a license or health practitioners who have received scoliosis screening training from a Certified Scoliosis Screening Instructor or those who have completed documents related to scoliosis screening workshops in the past five years and can demonstrate their competence to a Certified Scoliosis Screening Instructor.

Discussion

1. Efforts to Increase Knowledge of Scoliosis Screening Methods

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Based on the research findings above, in screening scoliosis, orthotist usually only perform *the Adam Forward Bending* (AFB) test without measuring six different body parts. This situation happened due to the lack of orthotic knowledge regarding appropriate scoliosis screening. The orthotist understands *the Angle of the Trunk* (ATR) and the function of *a scoliometer* but does not understand how to apply *a scoliometer* to calculate ATR during scoliosis screening. The obstacles must be resolved immediately by working with professional organizations to organize special seminars or workshops related to this scoliosis screening problem. Most orthotist get a case of scoliosis by bringing a prescription from a doctor, which is a general TLSO brace, to reduce pain and not describe specific prescriptions of scoliosis, e.g., MSO or *modified Boston Brace*. If the orthotic has a holistic understanding of scoliosis screening from the beginning of treatment to patients, there will be good cooperation between multidisciplinary teams. Scoliosis treatment is not a short-term treatment where the results can be seen immediately after the prescription. It is crucial for Orthotist not always to have to provide a prescription as requested by the doctor. However, it would be better if the discussion is made to get a solution to the problem whose results will be better for the patient in the future.

2. Efforts to Maximize Scoliosis Screening Performance

If the orthotist already has sufficient knowledge related to scoliosis screening, then the performance of the orthotist in conducting screening will increase. This factor can be seen from the orthotic's ability to conduct screening per *the SOSORT Guideline*. SOSORT stands for *The International Scientific Society on Orthopaedic Scoliosis and Rehabilitation Treatment*, which produced its first instruction manual regarding scoliosis management, including ways or methods of screening, in 2000018 2005 and renewed in 2011. Based on the SOSORT Guideline, the appropriate screening method must be carried out from the beginning. Firstly, is to make observations on six parts of the body from the back side of the

patient, where the orthotist should pay attention to the height of the shoulders, scapula bones, and pelvic height; the scoliosis patient has a different height, where one side is higher than the other. Orthotist also needs to ensure that the distance between the gaps on the sides of the two hands and the body is not different. Last, the waist folds should not differ between the right and left sides.

Next, the patient performs the *Adam Forward Bending* (AFB) test, and when the patient bends down, it will be seen that there is a protrusion of ribs.
1. The patient is standing, and we stand from their upper back.
2. Ask the patient to bend down; it will be seen that there is a protrusion in the lumbar or waist with a different high level on the side of the lower back.
3. There is a kyphosis when viewed from the lateral side of the patient's body (the presence of unnatural-looking curvature).

This observation is crucial to indicate that the patient has early symptoms of scoliosis. To be sure further, an ATR measurement should be taken with a scoliometer by placing it just above the vertebrae to determine how much rotation occurs in the spine. If the ATR angle is five degrees, it means that the patient has about 11 degrees cobb angle. If the ATR is 7 degrees, it means that the Cobb angle is as much as 20 degrees. The ATR results indicate the initial diagnostic results without asking the patient to perform radiography to determine the angle of his Cobb. AAOS and SRS state that not all children referred because of positive screening results require radiography. Suppose the child has a positive screening but has entered the menstrual period when screening is carried out. It means the child has entered skeletal maturity, where the severity is not as significant as in childhood. Factors such as the child's growth and growth are essential in the initial management of scoliosis cases.

3. Efforts to conduct screening for diagnosis of scoliosis

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It is vital to change the perception of multidisciplinary teams, especially toward orthopedic doctors or medical rehabilitation doctors. They have to involve an orthotist from the initial process of screening for scoliosis until the delivery of the brace. There are several clinical experiences where the scoliosis patient is usually not directly consulted with the orthotic. A specialist doctor carries out the examination and screening process. While the orthotist only carries out the application of diagnoses established by the doctor. It would be better if there is a diagnosis doubt; Orthotist can re-screen appropriately. According to Mr. G from clinic O, scoliosis screening is very important to determine the right therapy or brace for people with scoliosis at an early age. The severity of scoliosis (based on the degree and Risser sign) will influence the prescription of the device. Often doctors directly prescribe Regular Lumbo-Sacro Orthosis or Lumbo Sacral Thoraco Corset to reduce pain in patients and are not recommended to wear a scoliosis brace (e.g., MSO or *modified Boston Brace*). The reality on the ground is that there are still very many parents who do not realize that their child has scoliosis until when the scoliosis is severe and visible (which usually happens when the child is already a teenager). The solution that can be offered is to immediately socialize with the community about the importance of screening for scoliosis in children aged 9-12. Early detection and self-awareness starting from parents, can be carried out by intensively socializing scoliosis. This activity can be carried out by collaborating with orthopedic doctors or medical rehabilitation to conduct screening or counseling in places with many scopes of adolescent scoliosis, such as junior high school students. Socialization activities can also be given during certain events, such as *car-free days*.

This activity also needs to be supported by increasing the participation of orthotist as health practitioners in conducting scoliosis screening through special seminars or workshops about appropriate scoliosis screening methods. Providing seminars or workshops related to scoliosis will increase the skills in orthotics. This workshop activity must be practical, starting from the examination or assessment, *casting, rectification, fitting, seeing* radiographic photos when patients use aids, and problem-solving cases of scoliosis. This workshop must also be given to all orthotist in Indonesia, especially in areas outside Java. The quality of the examination can be improved by getting an accurate diagnosis. It is supported by orthotist skills during clinical examination and making patients satisfied because they do not spend much funds for non-optimal correction results.

Conclusion

Several conclusions can be drawn based on the results of qualitative research with observation techniques, interviews, and forum group discussions held at scoliosis clinics in Jakarta and Bogor cities about analyzing practical methods of early detection of scoliosis screening. The conclusions are presented as follows:

1. Lack of orthotic knowledge about appropriate scoliosis screening methods, especially related to indicators of ignorance of the SOSORT Guideline, not knowing how to screen six parts of the patient's body, knowing the function of ATR and scoliometers but not knowing how to apply them
2. Orthotist does not participate with orthopedic doctors or medical rehabilitation doctors in treating scoliosis because doctors usually do screening and give prescriptions to orthotist.
3. Scoliosis screening is essential to determine the subsequent scoliosis management. If the screening result is negative, the patient is advised to re-screen the next time. If the screening result is positive, the patient must do an x-ray radiography.

Recommendations

Based on the study's results, several problems were found that had not been solved, so the researcher asked several questions during the group discussion forum and offered some ideas and suggestions. The recommendations include the following:

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1. Efforts to Increase Scoliosis Screening Knowledge by socializing with the community, providing seminars or workshops related to scoliosis treatment to orthotics
2. Efforts to Maximize Scoliosis Screening Performance by providing workshop activities with hands-on practice. Start from the process of examination or assessment, casting, rectification, fittings, seeing radiographic photos when patients use brace, and problem-solving in scoliosis cases. This workshop must also be simultaneously given to all orthotics in Indonesia, especially in areas outside Java.
3. Screening efforts for Scoliosis Diagnosis, doctors must change the conventional way of directly giving prescriptions to patients without involving orthotics. By providing socialization to the community and practitioners about the importance of scoliosis screening in children, especially those 9-12 years, early detection activities will be carried out optimally and increase self-awareness in the community.

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