COMPARISON OF MEAN TEARS EXAMINATION RESULTS OF SCHIRMER TEST I USING WHATMAN PAPER NO. 91 AND NO. 41 IN NORMAL PEOPLE

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ABSTRACT

**Purpose:** To prove that there was no difference between Whatman paper No. 91 with Whatman paper No. 41 in the Schirmer test I.

**Methods:** A cross sectional study was done in men and women labors, with the following criteria: more than 30 years old, had normal segment anterior and normal result for the Schirmer test I. Labors who seek overseas jobs usually have to pass general check up examination including their eyes health. This study compared the use of Whatman paper No. 91 and Whatman paper No. 41 using the Schirmer test I and determined the wet of each paper of each eye at the same time. The result of Schirmer test was noted and the data was analyzed using Kolmogorov-Smirnov Goodness of Fit Test. The paired T-test was applied to compare the normal distribution of Whatman paper No. 91 and No. 41. Provided that the data had normal distribution, the comparison of both Whatman paper No. 41 and No. 91 was analyzed using paired T-test. **Result:** The Kolmogorov-Smirnov Goodness and Fit Test showed that the data had normal distribution. Paired T-test was used to compare the result of Schirmer test I using paper Whatman No. 91 and No. 41 resulted in $p = 0.768$ ($p > 0.05$). The power analysis showed value of 78% in which it approaches 80%. This means that there was no difference of Schirmer test I using Whatman paper No. 91 and Whatman paper No. 41. **Conclusion:** Schirmer Test I using Whatman paper No. 91 and 41 revealed no significant different between those papers.

Keywords: mean tears examination, Schirmer test, Whatman paper no. 91, Whatman paper no. 41

INTRODUCTION

Since 150 years ago, Dry Eye Syndrome (DES) has already been recognized. It was a rare case, but nowadays it is a common problem afflicting 20% to 30% patients who come to Eye Clinic (Weil, 1983). Schirmer I research carried out by Fatma Asyari in 1984 in RSCM Jakarta using Whatman paper No. 41 examination showed 28.57% patients were diagnosed with DES compared with 29.32% using red lacmus examination. To date, there is no incidence of DES in Dr. Soetomo Hospital Surabaya. Hamdanah and M. Badri research in 1993 on the description of tears secretion based on age and sex showed that men and women under 30 years old had highest rate of tears secretion than the older people.

Schirmer test is a clinic test for measuring tears production (Otto Schirmer, 1903). This test uses a piece of Whatman paper No. 41 sized 5 x 40 mm. About 5 mm of the edge of this paper was folded and putting to the inferior fornix of eye at one third temporal. The length of the wet paper indicates the tear secretion. The cost of one piece of Whatman paper No. 41 with diameter 12.5 is Rp 1500 and it can be used to examine 20 patients. Thus, the price per person is Rp 75. In contrast, the price of Whatman paper No. 91 sized 58 x 58 cm is Rp 6000. Additionally, this paper can be used to examine 840 patients. Hence, the price of using the paper is lower i.e. only Rp 7 per person. Therefore the cost of Whatman paper No. 91 is 10 times cheaper than Whatman paper No. 41 (as a gold standard). The purpose of this study was to prove that there was no difference between Whatman paper No. 91 and Whatman paper No. 41 in the Schirmer test I.

MATERIAL AND METHODS

A. Material
1. Flash light
2. Slit Lamp Biomicroscope
3. Whatman paper No. 41 and No. 91 sized 40 x 5 mm each and were sterilized by *hot air oven* for 15 minutes.
4. Timer
5. Milimeter stainless steel ruler with steadler mark
6. Artificial tears eye drops

B. Methods
The site of this study was the General Check-Up Clinic, Dr Soetomo Hospital, Surabaya. The population was labor men and women who visited General Check-Up Clinic, Dr Soetomo Hospital, during the periods of October through December 2002. The following steps were undergone:

1. Taking the sample of men and women labors with the following criteria:
   a) Age $\leq$ 30 years old
   b) Willing to join the research
   c) Cooperative
   d) Had normal segment anterior
   e) Examination result of Schirmer test I was not hypo or hypersecretion
   f) Were not using contact lens, cholinergic and anti cholinergic drugs, $\beta$-blocker, psychotropic

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Comparison of Mean Tears Examination Results of Schirmer Test I

drugs; and no history of arthritis, ephifora, or Steven Johnson Syndrome.

