Gender Variation of Finger Print Pattern Variation among the Patients of Poliomyelitis

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ABSTRACT
Aim: To describe gender variation of finger prints pattern in poliomyelitis patients and to support the evidence of court of law regarding identification of persons.
Study Design: Observational descriptive study
Place and duration of study: Study was conducted at Avicenna Medical College, Lahore and data was collected from the Medical OPD of Children Hospital and Institute of Child Health, Lahore
Methods: Finger prints were collected from the subjects after obtaining their informed consent from month of November 2011 to August 2012. A total of 100 diagnosed patients were selected from the Medical OPD of Children Hospital and Institute of Child Health, Lahore and data were analyzed at Avicenna Medical College Lahore. Finger prints were recorded on a plain white paper with a stamp pad by plain and rolled method.
Results: One hundred patients participated in these studies which were all known case of poliomyelitis. Out of these one hundred patients the majority of male patients were belonging to Loop pattern of finger prints i.e., 30(30%) where as the second most common pattern in males were Whorl 15%, and third common pattern was composite 10% and very least pattern was Arch 5% only. In females most common pattern was whorl 18%, second most common was loop 16% and third pattern was composite was only 6%.
Conclusion: Each fingerprint is unique hence it can be very effectively used as an evidence for identification in the court of law. Majority of male patients were belonging to Loop pattern of finger prints followed by Whorl pattern, and third common pattern was composite and very least pattern was Arch.

Keywords: Gender variation, finger print, poliomyelitis

INTRODUCTION
Poliomyelitis (polio) is a highly infectious viral disease, which mainly affects young children. Polio (poliomyelitis) mainly affects children under five years of age. The virus is transmitted through contaminated food and water, and multiplies in the intestine, from where it can invade the nervous system. Many infected people have no symptoms, but do excrete the virus in their faeces, hence transmitting infection to others.(1) Poliomyelitis often called polio or infantile paralysis is an acute, viral, infectious disease spread from person to person, primarily via the fecal-oral route5. The term derives from the Greek poliós meaning "grey", myelós “marrow”, referring to the grey matter of the spinal cord, and the suffix -itis, which denotes inflammation6. Initial symptoms of polio include fever, fatigue, headache, vomiting, stiffness in the neck, and pain in the limbs. In a small proportion of cases, the disease causes paralysis, which is often permanent. Polio can only be prevented by immunization.(1) A global effort to eradicate polio began in 1988, led by the World Health Organization, UNICEF, and The Rotary Foundation. These efforts have reduced the number of annual diagnosed cases by 99%; from an estimated 350,000 cases in 1988 to a low of 483 cases in 2001, after which it has remained at a level of about 1,000 cases per year (1,606 in 2009)5,6,7. A number of eradication milestones have already been reached, and several regions of the world have been certified polio-free. The Americans were declared polio-free in 19948. In 2000 polio was officially eliminated in 36 Western Pacific countries, including China and Australia8,10. Europe was declared polio-free in 200211. As of 2012, polio remains endemic in only three countries: Nigeria, Pakistan, and Afghanistan5,12. Although it continues to cause epidemics in other nearby countries due to hidden or reestablished transmission12. A finger print is the pattern on the inside of the finger in the area between

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the tip and the first joint, and stays the same from the
day of a person’s birth to the day he dies. These two
facts make fingerprints very useful in identifying
somebody beyond any doubt, and this is why police
forces find them invaluable in tracking down a
criminal. Epidermal ridges are formed between 11th
and 24th week of gestation; after this period
epidermal ridges do not change. The critical growth
of the brain is also occurring during this period. Since
the skin and brain develop from the same ectoderm,
dermatoglyphic variations are informative for early
developmental brain disturbances. There are three
basic patterns of finger prints Named Arch, Loop, and
Whorl. Arch can further be classified into tented and
loop arches with further sub divisions into Radial and
Ulnar variety. The whorls type is divided into five sub
groups- Simple, central packed loop, twinned loop,
lateral packed loop and accidental. The pattern
area is the part of a loop or whorl which contains the
core delta and ridges. Total finger ridges count is the
most inheritable feature in dermatoglyphics. The
most common pattern, a simple Loop (60-70%) is
characterized by single triradius, is not advantageous
for tactile perception and precession group. Whorl
has two triradi yielding two central, while simple
arches have no true triradi, resulting in zero
count. Finger prints are also useful in medical
diagnosis of genetically inherited diseases and in
detection of crimes. Finger prints collected at a crime
scene can be used to identify perpetrator of crime,
victims and other persons who touched the surface.
Finger prints scan can be used to validate electronic
registration, cash less catering, library access
especially in school and colleges and office
attendance. The secretions in the fingerprints contain
residues of various chemicals and metabolites which
can be detected and used for the forensic
purposes. A considerable improvement has been
achieved in the concept of relation between the type
of patterns of lines on the fingers and some individual
disorders. The dermatoglyphic pattern in
patients of poliomyelitis is an interesting matter and
little information is available about this relationship.
The objective of this study is to find the association
between the male and female finger print pattern in
poliomyelitis disease and helps in the evidence of
court of law regarding identification of persons.