2. Carrying out history taking to all labors (men and women) who were eligible for this study to identify the use of β blocker (timolol), cholinergic drugs (pilocarpin), anticholinergic drugs (atropin), psychotropic drugs (diazepam, phenotiazin), chlorpheniramine maleat and the history of Ephifora – Rheumatoid Steven Johnson Syndrome.

3. Next, the segment anterior examination was carried out using Slit Lamp Biomicroscope.

4. Following the normal result of the examination no. 3, the Schirmer test I was carried out using Whatman paper No. 41 for the right eye and Whatman paper No. 91 for the left eye. After 5 minutes, stainless steel millimeter ruler measured the length of wet paper. If necessary, appropriate adjustment of Millimeter scale ruler was applied for rounding up or down.

5. The labors having normal result of examination no. 4 i.e. ≥ 10 mm – 30 mm were selected as a sample.

6. The Schirmer Test I results were noted and compared.

RESULTS

The study was carried out between October to December, 2002. Total of 176 men and women labors under 30 years old were included.

Table 1. Sample based on sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number of labors</th>
<th>Number of eyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>153 (86.9%)</td>
<td>306 (86.9%)</td>
</tr>
<tr>
<td>Women</td>
<td>23 (13.1%)</td>
<td>46 (13.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>176 (100%)</td>
<td>352 (100%)</td>
</tr>
</tbody>
</table>

Table 1 shows that most of the participants were men and they accounted for 86.9% (306 labors) from the total participants.

Table 2. Sample based on the age

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number of labors</th>
<th>Number of eyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 – 20</td>
<td>33 (18%)</td>
<td>66 (18%)</td>
</tr>
<tr>
<td>21 – 25</td>
<td>95 (54%)</td>
<td>190 (54%)</td>
</tr>
<tr>
<td>26 – 30</td>
<td>48 (27.2%)</td>
<td>96 (27.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>176 (100%)</td>
<td>352 (100%)</td>
</tr>
</tbody>
</table>

This Table 2 illustrates 190 labors (54%) were 21 – 25 years old.

Table 3. Comparison of Schirmer test I using Whatman paper No. 41 and No. 91 based on sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Instrument</th>
<th>Mean</th>
<th>Std.Dev</th>
<th>Minimum (mm)</th>
<th>Maximum (mm)</th>
<th>Number of eyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>Whatman No. 41</td>
<td>20.09</td>
<td>6.69</td>
<td>10.00</td>
<td>34.00</td>
<td>153</td>
</tr>
<tr>
<td></td>
<td>Whatman No. 91</td>
<td>20.24</td>
<td>7.39</td>
<td>10.00</td>
<td>34.00</td>
<td>153</td>
</tr>
<tr>
<td>Women</td>
<td>Whatman No. 41</td>
<td>18.65</td>
<td>6.63</td>
<td>10.00</td>
<td>34.00</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Whatman No. 91</td>
<td>20.96</td>
<td>8.36</td>
<td>10.00</td>
<td>33.00</td>
<td>23</td>
</tr>
</tbody>
</table>

p = 0.768

Based on the Table 3, it describes that the mean different of Schirmer tests I using Whatman paper No. 91 and No. 41 in men labors group was only 0.15 mm whereas in women labors group had mean different of 31 mm.
Table 4. Comparison of Schirmer test I using Whatman paper No. 41 and No. 91 based on age

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Instrument</th>
<th>Mean (mm)</th>
<th>Std.Dev (mm)</th>
<th>Minimum (mm)</th>
<th>Maximum (mm)</th>
<th>Number of eyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-20</td>
<td>Whatman No. 41</td>
<td>19.85</td>
<td>6.07</td>
<td>10.00</td>
<td>34.00</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Whatman No. 91</td>
<td>20.36</td>
<td>6.63</td>
<td>10.00</td>
<td>32.00</td>
<td>33</td>
</tr>
<tr>
<td>21-25</td>
<td>Whatman No. 41</td>
<td>19.67</td>
<td>6.79</td>
<td>10.00</td>
<td>34.00</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>Whatman No. 91</td>
<td>19.80</td>
<td>7.15</td>
<td>10.00</td>
<td>34.00</td>
<td>95</td>
</tr>
<tr>
<td>26-30</td>
<td>Whatman No. 41</td>
<td>20.89</td>
<td>8.47</td>
<td>10.00</td>
<td>34.00</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Whatman No. 91</td>
<td>20.90</td>
<td>6.68</td>
<td>10.00</td>
<td>34.00</td>
<td>48</td>
</tr>
</tbody>
</table>

p = 0.768

According to the Table 4, it illustrates that mean different of Schirmer test I using Whatman paper No. 41 and No. 91 in age group between 15-20, 21-25 and 26-30 years old were 0.51, 0.13 and 0.01 mm, respectively.

Table 5 Comparison of Schirmer test I using Whatman paper No. 41 No. 91

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Mean (mm)</th>
<th>Std.Dev (mm)</th>
<th>Minimum (mm)</th>
<th>Maximum (mm)</th>
<th>Number of eyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whatman No. 41</td>
<td>20.03</td>
<td>7.29</td>
<td>10.00</td>
<td>34.00</td>
<td>176</td>
</tr>
<tr>
<td>Whatman No. 91</td>
<td>20.21</td>
<td>6.91</td>
<td>10.00</td>
<td>34.00</td>
<td>176</td>
</tr>
</tbody>
</table>

p = 0.768

Based on the Table 5, the mean different of Schirmer test I between Whatman paper No. 41 and No. 91 was almost similar.

DISCUSSION

From 176 people with 352 eyes in Table 1, it shows that most of the participants were men labors (86.9%) whereas the remaining (13.1%) were women. The data from 3349 labors (men and women) between October and November who visited Check Up Department showed that most of the visitors were men (3031 or 89.5%) and women only comprise of 318 or 10.5%. This was not surprising as those labors will be sent and distributed to Malaysia in Agrobusiness and Construction sectors that need more men than women.

Table 2 shows that only 18% of labors were under 20 years old and comprises of the smallest portion of the total participants. This is due to the reason that one of the employer’s requirements is the limitation of age in which the minimum age is 18 years old for overseas job application. In addition, the maximum age of overseas job seekers are determined by the type of jobs offered and the policy of the countries of destination.

In Table 3 shows the mean of Schirmer test I in men and women using Whatman paper No. 41 were 20.09 and 18.65 mm, respectively. These result were not similar with the study by Hamdanah and Badri (1993) on the description of tears secretion based on sex and age in which their study showed that for people under 30 years the mean result of Schirmer test I in men (24.25 mm) were lower than women (26.5 mm). This difference might be resulted from the number of sample in which this study used only 23 eyes whereas their study used 224 eyes. It is reasonable that the number of eyes examined is key determinant of the results of the study. Milder (1983) believed that women under 30 years old had the mean Schirmer test I results higher than men. However, the tears production in women will decrease more rapidly than men after the age of 30 years old.

Furthermore, this study showed that the mean result of Schirmer test I in men was 20.09 mm. When comparing this result with previous study by M. Badri and Hamdanah in men, their study showed lengthier result of 24.25 mm. It might be that the characteristic of their study i.e. involving younger subjects (0-10 and 11-20 years old) had the impact of this difference. Likewise, it is understood that the younger the subjects the longer of the wet paper.
The result of Schirmer test I based on age in Table 4 shows that labors of 26-30 years old had the highest results (20.89 mm), followed by labors of 15-20 years old (19.85 mm) and those of 21-25 years old as the lowest group (19.67 mm). This result were not similar with the previous study by Hamdanah and M. Badri (1993) in which their study showed the result of Schirmer test I in men as follow: 0-10 years old was 25.5 mm; 11-20 years old was 24.25 mm; and 21-30 years old was 23 mm. In women, their study showed that 0-10 years old was 30 mm; 11-20 years old was 27.5 mm; 21-30 years old was 22.5 mm. Nevertheless, these results cannot be compared with the current study because of the difference in using the age group.

Unfortunately, the result of Schirmer test I using Whatman paper No. 91 cannot be compared with any studies carried out previously. Until now, there is no study of Schirmer test I carried out using Whatman paper No. 91.

In conclusion, the Schirmer test I from 176 participants with 352 eyes using Whatman paper No. 41 resulted in the minimum result of 10 mm and the maximum of 34 mm with the standard deviation of 7.29 and the mean result was 20.03 mm. Moreover, the minimum and maximum results using Whatman paper No. 91 were 10 mm and 34 mm, respectively. The standard deviation was 6.91 and the mean result was 20.21 mm. These data were analyzed with normal distribution test using Kolmogorov Smirnov Goodness of Fit and resulted in probability value of 0.76 (p > 0.05). Based on the test, the data had normal distribution and paired t-test analysis (parametric statistic test) was used for subsequent analysis and resulted in probability p = 0.768 (p > 0.05). Additionally, the power analysis showed power of 78% in which it approaches 80% in which it showed that there was no different between Whatman paper No. 41 and No. 91 using Schirmer test I.

CONCLUSION

There was no significant different between Schirmer test I results using Whatman paper No. 41 and No. 91.

REFERENCES