MATERIALS AND METHODS

Finger prints were collected from the patients after
obtaining their informed consent in the month of
November, 2011 to August 2012. A total of 100
known case of poliomyelitis patients were selected
from Medicine OPD of children hospital and Institute
of Child Health and data were analyzed at Avicenna
Medical College Lahore. Finger prints were recorded
on a plain white paper with a stamp pad by plain and
rolled method and each finger print was assigned by
their Name, Age, Sex, and were recorded on the
Proforma. Ethical clearance was obtained from the
institutional Ethical Committee. The study design was
descriptive one. Patients of either sex diagnosed as a
case of Poliomyelitis subjects belonging to and any
ridge pattern of finger prints were included in the
study. Patients suffering from any chronic skin
disease e.g. eczema, leprosy and chronic dermatitis,
having scars, congenital or acquired anomalies due
to trauma on fingers were excluded from this study. A
proforma was designed in which data including
name, age, and sex were entered. Impression of all
fingers and thumbs of both hands were taken. The
impressions were taken by simple plain and rolled
method. Screening of finger prints were done by
using magnifying lens and scanner.

RESULTS

<table>
<thead>
<tr>
<th>Pattern of finger print</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arch</td>
<td>05</td>
<td>0</td>
</tr>
<tr>
<td>Loop</td>
<td>30</td>
<td>16</td>
</tr>
<tr>
<td>Whorl</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Composite</td>
<td>10</td>
<td>06</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

Analysis in this study was descriptive. A total of one
hundred patients participated in this study which were
all known case of poliomyelitis. Out of these one
hundred patients the majority of male patients were
belonging to Loop pattern of finger prints i.e.,
30(30%) where as the second most common pattern
in males were Whorl 15%, and third common pattern was composite 10% and very least pattern was Arch 5% only. In females most common pattern was Whorl 18%, second most common was loop 16%, and third pattern was composite was only 6%. There is need to develop a detailed and vast study to explore the association of finger print pattern with poliomyelitis patients. This study offered sensible weighting on distribution of finger print pattern among the poliomyelitis patients.

**DISCUSSION**

A number of studies have indicated dermatoglyphic correlation in a large number of genetic disorders, which include diabetes mellitus23, Schizophrenia24, Congenital heart disease25, and down syndrome26. Identification is a set of individual physical characteristics, functional or psychic, normal or pathological that defines an individual27. Dermatoglyphic is a scientific method for anthropological, medico legal and genetic studies. In our study we found Out of these one hundred poliomyelitis patients the majority of male patients were belonging to Loop pattern of finger prints i.e., 30(30%) where as the second most common pattern in males was Whorl pattern i.e., 15%, and third common pattern was composite 10% and very least pattern was Arch 5% only. In females most common pattern was whorl 18%, second most common pattern was loop 16% , and third pattern was composite was only 6%. The reason for such type of result might be due to sampling fluctuation, or the sample size is not adequate, sampling error or these two variables are independent and do not effect each other28. Limitations of study it was only limited to Medical OPD of Children Hospital and Institute of Child Health patients and Limited only to poliomyelitis patients. The study was conducted on small and selected area, if it will be conducted on Nationwide on larger scale findings might be different and useful. The role of finger printing should not be underestimated and the patterns of finger prints are unique to each and every individual due to their uniqueness they can be used to identify the culprits at crime scene and blast injuries and in mass disaster injuries and as well as for national identification24.

**CONCLUSION**

- Each fingerprint is unique hence it can be very effectively used as an evidence for identification in the court of law.
- Majority of male patients were belonging to Loop pattern of finger prints followed by Whorl pattern and third common pattern was composite and very least pattern was Arch. In females most common pattern was Whorl followed by Loop and third pattern was composite.

**Recommendations:**

- Similar studies should be conducted on a larger sample at a National level so as to increase the accuracy of prediction.
- There is a need to evaluate the finger printing in genetical diseases along with familial diseases.
- There is a need to utilize NADRA fingerprinting data bank for research purpose.
- There should be finger printing data bank of patients especially in genetical and familial disorders in hospitals for research purpose.

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